



Family and School Predictors of Tobacco Use in Chilean Adolescents Aged 13 - 14: A National Study

Alejandra Rodríguez-Fernández^{1,*}, Eduard Maury-Sintjago¹ and Julio Parra-Flores¹

¹Department of Nutrition and Public Health, Bio-Bío University, Chillán, Chile

*Corresponding author: Department of Nutrition and Public Health, Bio-Bío University, Chillán, Chile. Tel: +56-422463076, Email: alrodriguez@ubiobio.cl

Received 2020 January 07; Revised 2020 March 23; Accepted 2020 March 27.

Abstract

Objectives: Adolescent smoking is a major health care concern which calls for a more in-depth study of the factors affecting this pediatric disease. We aimed to determine the prevalence of tobacco use among Chilean adolescents aged 13 - 14 and its association with family and school factors.

Methods: This was a cross-sectional analytical study. Data from the Eleventh Chilean National Study of Drugs in the School Population 2015 were used (n = 11,791). School and family variables of parental control were evaluated and analyzed by the chi-Square test and a multivariate logistic regression model. Data were processed with the STATA V.14.0 software at the $\alpha = 0.05$ level of significance.

Results: The prevalence of tobacco use at some time during life was 36% with onset age of 11.4 ± 3.6 years. Girls smoke proportionally more than boys (40.5% and 31.5%, respectively). Parental monitoring decreased use and acted as a protective factor (OR: 0.41, 95%CI: 0.375 - 0.468); likewise for good school performance (OR: 0.52, 95%CI: 0.475 - 0.584). In turn, running away from school raises the risk of smoking (OR: 2.34, 95%CI: 2.03 - 2.72).

Conclusions: There is a feminization of cigarette use, and the risk of cigarette smoking increases considerably among adolescents who run away from school. However, parental control and school performance are powerful protective factors against early tobacco use.

Keywords: Smoking, Adolescents, Parental Control, School Performance, Risk Factors

1. Background

Smoking is one of the main public health problems worldwide because of its magnitude, social and health consequences, and high public expenditure (1, 2). Smoking is highly related to the occurrence of chronic diseases such as cancer and cardiometabolic, cerebrovascular, and respiratory diseases, which have a major impact on the increase of all types of morbidity and mortality worldwide (3-5). Tobacco use in middle-aged individuals is expected to be the most important risk factor for premature death of men and women by 2025 (6).

Since the initiation of tobacco use usually occurs during adolescence, it has been considered a pediatric disease, which is caused by the interaction of many factors such as psychological, social, educational, and family (7-9).

Diverse studies have emphasized the important role of both family and school to prevent and control tobacco use (10-12). However, studies evaluating the aspects related to the family environment and its influence on the onset of smoking in children and adolescents are still limited in Latin America.

2. Objectives

The objective of the present study was to determine the prevalence of tobacco use in Chilean adolescents aged 13 - 14 and its association with family and school factors. We hypothesize that parental control and better school performance are protective factors against tobacco use, whereas running away from school would be a risk factor.

3. Methods

3.1. Population

This was a cross-sectional analytical study. Data from the Eleventh Chilean National Study of Drugs in the School Population 2015 (13) were used; these data belong to the National Service for Prevention and Rehabilitation of Drug and Alcohol Use of the Chilean Ministry of Home Affairs and Public Security. The probabilistic sample consisted of 11,791 adolescents across the 15 political regions in Chile, who met the following inclusion criteria: had used tobacco

at some time in their lives and complete information regarding age and sex; adolescents over 15 years were excluded.

3.2. Sociodemographic, Family, and School Variables

The sociodemographic variables were sex, age, and parental education (< 12 years; ≥ 12 years). Family variables included three questions referring to parental control (PC): (1) *PC weekdays and weekends* (Do parents know their children's whereabouts during the week and on weekends?), (2) *PC school* (Are parents aware of their children's school activities?), and (3) *PC friends* (Do parents know their children's circle of friends?). The variables related to school included two questions about school performance (grade point average ≤ 5.4 or ≥ 5.5 on a scale of 1 - 7) and running away from school (Has your child left school without authorization?).

The study was reviewed and approved by the Bioethics and Biosecurity Committee of the Universidad del Bío-Bío.

3.3. Statistical Analysis

The statistical analysis included bivariate analysis by chi-Square and a multivariate logistic regression model adjusted for sex and age in which the association between tobacco use at some time during life with family and school variables by odds ratio (OR) and confidence interval (CI = 95%). Model adjustment was evaluated by the Hosmer and Lemeshow test. Data processing was performed with the STATA V. 14.0 software at $\alpha = 0.05$ level of significance.

4. Results

Distribution by sex was 50.2% girls and 49.8% boys with a mean age of 13.7 ± 0.06 years. Parental education (56.3% father and 56.6% mother) was generally < 12 years. The prevalence of tobacco use at some time during life was 36% with an onset age of 11.4 ± 3.6 years (data not shown).

There are significant statistical differences in the prevalence of tobacco use according to sex, which was higher for girls than boys (40.5% and 31.5%, respectively) ($P < 0.001$). Adolescents whose parents had < 12 years of education had higher tobacco use. The PC weekdays and weekends, PC school, and PC friends was significantly related with prevalence, and these were lower in all the cases in which there was PC. The prevalence of tobacco use in adolescents who had run away from school was higher (59.8%) than those who had not (32.4%). Subjects with a grade point average ≤ 5.4 exhibited higher prevalence (41.7%) than those with higher averages (24.7%) (Table 1).

The logistic regression model shows that running away from school increases the risk of smoking (OR: 2.34, 95%CI: 2.03 - 2.72). Variables related to PC in all cases, as

well as good school performance, acted as protective factors. Values for PC were: PC weekdays and weekends OR: 0.41 and 95%CI: 0.375 - 0.468, PC of closest friends OR: 0.89 and 95%CI: 0.812 - 0.979, PC school OR: 0.89 and 95%CI: 0.812 - 0.979, and school performance ≥ 5.5 OR: 0.52 and 95%CI: 0.475 - 0.584 (Table 2).

5. Discussion

The use of harmful substances such as alcohol, drugs, and tobacco increases morbidity and mortality in the medium and long term in children and adolescents (14). Despite the efforts that countries have made to remediate the situation, these appear to be insufficient since trends continue to rise (15).

In our study, the group of girls showed a higher prevalence of smoking habits (40.5%) compared with the boys (31.5%); these results are similar to those reported by the Global Youth Tobacco Survey (GYTS) which shows evidence of the feminization of tobacco use (16). The tobacco industry has been described as using marketing strategies based on female behavior to create products that encourage female tobacco use (17). Important gender differences have been described in smoking behavior; however, further research is needed to explore these relationships (18).

Among the many factors associated with adolescent smoking, those related to family (PC) and school (school performance) are particularly relevant. The present study found that effective PC on weekdays, school activities, and knowledge of their children's circle of friends, in addition to having better school performance are protective factors against tobacco use.

Nosa et al. studied adolescents in New Zealand and found a higher prevalence of tobacco use in adolescents whose parents were more permissive or without any PC compared with those with PC (11.2% vs. 6.4%, respectively); however, no association these two was encountered (OR 1.490, 95%CI: 0.970 - 2.270) (19). Less PC can be due to many factors, but it appears to be more related to an underestimation of the effects of smoking compared with other drugs and to the family's perception regarding the responsibility of tobacco companies in the population's smoking habits (20, 21). In a study of Swedish adolescents, the increase in the proportion of those who had never smoked was largely due to parental intervention (22).

In our study, we found that those adolescents who ran away from school on one or more occasions were at greater risk of early smoking habits. These results are similar to those reported by Malta et al. who showed that Brazilian adolescents that ran away from school once or twice without parental consent were at greater risk of tobacco use (OR: 2.7, 95%CI: 2.3 - 3.2), which increased when they ran away from school more than twice (OR: 5.4, 95%CI: 4.4 -

Table 1. Prevalence of Tobacco Use in Chilean Adolescents According to Sociodemographic, Family, and School Variables

Sociodemographic, Family, and School Variables	Tobacco Use at Some Time During Life		Chi ²	Cramer's V	P Value
	Yes, No. (%)	No, No. (%)			
Sociodemographic					
Sex					
Male	1852 (31.5)	4026 (68.5)	103.15	0.094	< 0.001
Female	2394 (40.5)	3519 (59.5)			
Education (mother)					
< 12 years	2569 (39.1)	4017 (60.9)	42.34	0.060	< 0.001
≥ 12 years	1728 (33.2)	3477 (66.8)			
Education (father)					
< 12 years	2533 (38.8)	3999 (61.2)	48.38	0.064	< 0.001
≥ 12 years	1714 (32.6)	3545 (67.4)			
Family					
PC weekdays and weekends					
Yes	1066 (43.3)	1397 (56.7)	576.23	0.221	< 0.001
No	6473 (69.4)	2855 (30.6)			
PC school					
Yes	685 (48.5)	727 (51.5)	164.75	0.118	< 0.001
No	6850 (66.0)	3529 (34.0)			
PC friends					
Yes	3617 (60.0)	2412 (40.0)	88.12	0.086	< 0.001
No	3935 (68.3)	1827 (31.7)			
Run away from school					
Yes	902 (59.8)	607 (40.2)	428.62	0.197	< 0.001
No	3331 (32.4)	6951 (67.6)			
Grade point average (scale of 1-7)					
≤ 5.4	3165 (41.7)	4425 (58.3)	340.33	0.169	< 0.001
≥ 5.5	1038 (24.7)	3163 (75.3)			

Abbreviation: PC, parental control.

Table 2. Logistic Regression Model for the Association Between Tobacco Use and Family and School Variables^a

Variables	OR _{Gross}	95% Confidence Interval	OR _{Adjusted}	95% Confidence Interval
Parents know their children's whereabouts during the week and on weekends	0.336	0.307 - 0.368	0.414	0.375-0.468
Grade point average ≥ 5.5 ^b	0.457	0.419 - 0.497	0.527	0.475 - 0.584
Parents are aware of school activities	0.483	0.431 - 0.541	0.755	0.6543 - 0.871
Parents know their children's circle of friends	0.692	0.641 - 0.747	0.892	0.812 - 0.979
Children have run away from school on one or more occasions	3.110	2.770 - 3.490	2.346	2.025 - 2.716

^aModel adjusted for sex and age.^bIn Chile, grades range from 1.0 to 7.0.

6.6) (23). Likewise, it has been observed that adolescents from the United States, Spain, and Brazil who do not attend school and run away from school or their homes are at greater risk of alcohol consumption, criminal behavior, and/or increased sexual victimization.

5.1. Limitations

The limitations of this study mainly pertain to using a database which does not consider some variables that could be relevant to explain the phenomenon.

5.2. Conclusions

We found that the feminization of smoking persists, and this is similar to the world trend. The risk of cigarette smoking increases considerably in those adolescents who run away from school. However, parental control and school performance are powerful protective factors of early tobacco use. These aspects must be considered for an early intervention of the smoking habit in this age group.

Acknowledgments

The authors thank the National Service for Prevention and Rehabilitation of Drug and Alcohol Use (SENDA) of the Chilean Ministry of Home Affairs and Public Security for their permission to use the database. All results from the study or research are the responsibility of the authors and in no way involve that institution.

Footnotes

Authors' Contribution: Alejandra Rodríguez-Fernández conceived and designed the study, analyzed and interpreted the data, revised and approved the final manuscript. Julio Parra-Flores and Eduard Maury-Sintjago designed the study, and discussed, revised, and approved the final manuscript.

Conflict of Interests: The authors declare no conflict of interest.

Ethical Approval: The study was reviewed and approved by the Bioethics and Biosecurity Committee of the Universidad del Bío-Bío.

Funding/Support: There was no financing for this study.

References

- Ginsberg GM, Geva H. The burden of smoking in Israel-attributable mortality and costs (2014). *Isr J Health Policy Res.* 2014;**3**:28. doi: 10.1186/2045-4015-3-28. [PubMed: 25258677]. [PubMed Central: PMC4164333].
- World Health Organization. *Tobacco*. 2017, [cited Aug. 18, 2018]. Available from: <https://www.who.int/es/news-room/fact-sheets/detail/tobacco>.
- Dunbar A, Gotsis W, Frishman W. Second-hand tobacco smoke and cardiovascular disease risk: an epidemiological review. *Cardiol Rev.* 2013;**21**(2):94-100. doi: 10.1097/CRD.0b013e31827362e4. [PubMed: 22968181].
- Maury-Sintjago E, Parra-Flores J, Rodríguez-Fernández A. Co-occurrence of Cardiometabolic Disease Risk Factors: Unhealthy Eating, Tobacco, Alcohol, Sedentary Lifestyle and Socioeconomic Aspects. *Arquivos Brasileiros de Cardiologia.* 2019;**113**:710-1.
- Jayes L, Haslam PL, Gratzou CG, Powell P, Britton J, Vardavas C, et al. SmokeHaz: Systematic Reviews and Meta-analyses of the Effects of Smoking on Respiratory Health. *Chest.* 2016;**150**(1):164-79. doi: 10.1016/j.chest.2016.03.060. [PubMed: 27102185].
- Bilano V, Gilmour S, Moffiet T, d'Espaignet ET, Stevens GA, Commar A, et al. Global trends and projections for tobacco use, 1990-2025: an analysis of smoking indicators from the WHO Comprehensive Information Systems for Tobacco Control. *Lancet.* 2015;**385**(9972):966-76. doi: 10.1016/S0140-6736(15)60264-1. [PubMed: 25784347].
- Sargent JD, Gabrielli J, Budney A, Soneji S, Wills TA. Adolescent smoking experimentation as a predictor of daily cigarette smoking. *Drug Alcohol Depend.* 2017;**175**:5-9. doi: 10.1016/j.drugalcdep.2017.01.038. [PubMed: 28391086]. [PubMed Central: PMC5443410].
- Wetter DW, Kenford SL, Welsch SK, Smith SS, Fouladi RT, Fiore MC, et al. Prevalence and predictors of transitions in smoking behavior among college students. *Health Psychol.* 2004;**23**(2):168-77. doi: 10.1037/0278-6133.23.2.168. [PubMed: 15008662].
- Ahmad A, Khaligur N, Khan Z. Analysis of substance abuse in male adolescents. *Iran J Pediatr.* 2009;**19**(4):399-403.
- Joung MJ, Han MA, Park J, Ryu SY. Association between Family and Friend Smoking Status and Adolescent Smoking Behavior and E-Cigarette Use in Korea. *Int J Environ Res Public Health.* 2016;**13**(12). doi: 10.3390/ijerph13121183. [PubMed: 27898019]. [PubMed Central: PMC5201324].
- Bird Y, Staines-Orozco H, Moraros J. Adolescents' smoking experiences, family structure, parental smoking and socio-economic status in Ciudad Juárez, Mexico. *Int J Equity Health.* 2016;**15**:29. doi: 10.1186/s12939-016-0323-y. [PubMed: 26897609]. [PubMed Central: PMC4761169].
- Goksan Yavuz B, Erensoy IY, Karamustafalioglu O, Bakim B, Gundogar A. Effects of Parental Attitudes Among a Group of High School Students in Istanbul. *Noro Psikiyatr Ars.* 2015;**52**(1):19-23. doi: 10.5152/npa.2015.6871. [PubMed: 28360670]. [PubMed Central: PMC5352994].
- National Service for the Prevention and Rehabilitation of Drug and Alcohol Use. *Mystery of the interior and public security. Data observatory.* [cited March 10, 2018]. Available from: <http://www.senda.gob.cl/observatorio/estadisticas/poblacion-general/>.
- Choi SH, Stommel M. Impact of Age at Smoking Initiation on Smoking-Related Morbidity and All-Cause Mortality. *Am J Prev Med.* 2017;**53**(1):33-41. doi: 10.1016/j.amepre.2016.12.009. [PubMed: 28169018].
- Pan American Health Organization. *Report on tobacco control in the region of the Americas.* Washington, D.C.; 2018. Available from: <http://iris.paho.org/xmlui/handle/123456789/49237>.
- Pan American Health Organization. *Youth and tobacco in the region of the Americas. Results of the world youth tobacco survey (2010 - 2017).* Washington, D.C: OPS; 2018.
- Alcantara Silva T, Ivo ML, Felix de Freitas SL, Almeida Carvalho AM, Jardim Cury Pontes ER, de Freitas Monteiro F, et al. Interfering factors to the abandonment of smoking cigarettes for the participants of the National Program for Tobacco Control. *International Archives of Medicine.* 2016;**9**(175):1-9. doi: 10.3823/2046.
- Allen AM, Scheuermann TS, Nollen N, Hatsukami D, Ahluwalia JS. Gender Differences in Smoking Behavior and Dependence Motives Among Daily and Nondaily Smokers. *Nicotine Tob Res.* 2016;**18**(6):1408-13. doi: 10.1093/ntr/ntv138. [PubMed: 26136526]. [PubMed Central: PMC4906260].
- Nosa V, Gentles D, Glover M, Scragg R, McCool J, Bullen C. Prevalence and risk factors for tobacco smoking among pre-adolescent Pacific children in New Zealand. *J Prim Health Care.* 2014;**6**(3):181-8. [PubMed: 25194244].
- Glover M, Kira A, Min S, Scragg R, Nosa V, McCool J, et al. Smoking is rank! But, not as rank as other drugs and bullying say New Zealand parents of pre-adolescent children. *Health Promot J Austr.* 2011;**22**(3):223-7. doi: 10.1071/hei1223. [PubMed: 22497067].
- Smith A, McCool J, Paynter J, Newcombe R. Youth opinions of tobacco control in New Zealand: support for specific measures and the relationship with smoking behaviors among 14-15-year-olds. *Nicotine Tob Res.* 2012;**14**(4):479-85. doi: 10.1093/ntr/ntn239. [PubMed: 22319558].
- Nilsson M, Weinehall L, Bergstrom E, Stenlund H, Janlert U. Adolescent's perceptions and expectations of parental action on children's smoking and snus use; national cross sectional data from three decades. *BMC Public Health.* 2009;**9**:74. doi: 10.1186/1471-2458-9-74. [PubMed: 19261172]. [PubMed Central: PMC2664804].
- Malta DC, Porto DL, Melo FC, Monteiro RA, Sardinha LM, Lessa BH. Family and the protection from use of tobacco, alcohol, and drugs in adolescents, National School Health Survey. *Rev Bras Epidemiol.* 2011;**14** Suppl 1:166-77. doi: 10.1590/s1415-790x2011000500017. [PubMed: 22002153].