Waterpipe and cigarette smoking among adolescents in Seville (Spain): prevalence and potential determinants

Consumo de pipas de agua y cigarrillos entre adolescentes de Sevilla (España): prevalencia y potenciales determinantes

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Waterpipe smoking has been linked to serious health problems (Waziry, Jawad, Ballout, Al Akel, & Akl, 2017) and, given its growth in recent years, is becoming a worldwide public health issue, especially among young people. It represents a new threat in the global fight against tobacco and its consequences in terms of morbidity and mortality (Maziak et al., 2017; WHO Study Group on Tobacco Product Regulation (TobReg), 2015).

Only very limited data are available on waterpipe smoking in Spain (Agaku et al., 2014; Jorge-Araujo, Torres-García, Saavedra-Santana, & Navarro-Rodríguez, 2017). As part of a project on the prevention of tobacco use among adolescents, this cross-sectional study was conducted between April and May 2014 in three state secondary schools (IES) in Seville (3057 students). The aims of the study were to assess the prevalence of waterpipe and cigarette smoking among adolescents and analyze the possible determinants of and beliefs about waterpipe smoking. To this end, we used an anonymous self-administered ad-hoc questionnaire comprising 12 questions on smoking and beliefs (available upon request) which was created in accordance with the recommendations of experts (Maziak, Ward, Afifi Soweid, & Eissenberg, 2005).

In each IES, one class was selected for each school year using a table of random numbers. Of the 501 participants in the selected classes, 139 (28%, 95% confidence interval [CI] 24 - 32) were habitual tobacco users, smoking either cigarettes or waterpipes (see table's footnote for definitions regarding stage of use). Irrespective of concomitant use of the other modality, 66 (13%, 95% CI 10-16) students were habitual waterpipe smokers, and 93 (19%, 95% CI 15-22) were habitual cigarette smokers; likewise, 343 (69%, 95% CI 64-73) students had used waterpipes at some point and 253 (51%, 95% CI, 46-55) had at some point smoked cigarettes.

The bivariate analysis of potential sociodemographic determinants of waterpipe smoking are presented in the table. We can highlight that 56% of those who had never smoked water pipes lived in a family with a habitual smoker, while 80% of students who were habitual smokers lived with one or more habitually smoking relatives; the higher the number of cohabiting smokers, the higher the prevalence of habitual waterpipe and cigarette use among students (figure). Students who were habitual waterpipe smokers also were habitual cigarette smokers more often (30%), while those who had never smoked water pipes were also far less likely to be habitual cigarette smokers (4%).

Regarding beliefs, habitual waterpipe users were more likely to consider this type of consumption to be less harmful to health than cigarettes, and to be something which does not affect passive smokers. They believe that waterpipe tobacco packages provide full information and warnings regarding the product's compounds and additives, that waterpipe smoking does not create addiction, and does not induce cigarette smoking ($p < 0.001$). Almost two thirds of

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the students (a third of habitual waterpipe smokers) did not know whether waterpipe tobacco packages specified all the information and warnings about the product's compounds and additives.

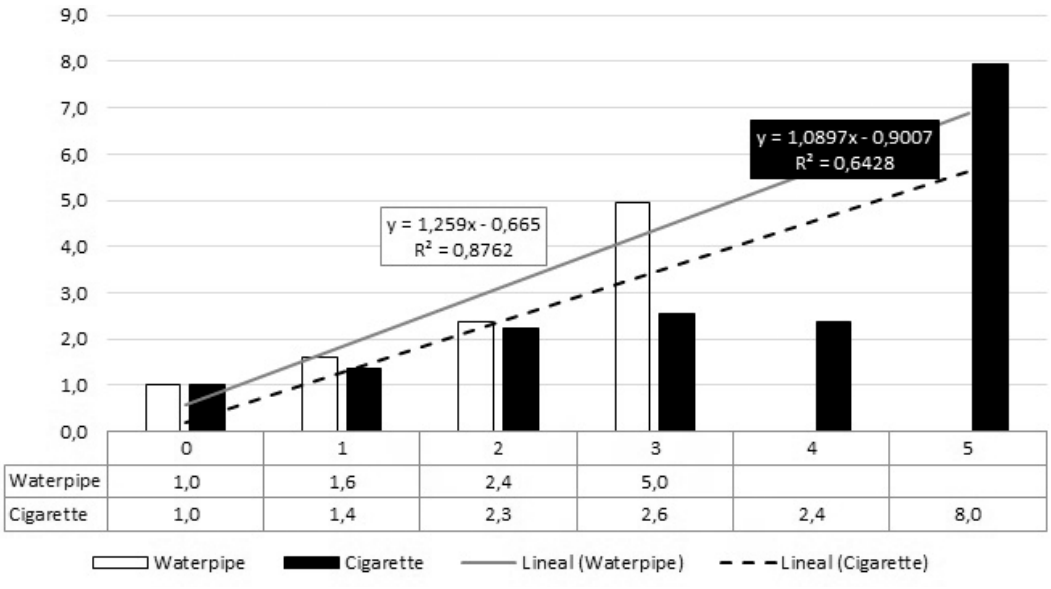
In conclusion, our study shows a high prevalence of habitual waterpipe smoking among adolescents (13%), which, if confirmed at the national level, would be among the highest reported in a range of countries or geographic regions (Agaku et al., 2014; Akl et al., 2011), and similar to the level among the Arab population in the USA (12-15%) or in the Persian Gulf region (9-16%) (Akl et al., 2011). This waterpipe smoking contributes significantly to total tobacco use among adolescents (28% in our survey), with higher figures in our study than those reported on tobacco consumption among adolescents for Spain in the 2014 *Health Behavior in School-aged Children* survey (Moreno et al., 2016); future versions of this latter survey will include waterpipe smoking and other modes of tobacco use, providing more accurate data regarding current smoking habits (Moreno, Ramos, & Rivera, 2017). Although limited by the cross-sectional design, in line with other studies (Jiang, Ho, Wang, Leung, & Lam, 2017), our data suggest that waterpipe use is associated with cigarette smoking. In addition to the need for studies at the national level, these results suggest that it is necessary to adopt preventive measures that should start early - before the third year of compulsory secondary education (ESO) (Diaz Geada, Busto Miramontes, & Caamano Isorna, 2018) – and be aimed at demystifying the supposedly less harmful nature of both waterpipe and electronic cigarette smoking (González Roz, Secades Villa, & Weidberg, 2017) among children and adolescents. Such measures must be applied in the family environment and should also include the development of specific regulations for this kind of smoking.

Table 1. *Bivariate analysis of the relationship between demographic characteristics and waterpipe smoking.*

	Waterpipe smoking			
	Never	**Occasional***	**Habitual***	**p value**
Characteristics	**N= 158**	**N= 277**	**N=66**	
Age (years), P50 (P25-P75)	15.5 (14.0-17.4)	17.4 (15.5-18.4)	16.5 (15.3-17.5)	<0.001‡
Sex, N (%)				0,18#
male	78 (49.4)	133 (48.0)	40 (60.6)	
female	80 (50.6)	144 (52.0)	26 (39.4)	
School type, N (%)				<0.001#
rural (IH)	39 (24.7)	59 (21.3)	31 (47.0)	
suburban (CL)	62 (39.2)	128 (46.2)	25 (37.9)	
central (JM)	57 (36.1)	90 (32.5)	10 (15.2)	
School year, N (%)				<0.001#
1st year ESO	37 (25.0)	25 (10.2)	8 (12.7)	
2nd year ESO	29 (19.6)	19 (7.8)	7 (11.1)	
3rd year ESO	24 (16.2)	42 (17.1)	15 (23.8)	
4th year ESO	16 (10.8)	39 (15.9)	14 (22.2)	
1st year Bachiller	30 (20.3)	69 (28.2)	13(20.6)	
2nd year Bachiller	12 (8.1)	51 (20.8)	6 (9.5)	
Vocational training	10 (6.3)	32 (11.6)	3 (4.5)	
Habitual smoker in the family, N (%)				0,001#
no	70 (44.3)	86 (31.0)	13 (19.7)	
yes	88 (55.7)	191 (69.0)	53 (80.3)	
Cigarette smoker†, N (%)				<0.001#
no	142 (89.9)	88 (31.8)	18 (27.3)	
occasional	10 (6.3)	122 (44.0)	28 (42.4)	
habitual	6 (3.8)	67 (24.2)	20 (30.3)	

Note. *Habitual waterpipe smoker: daily or weekly use; occasional smoker: monthly or sporadic use.
† Habitual cigarette smoker: daily or weekly use; occasional smoker: sporadic use ("sometimes").

P, percentile; CL, Carmen Laffón secondary school in San José de la Rinconada; IH, Heliche secondary school in Olivares; JM, Juan de Mairena secondary school in Mairena del Aljarafe; ESO, compulsory secondary education; Bachiller, higher secondary school certificate.
Bilateral hypothesis testing, 95% confidence interval; ‡Mann-Whitney U test; #Pearson chi-square (IBM-SPSS v.18).



	0	1	2	3	4	5
Waterpipe	1,0	1,6	2,4	5,0		
Cigarette	1,0	1,4	2,3	2,6	2,4	8,0

Figure 1. Prevalence ratios of habitual cigarette or waterpipe smoking depending on the number of habitual smokers in the family.

Note. The prevalence ratio (y-axis) is calculated for each category in relation to the number of relatives living in the family home who are smokers (x-axis) as the ratio of habitual smokers in the respective category to '0' smokers living at home (EPIDAT 3.1).

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Conflict of interests

On behalf of all authors, the first signatory of the manuscript declares that there is no conflict of interest in relation to this article.

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