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Factors associated with cigarette smoking among public school adolescents*

Fatores associados ao consumo do cigarro entre adolescentes de escola pública

Factores asociados con el consumo de tabaco entre adolescentes de escuela pública

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ABSTRACT

Objective: Estimating the prevalence of cigarette smoking and its association with sociodemographic variables, sexual initiation and experience with domestic violence among adolescents from public schools in Guanambi, Bahia, Brazil. **Method:** A cross-sectional study carried out with adolescents. Data were collected through interviews guided by a structured instrument, and analyzed according to descriptive and inferential statistics with multiple logistic regression. **Results:** A total of 370 adolescents participated in the study. The prevalence of cigarette smoking was 17.6% and a statistically significant association was observed between the variables: age over 15 years (PR = 5.63 and 95% CI: 1.33 – 23.85), males (PR = 2.53 and 95% CI: 1.47 – 4.37), no reported religion (PR = 1.93 and 95% CI: 0.99 – 3.75), working (PR = 2.17 and 95% CI: 1.25 – 3.74), onset of sexual activity (PR = 10.64 and CI= 95%: 5.31 – 21.33) and experience of domestic violence (PR = 3.61 and 95% CI: 2.07 – 3.28). **Conclusion:** The prevalence of cigarette smoking and the associated variables point to the need for intervention strategies among more vulnerable groups of adolescents, encompassing family involvement and assistance from teachers and health professionals, in particular nurses working in Primary Care.

DESCRIPTORS

Tobacco User Disorder; Adolescents; Risk Factors; Strategies; Primary Care Nursing.

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INTRODUCTION

Smoking is responsible for high rates of morbidity and mortality throughout the world and it is initiated early, almost always in adolescence[1]. Identifying schoolchildren more exposed to cigarette consumption is essential in the sense of offering educational actions in order to alert them to the harmful effects of the drug.

During the 20th century, smoking was responsible for the death of approximately 100 million people worldwide. This phenomenon persists as a serious and growing global health threat with about 6 million lives lost annually[1]. A Danish study indicates that smoking has the highest mortality rate[2] among all causes of death. The magnitude of such a disease can be highlighted when studies indicate that mortality rates outweigh the lives lost from AIDS, malaria and tuberculosis combined[3-4].

With regard to morbidity, cigarette consumption triggers and potentiates pathologies such as hypertension and diabetes, increasing the risk of developing tuberculosis, promoting early skin aging, in addition to being responsible for almost 90% of the cases of lung cancer, among other health disorders[5]. The Danish study also emphasizes the association between smoking and lung cancer[2]. A study developed in China on diseases related to cigarette smoking evidenced the relationship between smoking and postoperative complications, reporting higher rates of infection, bile leakage, hepatic insufficiency and other comorbidities in smoking patients when submitted to hepatectomy[6].

There is real concern about the harmful effects of smoking, and there are a number of efforts seeking to reduce tobacco consumption worldwide which include a ban on smoking in public spaces and workplaces[7], up to tax measures such as increased tax rates. In the Brazilian scenario, the prevalence of smoking has decreased considerably among the population over 18 years of age, going from 34.8% in 1989 to 14.7% in 2013. However, the country still faces a serious challenge: the need to reduce early initiation, which usually occurs in adolescence[8]. A study by the National School Health Survey (*PeNSE – Pesquisa Nacional de Saúde do Escolar*) carried out throughout Brazil in 2015 reveals that cigarette experimentation by adolescents is around 18.4%, highlighting a greater predominance of consumption by this group when compared to the same survey conducted in 2012[9].

In addition to adolescents starting a smoking habit early, it is urgent to point out the social risks related to tobacco consumption such as: increased chances for other drug use, delinquency, relationship problems and impairment in academic achievements[10]. Specifically regarding school problems in this phase of life, involvement with this substance is associated with absenteeism, grade repetition, school dropouts, learning difficulties and involvement with school violence[10-11]. We can point out that problems in school development in adolescence can trigger social repercussions in the short or long term, such as involvement in crime, unemployment and the continued poverty[12].

Considering the compromised human development with the early consumption of cigarettes, and mainly the fact that this substance is the main cause of preventable deaths worldwide[9], it is believed that implementing educational actions among adolescents may contribute to the less cigarette use in this stage of life. It is thereby hoped to reduce the chances of them being adult smokers, and consequently reduce morbidity and mortality rates related to this problem. In order to understand the profile of more vulnerable adolescents to cigarette use for whom preventive actions should be prioritized, this study aims to estimate the prevalence of cigarette consumption and its association with sociodemographic variables, sexual initiation and experience with domestic violence among adolescents in the public school system in Guanambi, Bahia, Brazil.

METHOD

This is a quantitative cross-sectional study carried out in public schools of the State network of the municipality of Guanambi, Bahia, Brazil. The state education network consists of a total of 5,480 students, 1,067 of which are in primary education, 3,032 in secondary education and 1,381 in professional education, all distributed throughout seven schools.

The study participants were 370 students who met the following inclusion criteria: being regularly enrolled in one of the four teaching units and being an adolescent – age group between 10 to 19 years, according to the chronological basis designated by the World Health Organization (WHO). Adolescents absent on the day established for data collection in the previously determined school group(s) were excluded from the study.

For the sampling design, the stratified sampling technique was chosen proportional to the total number of students from the seven schools (n=5,480), which resulted in an estimated population of 370 adolescents. Information provided by student enrollment was considered for this calculation. The prevalence of risk behaviors was adopted as unknown (p=0.50), with a sample error of 5% (d=0.05) and a confidence level of 95% (α=0.05).

Data collection was performed between November 2014 and January 2015, by a master's degree student and six nursing students, duly trained by the former. The data collection technique consisted of an interview which occurred in a private place indicated by the direction of the school. A structured, previously designed and tested questionnaire validated by researchers with expertise in quantitative studies was used to meet the study objective. To do so, this questionnaire included smoking as the dependent variable and independent variables were sociodemographic variables (age, gender, race, religion, family coexistence, housing, working, family income), sexual initiation and domestic violence.

The data were organized in the Microsoft Excel 2013 program and later transferred to the Stata version 13 program, a software program used for data processing. A descriptive analysis was initially carried out using frequency and mean distribution for characterizing the subjects. In order to investigate differences between proportions ($p<0.05$), contingency tables with X^2 (chi-square) were used for the bivariate analysis. The association between cigarette smoking and independent variables was expressed as a prevalence ratio (PR) and its respective 95% confidence

intervals (95% CI). Next, the variables that presented p<0.20 were reported for the multivariate logistic regression model with the purpose of obtaining *odds ratio* estimates and their respective 95% confidence intervals, considering a statistical significance level of 5%.

The study met the legal ethical principles contained in Resolution No. 466/2012 of the National Health Council, and was approved by the Ethics Committee of the Nursing School of the Universidade Federal da Bahia (Consubstantiated Opinion number 777.967, from 2014; CAAE: 34003714.2.0000.5531). The adolescents who participated in the study signed the Informed Consent Form after their legal guardians had also signed the Clear and Informed Consent Form.

RESULTS

The prevalence of smoking among the 370 students was 17.6%. Regarding sociodemographic variables (Table 1), the mean age was 16.8 years (SD = 1.8), with 87% between 15 and 19 years, and the majority declared as females (64.6%), black (75.4%), belonging to some religion (84.9%), living with both parents (57.8%), living in a family owned home (82.6%), working to contribute to the family's earnings (35.6%) and having a family income of up to two minimum wages (59.7%).

Table 1 – Sociodemographic characterization of adolescents in the public school system – Guanambi, BA, Brazil, 2015.

Variables	N.	%
Cigarette consumption		
Yes	65	17.6
No	305	82.4
Age		
10 to 14 years	48	13.0
15 to 19 years	320	87.0
Gender		
Males	131	35.4
Females	239	64.6
Race		
Black	260	75.4
Non-black	85	24.6
Religion		
Yes	314	84.9
No	56	15.1
Housing		
Family-owned	304	82.6
Rented	64	17.4
Family coexistence		
Parents	214	57.8
Others	156	42.2
Working		
Yes	128	35.6
No	232	64.4
Family income		
Up to 2	80	59.7
More than 2	54	40.3

Note: (n= 370).

Regarding sexual initiation, the majority (58.8%) reported not having had their first sexual intercourse. Regarding the variable cigarette use, the result of the bivariate analysis (Table 2) indicated a statistically significant and positive association between its consumption and experience with domestic violence (PR = 3.61 and 95% CI: 2.07 – 3.28), age over 15 years (PR = 5.63 and 95% CI: 1.33 – 23.85), males (PR = 2.53 and 95% CI: 1.47 – 4.37), working (PR = 2.17 and 95% CI: 1.25 – 3.74) and first sexual intercourse (PR = 10.64 and 95% CI: 5.31 – 21.33). Also regarding cigarette smoking, a borderline association was identified with the variable 'no religion reported' (PR = 1.93 and 95% CI: 0.99 – 3.75) and a positive association (although with no statistical significance) with 'not living with both parents'.

Table 2 – Association between cigarette smoking by adolescents, sociodemographic variables and sexual initiation – Guanambi, BA, Brazil, 2015.

Variables	N.	Cigarette smoking	Prevalence Ratio (PR)	CI (95%)
Domestic violence				
Yes	113	36 (31.8)	**3.61**	**2.07 – 6.28**
No	253	29 (11.5)	1	
Age				
10 to 14 years	48	2 (4.2)	1	
15 to 19 years	320	63 (19.7)	**5.63**	**1.33 – 23.85**
Gender				
Males	131	35 (26.7)	**2.53**	**1.47 – 4.37**
Females	239	30 (12.5)	1	
Race				
Black	260	43 (16.5)	0.68	0.37 – 1.26
Non-black	85	19 (22.3)	1	
Religion				
Yes	314	50 (15.9)	1	
No	56	15 (26.8)	**1.93**	**0.99 – 3.75**
Family coexistence				
Parents	214	34 (15.9)	1	
Others	156	31 (19.9)	1.31	0.76 – 2.24
Housing				
Family-owned	304	55 (18.1)	1	
Rented	64	9 (14.1)	0.74	0.34 –1.58
Working				
Yes	128	33 (25.8)	**2.17**	**1.25 – 3.74**
No	232	32 (13.8)	1	
Family income				
Up to 2	80	18 (22.5)	0.91	0.40 – 2.06
More than 2	54	13 (24.1)	1	
Sexual initiation				
Yes	143	54 (37.8)	**10.64**	**5.31 – 21.33**
No	204	11 (5.4)	1	

Note: (n= 370).

In the multiple logistic regression model (Table 3), in which all variables associated with bivariate analysis were included, it is observed that the variables that remained associated with cigarette smoking both in the initial and final models were: domestic violence (OR = 2.34 and 95%CI: 1.23 – 4.44 and OR = 2.37 and 95%CI: 1.26 – 4.47), males (OR = 2.11 and 95%CI: 1.10 – 4.03 and OR = 2.22 and 95%CI: 3.75 – 15.86) and sexual initiation (OR = 6.56 and 95%CI: 3.12 – 13.79 and OR = 7.71 and 95%CI: 3.75 – 15.86).

Table 3 – *Odds ratio* and its respective 95% confidence interval for associations between cigarette smoking by adolescents, sociodemographic variables and sexual initiation – Guanambi, BA, Brazil, 2015.

Variables	Initial Model OR 95%CI	Final Model OR 95%CI
Domestic violence		
Yes	**2.34 (1.23 – 4.44)**	**2.37 (1.26 – 4.47)**
Age		
15 to 19 years	2.44 (0.52 – 11.34)	-
Gender		
Males	**2.11 (1.10 – 4.03)**	**2.22 (3.75 – 15.86)**
Religion		
No	1.03 (0.47 – 2.23)	-
Working		
Yes	1.28 (0.69 – 2.41)	-
Sexual initiation		
Yes	**6.56 (3.12 – 13.79)**	**7.71 (3.75 – 15.86)**

Note: (n= 370).

DISCUSSION

The prevalence of smoking among the studied adolescents (17.6%) was consistent with data from studies carried out with students from high school and secondary levels of the Northeast and Southeast regions of the country, with percentages corresponding to 17.5% and 15.3%, respectively[13]. A national survey with 74,589 students showed that 18.5% of respondents had smoked at least once in their lives[14]. A higher prevalence (26.6%) was found in Malaysia, also a developing country[15].

It is worth emphasizing that although the literature points to a trend of lower rates of cigarette smoking by adolescents in developed countries, some studies point to divergent findings such as a study conducted in an underdeveloped country (Iran) with prevalence of 4.7%; and another in a developed country such as the United States where North Carolina state recorded a prevalence of 29.7%[4-16]. The high rate of cigarette smoking in certain developed countries may be related to the fact that it is easier to buy cigarettes, as well as the greater difficulty in facing the economic crisis that has brought high levels of personal and family indebtedness in the face of the recession and/or economic crisis that affects several countries. By triggering imbalance and emotional instability in an individual, such an event can lead to the consumption of toxic substances such as cigarettes, and even culminate in suicides[17].

It should also be noted that the prevalence of cigarette smoking among the students studied (17.6%) is similar to the percentage evidenced by the PeNSE (18.4%). By investigating schools every three years from all Brazilian capitals since 2009, the PeNSE is able to present a panorama of student health, in which cigarette smoking is one of its main focuses. This consumption has been decreasing throughout all stages of life, although the drop in adolescence was less pronounced when compared to the other age groups[9]. It is important to emphasize that in the case of adolescents, in which studies that measure lesser percentages of them in national surveys, cigarette smoking should be a concern of the family, of health professionals and educators, and of the government; in short, the whole of society.

Experience with domestic violence was one of the factors associated with cigarette smoking, including in the final logistic regression model. The survey showed that adolescents who smoke cigarettes have a 3.6 times greater chance of being abused in their own homes. Studies with adolescents who experience violence confirm the association between this and drug use, as observed in a national survey conducted with students from all Brazilian capitals[18], and in a survey with 5,172 students from Australia[19]. Although the studies do not indicate a causal relationship, they highlight that the indispensability of a condition favors the development of another.

Another variable associated with statistical significance to cigarette smoking was the male gender, who presented more than double the chance when compared to women. This finding is consistent with a study carried out with Colombian adolescents, whose exposure to smoking among men was 2.4 times higher than among the female population[20]. The greater male exposure to smoking may be related to the social construction of the gender, which educates boys to take on more daring and fearless behaviors. Although there is no defining aspect that influences boys to cigarette consumption, the desire for belonging to groups of friends, curiosity and the need for self-affirmation constitute some of the main aspects present in adolescence, a period of greater ease to adhere to environmental influences[21].

This gender construction may also justify the association found between cigarette smoking and sexual experience, considering that male adolescents are socially incited to initiate sexual activities early, as a requirement to ensure their virility among peers. Such a conception of the masculine identity based on the valorization of early sexual initiation, as well as involvement with smoking, is confirmed by a literature review that discusses sexuality at this stage of life[22]. The social stimulus for sexual freedom among boys finds resonance in a study that discusses the different roles established in society for men and for women in relation to their sexual conduct, revealing that men are pressured to lose their virginity sooner and have many partners, while women are encouraged to have their first intercourse after marriage[23].

It is worth pointing out that although these findings indicate a greater vulnerability of boys to their first sexual intercourse, an early sexual experience was already associated with smoking, considering that 37.8% of the 143 respondents who started sexual activities in adolescence declared themselves to be smokers. This relationship was also evidenced in a study with almost 60 thousand adolescents from all regions of the country, which indicated an association between cigarette consumption and the onset of sexual activity[18].

Regarding the factors with a significant association to cigarette smoking in the bivariate analysis, we found: having a religion, belonging to the age group between 15 and 19 years and having a paid activity. It is striking that even though most of the adolescents reported belonging to a religion, the variable 'not being religious' showed a borderline association with smoking. A study with 6,264 students in Pernambuco, Brazil, corroborates that non-religious adolescents are more exposed to cigarette consumption and other drugs[24]. Another study carried out in Mexico identifies religiosity as a protection factor for substance use, since the cultural and social norms adopted by each individual can place them in a situation of protection or risk for the consumption of substances such as cigarettes[25]. It is believed that having a religious belief that cultivates healthy life habits constitutes a protective factor for smoking cigarettes, representing a strategy to ensure the quality of life of adolescents.

Regarding the age group, a study developed in India reinforces the idea of an association between higher age and the use of tobacco in adolescence[26]. A national study which also identified a relationship between the age group greater than 15 years and cigarette smoking also confirmed an association between smoking and performing a paid activity[27]. By revealing that the more financially favored adolescents are more accepted among peer groups, an investigation carried out in Paris points out that the availability of drug acquisition increases the chances of establishing social bonds[28], making it possible to infer that sharing cigarettes in the 'social contract' of these groups, makes other adolescents vulnerable to drug experimentation. This risk is intensified considering that adolescence is a phase when people are searching for their identity, when drugs can represent resources for establishing social relations due to the importance that belonging to other groups other than the family occupies in the life of the adolescent.

Although with no statistical association, the findings point to the fact that adolescents who have better financial conditions, whose family income is higher than two minimum wages and who have a family owned house are more exposed to smoking. Similarly, a systematic experiment carried out in India found a positive association between wealth and cigarette smoking[26].

Regarding living with the parents, a study found a positive association in the bivariate analysis between tobacco consumption and not living with both parents. A similar result was found in international research conducted with 52,907 adolescents from Europe, North America and Israel, which also revealed this association[1]. Another study with Arab adolescents also argues that living with both parents favorably contributes to avoiding these minors being involved in situations of risk[29]. Although the findings suggest that in traditional families with both a mother and father living under one roof, adolescents are less susceptible to the risk of involvement with tobacco; this protection may be related to harmonious bonds in households, and is a context that may also occur in the current family settings.

Regarding individuals with black skin, the study pointed to a negative relation with cigarette smoking, meaning black and brown teenagers are less likely to smoke. This finding is in agreement with the results evidenced in a study carried out in the United States which compared the history of smoking in the life of African-Americans and whites, evidencing a higher prevalence of smoking in the latter[30].

Considering the prevalence of cigarette smoking measured among adolescents and associated factors, the study points to the need for prevention and coping strategies. Given the short and long term repercussions that smoking can trigger in the quality of life of those involved, the National Tobacco Control Policy developed by the Ministry of Health aims to prevent initiation and reduce tobacco consumption through educational actions, seeking to reduce the prevalence of smokers, and consequently morbidity/mortality indices related to smoking cigarettes[7]. These health education actions can and should be developed by health and education professionals with the Health in School Program (PSE – *Programa Saúde na Escola*), an important articulation tool between these sectors which aims to reduce vulnerabilities of the adolescent public.

CONCLUSION

Our study indicates a 17.6% prevalence of cigarette smoking among the adolescents surveyed. Although the study is limited as the findings only represent a certain municipality in Bahia, and thus cannot be generalized to the entire Brazilian population, the percentage found for cigarette smoking converges with the percentages of national surveys such as the PeNSE, which identified a prevalence of 18.4%. It is important to point out that regardless of the percentage of adolescent smokers, drug experimentation in this life phase when they are still immature increases the chances of them becoming adult smokers, in turn contributing to higher rates of morbidity and mortality.

Cigarette smoking among students presented an association with statistical significance with the following variables: age over 15 years, males, who reported no religion, working, onset of sexual activity and experience with domestic violence. Another limitation of the study is that despite not establishing a cause and effect relationship between the variables in revealing a profile of more vulnerable adolescents, the study offers subsidies for identifying groups of schoolchildren for whom health education actions should be prioritized.

These educational actions must take into consideration the involvement of family members and should focus on preventing first drug experimentation, as well as the promotion of quality of life in favor of a healthy adolescence. In this scenario, we highlight the professionals of education and health, especially nurses who work in primary care and especially through the PSE.

RESUMO

Objetivo: Estimar a prevalência de consumo de cigarro e sua associação com as variáveis sociodemográficas, iniciação sexual e vivência de violência doméstica em adolescentes escolares da rede pública de ensino de Guanambi, Bahia, Brasil. **Método:** Estudo transversal, realizado com adolescentes. Os dados foram coletados por meio de entrevistas guiadas por um instrumento estruturado, e analisados conforme estatística descritiva e inferencial, com regressão logística múltipla. **Resultados:** Participaram do estudo 370 adolescentes. A prevalência de consumo de cigarro foi de 17,6% e houve associação estatisticamente significante com as variáveis: idade maior que 15 anos (RP = 5,63 e IC = 95%: 1,33 – 23,85), sexo masculino (RP = 2,53 e IC = 95%: 1,47 – 4,37), não proferir religião (RP = 1,93 e IC = 95%: 0,99 – 3,75), trabalhar (RP = 2,17 e IC = 95%: 1,25 – 3,74), início das atividades sexuais (RP = 10,64 e IC= 95%: 5,31 – 21,33) e vivência de violência doméstica (RP = 3,61 e IC = 95%: 2,07 – 3,28). **Conclusão:** A prevalência do consumo de cigarro e as variáveis associadas apontam para a necessidade de estratégias de intervenção nos grupos de adolescentes mais vulneráveis, com envolvimento familiar e auxílio dos profissionais da educação e saúde, em especial os enfermeiros que atuam na atenção primária.

DESCRITORES

Tabagismo; Adolescentes; Fatores de Risco; Estratégias; Enfermagem de Atenção Primária.

RESUMEN

Objetivo: Estimar la prevalencia de consumo de tabaco y su asociación con las variables sociodemográficas, iniciación sexual y vivencia de violencia doméstica en adolescentes escolares de la red pública de enseñanza de Guanambi, Bahía, Brasil. **Método:** Estudio transversal, llevado a cabo con adolescentes. Los datos fueron recogidos mediante entrevistas guiadas por un instrumento estructurado y analizados conforme a la estadística descriptiva e inferencial, con regresión logística múltiple. **Resultados:** Participaron en el estudio 370 adolescentes. La prevalencia de consumo de tabaco fue del 17,6% y hubo asociación estadísticamente significativa con las variables: edad mayor que 15 años (RP = 5,63 e IC = 95%: 1,33 – 23,85), sexo masculino (RP = 2,53 e IC = 95%: 1,47 – 4,37), no proferir religión (RP = 1,93 e IC = 95%: 0,99 – 3,75), trabajar (RP = 2,17 e IC = 95%: 1,25 – 3,74), inicio de las actividades sexuales (RP = 10,64 e IC= 95%: 5,31 – 21,33) y vivencia de violencia doméstica (RP = 3,61 e IC = 95%: 2,07 – 3,28). **Conclusión:** La prevalencia del consumo de tabaco y las variables asociadas señalan la necesidad de estrategias de intervención en los grupos de adolescentes más vulnerables, con involucración familiar y auxilio de los profesionales de la educación y salud, en especial los enfermeros que actúan en la atención primaria.

DESCRIPTORES

Tabaquismo; Adolescentes; Factores de Riesgo; Estrategias; Enfermería de Atención Primaria.

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