SciELO Preprints

Status: Preprint has been published in a journal as an article
DOI of the published article: https://doi.org/10.34119/bjhrv4n4-246

Subjective knowledge of school adolescents about the health effects of smoking and association with smoking status

Leonardo Essado Rios, Maria do Carmo Matias Freire

https://doi.org/10.1590/SciELOPreprints.2158

Submitted on: 2021-04-21
Posted on: 2021-04-23 (version 1)
(YYYY-MM-DD)

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

Subjective knowledge of school adolescents about the health effects of smoking and association with smoking status

Conhecimento subjetivo de escolares adolescentes sobre os efeitos do tabagismo na saúde e associação com status tabágico

Leonardo Essado Rios (https://orcid.org/0000-0002-3096-9141)[1]

Maria do Carmo Matias Freire (https://orcid.org/0000-0001-6078-6728)[2]

[1] Instituto Federal de Goiás. Av. Universitária s/n, Vale das Goiabeiras. 75402-556 Inhumas GO Brasil. leonardo.rios@ifg.edu.br

[2] Programa de Pós-graduação em Odontologia, Faculdade de Odontologia, Universidade Federal de Goiás. Av. Universitária s/n, Setor Leste Universitário. 74605-020 Goiânia, GO Brasil.

Abstract *This study aimed to assess the subjective knowledge (SK) of adolescents about the health effects of smoking and association with smoking status. A cross-sectional school survey was carried out in Goiás, Midwestern Brazil. Participants were 3034 students aged 13-19. SK was assessed by three questions about 'How do you evaluate your knowledge on:' (1) 'Effects of smoking on the general health of people who smoke', (2) 'Effects of smoking on the oral health of people who smoke', (3) 'Effects of other people smoking on the health of people who do not smoke (passive smokers)'. Smoking status categories were never-smoker, former smoker, and smoker. Poisson regression was used in the statistical analysis. Prevalence ratios and 95% confidence intervals (CI) are reported. About half of the participants had low SK about general health effects of smoking, and most had low SK about oral health (62.9%) and second-hand effects (61.5%). Compared with smokers and former smokers, never-smokers were more likely to have low SK about general (1.52; 95%CI=1.25-1.85), oral (1.17; 95%CI=1.03-1.32) and second-hand effects (1.21; 95%CI=1.16-1.38) of smoking. Adolescents' SK about the health effects of smoking tended to be low, especially among never smokers.*

Key words *Adolescent, Knowledge, Smoking*

Resumo *O estudo visou avaliar o conhecimento subjetivo (CS) de adolescentes sobre os efeitos do tabagismo na saúde e associação com status tabágico. Realizou-se um inquérito escolar transversal no estado de Goiás. Participaram 3.034 alunos de 13-19 anos. O CS foi avaliado por três perguntas sobre 'Como você avalia seu conhecimento sobre:' (1) 'Efeitos do cigarro na saúde geral das pessoas que fumam', (2) 'Efeitos do cigarro na saúde bucal das pessoas que fumam', (3) 'Efeitos da fumaça do cigarro na saúde das pessoas que não fumam (fumantes passivos)'. As categorias do status tabágico foram nunca fumante, ex-fumante e fumante. Regressão de Poisson foi utilizada na análise estatística. Razões de prevalência e intervalos de confiança (IC) de 95% são reportados. Cerca de metade dos participantes tinha CS baixo sobre efeitos do tabagismo na saúde geral, e a maioria tinha CS baixo sobre efeitos na saúde bucal (62,9%) e efeitos do fumo passivo (61,5%). Comparados aos fumantes e ex-fumantes, os nunca fumantes foram mais propensos a ter baixo CS sobre o efeito na saúde geral (1,52; IC 95% = 1,25-1,85), oral (1,17; IC 95% = 1,03-1,32) e efeitos do fumo passivo (1,21; IC 95% = 1,16-1,38). O CS dos adolescentes sobre os efeitos do tabagismo na saúde tende a ser baixo, especialmente entre os que nunca fumaram.*

Palavras-chave *Adolescente, Conhecimento, Tabagismo*

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

INTRODUCTION

Smoking and exposure to tobacco smoke negatively impact health with the development of several chronic non-communicable diseases, diseases of the respiratory system and contagious diseases[1]. In the oral cavity, smoking also causes a devastating effect, causing neoplasms and contributing to the etiology of periodontal diseases[2].

Among the various forms of presentation of tobacco products, smoked combustible cigarettes remain the most used worldwide[3]. Given that most adult smokers started smoking during adolescence[4], the adolescent population is one of the most important target groups for preventing smoking initiation[1,3]. Among the adolescent smokers, it is essential to promote smoking cessation interventions[1].

Many adolescents may not be aware that smoking is harmful for their health[4-9], especially regarding second-hand smoking[10-13] and oral health effects[14]. A lack of knowledge about the hazards of smoking has been described as a predictor of smoking status[13,15-18] and susceptibility to smoking[19-21] in this population group. Adolescents from Aboriginal and Black groups may be less likely than White adolescents to link smoking to health effects[22]. Also, male students have been found to have less knowledge of the health hazards of smoking than their female counterparts[23].

Previous studies on adolescents' knowledge about smoking effects on health have focused on their objective knowledge measured by an objective test, instead of their subjective knowledge (SK). SK refers to the knowledge that individuals perceive to have[24-26]. The measurement of SK about a product among its users or potential users is important because it can indicate not only their knowledge levels, but also their level of self-confidence about what they know[24-26].

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

Furthermore, the extant literature typically analyzed knowledge about smoking effects on health as a predictor of adolescent smoking. As the main global strategy to warn people about the harmful effects of cigarettes has been to warn smokers through the packaging of tobacco products[1], it can be suggested that smoking status has assumed the role of predictor of this knowledge among adolescents.

As consumers or potential consumers of both tobacco products and antitobacco messages, how do the adolescents evaluate their level of knowledge about the health effects of smoking? In this study, the aim was to assess the SK of adolescents about the health effects of smoking and association with smoking status.

METHODS

We carried out a cross-sectional school survey. Participants were adolescent students from the Federal Institute of Education Science and Technology of Goiás (IFG). This is a public educational institution that has high schools in 13 municipalities of Goiás, in the Midwest region of Brazil, including one of the Brazilian capital cities. All the IFG schools (n=14) took part in the survey.

The sample size was calculated using the online OpenEpi tool and the following parameters for calculating proportions: (1) estimated population of IFG high school students in 2018, aged up to 19 years old (n=3694); (2) 5.9% expected frequency of current cigarette use (in the last 30 days) and 19.4% of cigarette experimentation, based on prevalence among Brazilian public school students aged 16 to 17 found by the National School Student Health Survey in 2015; (3) 2% sample error; and (4) 95% confidence interval. The minimum number estimated for the sample was 467 students for the ‘current smoker’ outcome and 1068 for the ‘tobacco use experimentation’ outcome. To ensure the sample size, all the IFG high-school students aged between 13 and 19 years old who were

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

attending classes when the data were collected were invited to participate in the survey (n=3043).

The survey protocol was approved by the Research Ethics Committee (REC) of the sponsor institution, the Federal University of Goiás, Brazil (Approval #2142027). The REC exempted the survey from obtaining formal permissions from parents or guardians of underage adolescents (Approval #2431088). Subsequently, the protocol was approved by the REC of the institution where data were collected (Approval #2556510). Formal authorizations were given by school administrators, and all the participants signed informed consent forms.

Data were collected in a self-administered printed questionnaire, including validated scales and a set of questions specifically designed for this survey. The new questions were based on a literature review and later assessed by a group of six PhD researchers with experience in studies based on health questionnaires. The instrument was also pre-tested in a sample of 14 adolescents who were not part of the study's target population[27].

The outcome variables were low SK in relation to general and oral health, and second-hand effects of smoking. The choice for these three variables was based on the health content in cigarette pack warnings in Brazil. Questions were:

'How do you evaluate your knowledge about'

(1) 'Effects of smoking on the general health of people who smoke'

(2) 'Effects of smoking on the oral health of people who smoke'

(3) 'Effects of other people smoking on the health of people who do not smoke (passive smokers)'

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

The answer categories for each question were: ‘no knowledge’, ‘little knowledge’, ‘average knowledge’, ‘good knowledge’, or ‘excellent knowledge’. Based on the responses, the sample was divided into low SK (no + little + average knowledge) and high SK (good + excellent).

The main independent variable was the adolescents’ smoking status, which was obtained in two yes/no questions: (1) ‘Have you ever tried smoking cigarettes, even one or two puffs?’, (2) ‘Currently, do you smoke cigarettes? (Select **yes** if you smoked at least one cigarette in the past 30 days)’. Those who answered ‘no’ to both questions were classified as never-smokers; those who answered ‘yes’ to the first and ‘no’ to the second question were former smokers; and those with two positive answers were smokers.

Covariates were social exposure to smoking and sociodemographic characteristics of the adolescents. Social exposure to smoking (No / Yes) was based on the information provided by the adolescents on the smoking status of their parents, friends, and romantic partners. If any of those were smokers, adolescents were classified as being socially exposed to smoking. Sociodemographic variables were: Age: 13 – 19 years; Gender: Male / Female; Race/skin color according to official categories in Brazil: White / Black / Brown / Yellow / Indigenous; Educational level of the adolescents’ mothers, with seven categories ranging from no education to higher education.

In the statistical analysis, the IBM SPSS Statistics Software (v24) was used. We describe our data using counts (n) and proportions (%). Poisson regression with robust variance was used to estimate the raw and adjusted associations between the smoking status and SK. Prevalence ratios (PR) and 95% confidence intervals (CI) are reported.

The inclusion of covariates in the multivariable models was not based on statistical significance, but on the extant knowledge about the determinants of smoking among

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

adolescents. Therefore, all the study covariates were included. To avoid reporting fallacious findings, estimates for associations between SK and the covariates were not reported.

RESULTS

A total of 3034 adolescents participated in the study (response rate = 99.7%). They were mostly female (53.6%), Brown (50.9%), and their mean age was 16 years (SD=1.1). The educational level of their mothers was mainly high school (32.4%) or higher education (29.4%). The majority had never experimented cigarettes (72.7%) and were socially exposed to smoking (65.6%) (Table 1).

The prevalence of low SK was 47.8% regarding effects of smoking on general health, and above 60% regarding both oral and second-hand effects (Table 1). The higher prevalence of low SK about each of these three effects occurred among never-smokers (Figure 1).

In both the unadjusted and adjusted Poisson regression analyses, low SK was statistically associated with the adolescents' smoking status (Table 2). In comparison with smokers, never-smokers were 52% more likely to have low SK about smoking effects on general health, 17% more likely to have low SK about oral effects, and 21% more likely to have low SK about second-hand effects. Furthermore, former smokers were 41% more likely to have low SK about general health effects, and 16% more likely to have low SK on the second-hand effects of smoking, compared to smokers.

DISCUSSION

In this study, adolescent students reported their levels of SK about the effects of smoking on general and oral health, and second-hand smoking effect. High rates of low SK were observed, especially about the effects on oral health and the second-hand effects,

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

indicating possibilities for improvements. These findings agree with several previous studies that observed low levels of OK on the harms of smoking among adolescents[5-14].

When we compared the adolescents' SK according to their smoking status, controlling for social exposure to smoking and sociodemographic characteristics, higher rates of low SK were reported by never-smokers in comparison with smokers and former smokers. This finding may be reflecting the current global situation when it comes to warning people about the dangers of smoking. While the coverage of mandatory health warnings in packs of tobacco products increased substantially worldwide during the past decade, a decrease in mass media campaigns was observed[1].

Noticing health warning labels on cigarette packages has been associated with increased cognition about the harms of smoking[28-33]. Health warnings in tobacco products are one of the most powerful anti-smoking interventions of the W axis of the Monitor, Prevent, Offer, Warn, Enforce and Raise (MPOWER) initiative operated by the World Health Organization to help countries controlling the smoking epidemics worldwide[1]. However, because it mainly reaches people when they are exposed to tobacco products, it should be considered a high-risk strategy of anti-smoking education.

Anti-tobacco mass media campaigns are also effective anti-smoking interventions to reduce tobacco use[1,31], and cost-effective to fully educate large populations about the risks of tobacco use and exposure to second-hand smoke[1]. Because the goal is to inform the whole population about the dangers of smoking, they should be recognized as population-based strategy of anti-smoking education.

Considering that knowledge about the health effects of smoking may reduce tobacco use[34,35], our findings suggest that the awareness of non-smokers should be specially

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

targeted for the achievement of the fourth MPOWER global measure to promote smoking control: to warn people about the dangers of tobacco[1].

An analogy can be drawn between improving smokers' knowledge about the harms of smoking and improving pregnant adolescents' knowledge about the risks of becoming pregnant, which is to say that it is unacceptable to wait for adolescents to become smokers and only then provide warnings to them about the health harms of smoking. It may be too late, given that their knowledge may be overwhelmed by nicotine dependence[36].

By itself, knowledge and its rational assessment may not drive the smoking behaviour[37]. Still, it is an essential domain related to the psychological capability of individuals to change their smoking behaviour, along with motivation and the opportunity to change[35].

The 'smoking kills' warning should be delivered properly to each adolescent, in addition to reaching those who are exposed to tobacco products. Although a high-risk education strategy to improve tobacco users' knowledge is important, an intensification of population education strategies is now crucial to promote equity in the right to information about the dangers of tobacco use among adolescents.

The limitations of this study include its observational design which does not allow causal inference. Also, only public schools were included. An analysis among adolescents from public and private schools would have guaranteed better representativeness and, therefore, generalizability of the findings.

In summary, adolescents tended to perceive that they had low knowledge about the effects of smoking and second-hand smoking on general and oral health. Low SK was associated with the smoking status, meaning that, compared to smokers and former smokers, never-smokers had lower SK about the health effects of smoking.

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

Authors' contributions

LE Rios and MCM Freire participated in the conception, design, and data analysis and interpretation. LE Rios collected the data, carried out the statistical analysis and wrote the first version of the paper. MCM Freire performed critical review of the manuscript. Both authors approved the current version.

Conflicts of interest

The authors have no conflicts of interest to disclose.

Funding

This work was funded by the Foundation for Research Support of the State of Goiás, Brazil (FAPEG) (Public call Nº 04/2017 – Research Program for the Unified Health System [PP-SUS], and Public call Nº 03/2018 – Scholarships for master's and doctoral training); and The Coordination for the Improvement of Higher Education Personnel (CAPES), Brazil (Financing code 001).

REFERENCES

1. World Health Organization. *WHO report on the global tobacco epidemic, 2019: Offer help to quit tobacco use.* Geneva: World Health Organization; 2019.

2. World Health Organization. *WHO Monograph on tobacco cessation and oral health integration.* Geneva: World Health Organization, 2017.

3. World Health Organization. *Adolescents: health risks and solutions.* Geneva: World Health Organization, 2018.

4. Nuyts PAW, Kuipers MAG, Willemsen MC, Kunst AE. Trends in age of smoking initiation in the Netherlands: a shift towards older ages? *Addiction* 2018; 113(3): 524–532.

5. Bertani AL, Garcia T, Tanni SE, Godoy I. Tobacco in Adolescence: Importance to Knowledge the Health Hazards and Preventive Measures. *J Addict Res Ther* 2015; 6:1000218.

6. Mounach S, Zahrou F-E, Mahdaoui E, Belakhel L, Khazraji YC, El Berri H. Evolution of attitudes, trends and perceptions of smoking among middle and secondary school students in the Gharb Region, Morocco, 2010–2015. *Afr J Prm Health Care Fam Med.* 2019; 11(1): a1914.

7. Sharma I, Chalise S. The Knowledge and Attitude Regarding the Health Effect of Smoking among Secondary Level Students in Nepal. *Asian J Humanit Soc Studies* 2018; 6(2): 83-90.

8. Herawati L, Budiman JA, Haryono W, Mulyani W. Jayapura Teenagers Smoking Behavior. *J Community Health* 2017; 42: 78–82.

9. Xu X, Chen C, Abdullah AS, Sharma M, Liu H, Zhao Y. Knowledge about and sources of smoking-related knowledge, and influencing factors among male

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

urban secondary school students in Chongqing, China. *SpringerPlus* 2016; 5: 1879.

10. Kaleta D, Polanska K, Wojtysiak P, Szatko F. Involuntary Smoking in Adolescents, Their Awareness of Its Harmfulness, and Attitudes towards Smoking in the Presence of NonSmokers. *Int J Environ Res Public Health* 2017; 14: 1095.

11. Raina R, Krishna M, Murali R, Shamala A, Yalamalli M, Kumar AV. Knowledge, attitude and behavioral determinants of tobacco use among 13-15 year old school children. *J Int Soc Prev Community Dent* 2015; 5 (4): 321–326.

12. Vasconcelos HG, Vaz SHS, Rodrigues FOS, Oliveira DLV, Prado LFR, Saliba PS. Associação entre a prevalência do tabagismo e o perfil socioeconômico de estudantes do ensino médio em uma Cidade do Estado de Minas Gerais. *Braz J Health Rev* 2020; 3(4): 9667-9679.

13. Veeranki SP, John RM, Ibrahim A, Pillendla D, Thrasher JF, Owusu D, Ouma AEO, Mamudu HM. Age of smoking initiation among adolescents in Africa. *Int J Public Health* 2017; 62:63–72.

14. Lawal FB, Fagbule OF. Knowledge of School-Going Adolescents About the Oral Effects of Tobacco Usage in Ibadan, Southwest Nigeria. *Int Q Community Health Educ* 2020; 40(4): 337–343.

15. Cosci F, Zagà V, Bertoli G, Campiotti A. Significant others, knowledge, and belief on smoking as factors associated with tobacco use in Italian adolescents. *ISRN Addict* 2013; Article ID 968505.

16. Ho SY, Chen J, Leung LT, Mok HY, Wang MP, Lam TH. Adolescent Smoking in Hong Kong: Prevalence, Psychosocial Correlates, and Prevention. *J Adolesc Health* 2019; 64(6): S19-S27.

17. Mbongwe1 B, Tapera R, Phaladze N, Lord A, Zetola NM. Predictors of smoking among primary and secondary school students in Botswana. *PLoS One* 2017; 12(4): e0175640. https://doi.org/10.1371/journal.pone.0175640

18. Okagua J, Opara P, Alex-Hart BA. Prevalence and determinants of cigarette smoking among adolescents in secondary schools in Port Harcourt, Southern Nigeria. *Int J Adolesc Med Health* 2016; 28(1): 19–24.

19. Aslam SK, Zaheer S, Rao S, Shafique K. Prevalence and determinants of susceptibility to cigarette smoking among school students in Pakistan: secondary analysis of Global Youth Tobacco Survey. *Subst Abuse Treat Prev* Policy 2014; 9, 10.

20. Bobo FT, Thanasekaran P, Joice AJR, Yadecha B, Alebel A. Susceptibility to cigarette smoking and associated factors among high school students in western Ethiopia. *BMC Res Notes* 2018; 11: 626.

21. Veeranki SP, Mamudu HM, Anderson JL, Zheng S. Worldwide Never-Smoking Youth Susceptibility to Smoking. *J Adolesc Health* 2014; 54: 144-150.

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

22. Elton-Marshall T, Wijesingha R, Kennedy RD, Hammond D. Disparities in knowledge about the health effects of smoking among adolescents following the release of new pictorial health warning labels. *Prev Med* 2018; 111: 358-365.

23. Huong NT, Kien NT, Giang KB, Minh HV, Hai PT, Huyen DT et al. Knowledge and Attitude Towards Tobacco Smoking among 13-15 Year-Old School Children in Viet Nam - Findings from GYTS 2014. *Asian Pac J Cancer Prev* 2016; 17 (Suppl. 1): 37-42.

24. Flynn LR, Goldsmith RE. A Short, Reliable Measure of Subjective Knowledge. *J Bus Res* 1999; 46: 57–66.

25. Raju PS, Lonial SC, Mangold WG. Differential Effects of Subjective Knowledge, Objective Knowledge, and Usage Experience on Decision Making: An Exploratory Investigation. *J Consum Psychol* 1995; 4(2): 153-180.

26. Brucks M. The effects of product class knowledge on information search behavior. *J Consum Res* 1985; 12(1): 1-16.

27. Rios LE, Freire MCM. Opinion of school adolescent smokers about smoking cessation counselling and treatment in health services: cross-sectional study, State of Goiás, Brazil, 2018. *Epidemiol Serv Saúde* 2020; 29(4): e2019604.

28. Chiosi JJ, Andes L, Asma S, Palipudi K, McAfee T. Warning about the harms of tobacco use in 22 countries: findings from a cross-sectional household survey. *Tob Control* 2016; 25: 393–401.

29. Magnan RE, Cameron LD. Do Young Adults Perceive That Cigarette Graphic Warnings Provide New Knowledge About the Harms of Smoking? *Ann Behav Med* 2015; 49 (4): 594-604.

30. Pepper JK, Nguyen Zarndt A, Eggers M E, Nonnemaker JM, Portnoy DB. Impact of Pictorial Cigarette Warnings Compared with Surgeon General's Warnings on Understanding of the Negative Health Consequences of Smoking. *Nicotine Tob Res* 2020; 22(10): 1795-1804.

31. Duke JC, Farrelly MC, Alexander TN, MacMonegle AJ, Zhao X, Allen JA, Delahanty JC, Rao P, Nonnemaker J. Effect of a National Tobacco Public Education Campaign on Youth's Risk Perceptions and Beliefs About Smoking. *Am J Health Promot* 2018; 32(5):1248-1256.

32. Mourik DA, Nagelhout GE, Willemsen MC, Putte B, Vries H. Differences in smokers' awareness of the health risks of smoking before and after introducing pictorial tobacco health warnings: findings from the 2012–2017 international tobacco control (ITC) Netherlands surveys. *BMC Public Health* 2020; 20: 512.

33. Mannocci A, Guerra F, Colamesta V, Backhaus I, Firenze A, Provenzano S, Fiore M, Ferrara M, Langiano E, De Vito E, Lorini C, Bonaccorsi G, Villari P, La Torre G, Collaborative Group. The Adolescent Label Impact Index in a Multicentric Observational Study. Have the Tobacco Advertisements an Impact on the Adolescents? *J Child Adolesc Subst Abuse* 2019; 28(5): 331-342.

34. Ahluwalia IB, Smith T, Arrazola RA et al. Current Tobacco Smoking, Quit Attempts, and Knowledge About Smoking Risks Among Persons Aged ≥15 Years

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

- Global Adult Tobacco Survey, 28 Countries, 2008–2016. *MMWR Morb Mortal Wkly Rep* 2018; 67: 1072–1076.

35. Michie S, Atkins L, West R. *The Behavior Change Wheel: A Guide to Designing Interventions.* London: Silverback Publishing, 2014.

36. West R, Shiffman S. *Smoking cessation*, 3rd ed. Abingdon: Health Press, 2016.

37. Kelly MP, Barker M. Why is changing health-related behaviour so difficult? *Public Health* 2016; 136: 109-116.

Table 1. Participants' sociodemographic and smoking-related characteristics (n=3034).

Characteristics	**N**	**%**
Race/skin color*		
Black	397	13.1
Brown	1543	50.9
White	952	31.4
Yellow	116	3.8
Indigenous	14	0.5
Not reported	12	0.4
Sex		
Male	1404	46.3
Female	1625	53.6
Not reported	5	0.1
Mothers' level of education		
Illiterate	23	0.8
Incomplete elementary school	376	12.4
Elementary school	163	5.4
Incomplete High-school	258	8.5
High school	982	32.4
Incomplete higher education	225	7.4
Higher education	892	29.4
Not known / not reported	115	3.8
Smoking status		
Smokers	241	7.9
Former smokers	584	19.2
Never-smokers	2201	72.6
Not reported	8	0.3
Social exposure to smoking		
Yes	1991	65.6
No	1043	34.4
Low subjective knowledge about the health effects of smoking		
General health effects	1447	47.8
Second-hand effects	1865	61.5

SciELO Preprints - This document is a preprint and its current status is available at: https://doi.org/10.1590/SciELOPreprints.2158

Oral health effects	1910	62.9

*Description of race/skin color according to the official categories in Brazil.

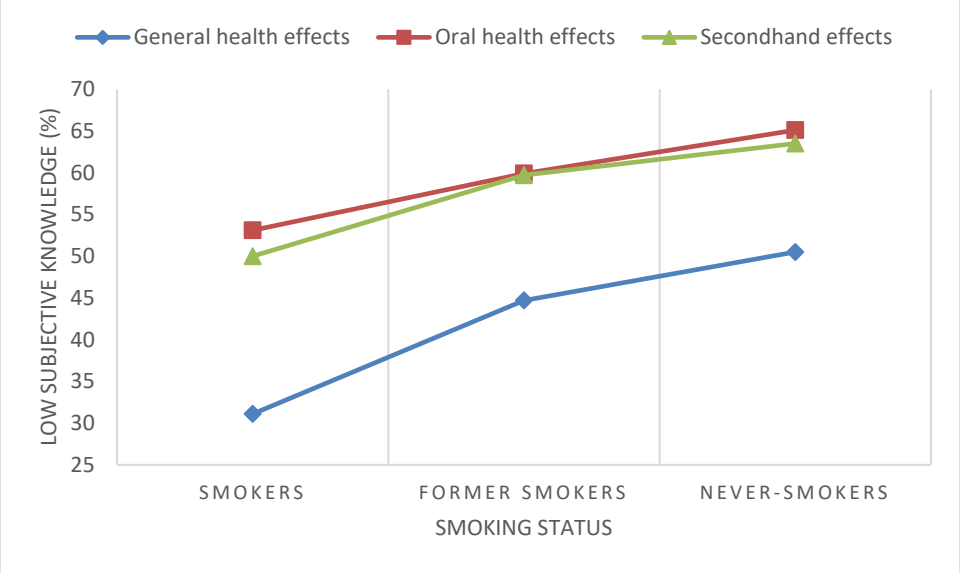

Figure 1. Percentages of low subjective knowledge about the health effects of smoking among adolescents, according to their smoking status. Source: Authors.

Table 2. Poisson regression between smoking status and low subjective knowledge about the health effects of smoking among adolescent students in Goiás, Midwestern Brazil.

	Low subjective knowledge		
	General health effects	**Oral health effects**	**Second-hand effects**
Smoking status		Unadjusted PR (95%CI)	
Never-smokers	1.62 (1.34; 1.96)[1]	1.23 (1.08; 1.38)[1]	1.27 (1.12; 1.44)[1]
Former smokers	1.44 (1.17; 1.77)[1]	1.13 (0.98; 1.29)	1.19 (1.04; 1.37)[3]
Smokers	1	1	1
		Adjusted PR (95%CI) *	
Never-smokers	1.52 (1.25; 1.85)[1]	1.17 (1.03; 1.32)[3]	1.21 (1.06; 1.38)[2]
Former smokers	1.41 (1.14; 1.74)[2]	1.09 (0.95; 1.25)	1.16 (1.01; 1.34)[3]
Smokers	1	1	1

* Adjusted for mother's level of education, social exposure to smoking, race/skin color, age, and sex.
Significance level: [1] $p < 0.001$; [2] $p < 0.01$; [3] $p < 0.05$ (Wald test).