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Original

## FACTORES SOCIOECONÓMICOS COMO PREDICTORES DE LA ACTIVIDAD FÍSICA, EL CONSUMO DE TABACO Y ALCOHOL, EN LA POBLACIÓN ADULTA ESPAÑOLA

## SOCIOECONOMIC FACTORS AS PREDICTORS OF PHYSICAL ACTIVITY, TOBACCO AND ALCOHOL USE, IN THE SPANISH ADULT POPULATION

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## FACTORES SOCIOECONÓMICOS COMO PREDICTORES DE LA ACTIVIDAD FÍSICA, EL CONSUMO DE TABACO Y ALCOHOL EN LA POBLACIÓN ADULTA ESPAÑOLA.

### RESUMEN

Objetivos; en España, el tabaco causa más de 50.000 muertes al año (13 % de las muertes anuales). Más de 10.000 muertes fueron atribuibles al alcohol durante 2016. La actividad física regular ayuda a prevenir y tratar una serie de enfermedades no transmisibles, así como la hipertensión, el sobrepeso y la obesidad. También puede mejorar la salud mental, calidad de vida y bienestar. Los objetivos de este estudio fueron estimar la prevalencia de estos tres hábitos relacionados con estilos de vida (3HEV) en la población española adulta, así como su relación con factores socioeconómicos individuales.

Material y métodos; utilizamos la Encuesta Europea de Salud en España 2020, una encuesta poblacional ( $n = 21.569$ ), para analizar la prevalencia y la relación de los 3HEV con los siguientes factores socioeconómicos: sexo, edad, nacionalidad, cohabitación, educación, clase social y comunidad autónoma de residencia. Se usaron modelos de regresión logística para calcular los odds ratios para cada uno de los 3HEV.

Resultados; El 78,6 % de los entrevistados declaró no fumar y el 34,5 % no beber alcohol. El 14,1 % de los encuestados notificó hacer ejercicio regularmente (varias veces por semana). En los tres modelos, el sexo, la edad, la nacionalidad, la cohabitación, la educación y la clase social tuvieron efectos estadísticamente significativos ( $p < 0,05$ ).

Conclusiones; Este estudio proporciona evidencia científica de la asociación estadística en la población adulta española entre los predictores analizados y la actividad física, el consumo de tabaco y alcohol. Esta información sería útil para diseñar políticas de prevención y tratamiento de la salud dirigidas a los grupos en riesgo.

**Palabras clave:** Tabaquismo. Alcohol. Actividad física. Factores socioeconómicos. Hábitos. España.

## SOCIOECONOMIC FACTORS AS PREDICTORS OF PHYSICAL ACTIVITY, TOBACCO AND ALCOHOL USE IN THE SPANISH ADULT POPULATION.

### ABSTRACT

Objectives; in Spain, tobacco causes more than 50,000 deaths per year (13% of annual deaths). More than 10,000 deaths were alcohol-attributable during 2016. Regular physical activity helps prevent and treat a number of noncommunicable diseases, as well as hypertension, overweight and obesity. It can also improve mental health, quality of life and well-being. The objectives of this study were to estimate the prevalence of these three lifestyle habits (3LH) in the adult Spanish population, as well as their relationship with individual socioeconomic factors.

Methods; we used the European Health Interview Survey in Spain 2020, a population-based survey ( $n=21,569$ ), to analyze the prevalence and relationship of the 3LH with the following socioeconomic factors: sex, age, nationality, cohabitation, education, social class and autonomous region of residence. Logistic regression models were used to calculate odds ratios, for each of the 3LH.

Results; 78.6% of interviewees declared not to smoke and 34.5% not to drink alcohol. 14.1% of respondents reported to do regular exercise (several times per week). Sex, age, nationality, cohabitation, education and social class had statistically significant effects ( $p < 0.05$ ) in the three models.

Conclusions; this study provides evidence of the statistical association in Spanish adult population of the analysed predictors with physical activity, tobacco and alcohol consumption. This information would be useful for designing prevention and treatment health policies that target the groups at risk.

**Keywords:** Tobacco. Alcohol. Physical activity. Socioeconomic factors. Lifestyle habits. Spain.



## INTRODUCCIÓN

The tobacco epidemic is one of the biggest public health threats the world has ever faced, killing up to half of its users who don't quit (WHO, 2023). Tobacco kills more than 8 million people each year, including an estimated 1.3 million non-smokers who are exposed to second-hand smoke (WHO, 2023).

The harmful use of alcohol is a causal factor in more than 200 disease and injury conditions (WHO, 2022). Worldwide, 3 million deaths every year result from harmful use of alcohol. This represents 5.3% of all deaths (WHO, 2022). Alcohol consumption causes death and disability relatively early in life. In people aged 20–39 years, approximately 13.5% of total deaths are attributable to alcohol (WHO, 2022).

In Spain, tobacco causes more than 50,000 deaths per year and it accounts for the 13% of annual deaths (AECC, 2018), whereas more than 10,000 were alcohol-attributable during 2016 (WHO, 2018b). Among the top risk factors according to impact on Disability Adjusted Life Years (DALYs), smoking, high body-mass index and alcohol are respectively the first, second and fourth ones (Soriano et al., 2018).

Physical activity contributes to preventing and managing noncommunicable diseases such as cardiovascular diseases, cancer and diabetes (WHO, 2022). Physical activity reduces symptoms of depression and anxiety (WHO, 2022). It also helps to prevent hypertension, overweight and obesity. In addition to the multiple health benefits of physical activity, societies that are more active can generate additional returns on investment including a reduced use of fossil fuels, cleaner air and less congested, safer roads (WHO, 2018a).

Given the potential impact of tobacco and alcohol use and physical activity on mortality and DALYs, the purposes of this study were to estimate their prevalence in the adult Spanish population, as well as their relationship with individual socioeconomic factors.

## MATERIAL Y MÉTODOS

### *Sample*

Microdata from the adult's questionnaire of the European Health Interview Survey in Spain (EHISS 2020), conducted in 2019-2020 (INE-2020), were used as the main source for this analysis. The EHISS 2020 is a longitudinal population-based survey, which is representative at national and autonomous region levels. This survey has the main objective to monitor the health of the population resident in Spain by collecting and analyzing a broad set of health aspects disaggregated according to their demographic and socioeconomic characteristics, as well as by autonomous region. Since 2009, it alternates every two and a half years with the Spanish National Health Survey, with which it shares a wide group of variables. Both surveys have been harmonized in order to constitute a single series at the end (INE). The EHISS 2020 includes 21,569 interviews with adults.

### *Tobacco use*

Scientific evidence suggests that there is no safe level of exposure to tobacco (AECC, 2018; WHO, 2019). Under this premise and considering the limitations of cross-sectional studies (such as the EHISS 2020), as well as the objective of establishing relationship between the main socioeconomic factors and lifestyles, this dependent variable was defined as dichotomous (daily/occasional smokers, or non-smokers either if they never smoked or did so in the past). After excluding missing values, the sample comprised 21,548 adult subjects.

### *Alcohol use*

Defined as a dichotomous variable, for similar reasons as in tobacco use. Current drinkers were defined similarly as in the Global Burden Disease 2016 – Alcohol Collaborators (GBD-2016-Alcohol-Collaborators, 2018) i.e., individuals who have consumed at least one alcoholic beverage, or some approximation, in a 12-month period. After excluding missing values, the sample comprised 21,536 adult subjects.

### *Physical activity in the spare time*

It was also defined as a dichotomous variable (physical activity several times per week, versus

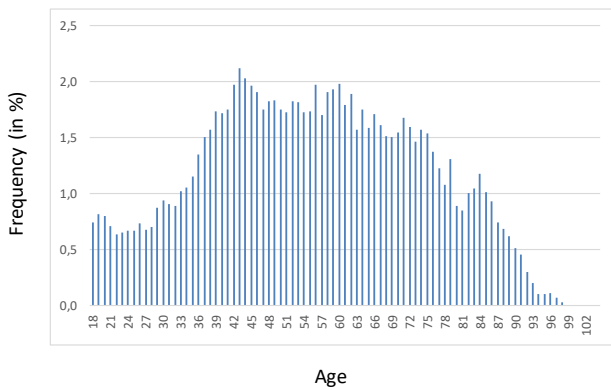


occasional or no physical activity in the spare time). After excluding missing values, the sample comprised 21,548 adult subjects.

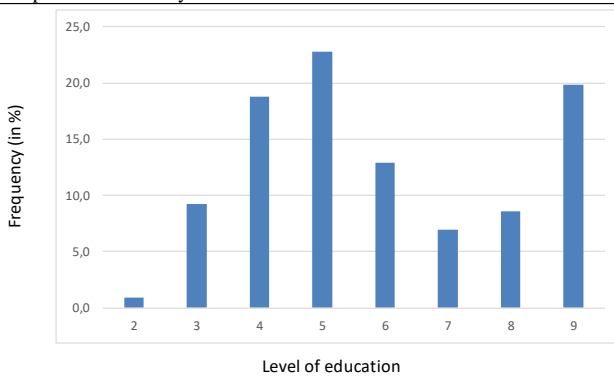
*Socioeconomic factors*

These seven independent variables were selected for the analysis: sex (male/female), foreign nationality (yes/no), age (years), cohabitation (living alone or as a couple), education, social class and autonomous region of residence (the autonomous cities of Ceuta and Melilla were clustered like one additional region).

**Figure 1**  
Sample distribution by age.



**Figure 2**  
Sample distribution by education.

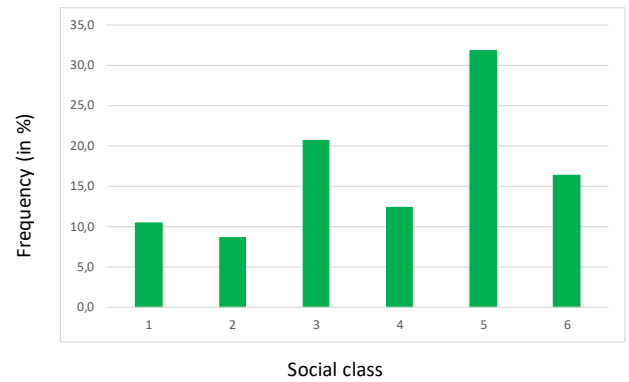


Note : the higher the index, the higher the level of education.

Education: the EHISS 2020 provides an aggregated coding, according to the National Classification of Education (CNED14-A), according to the levels of training achieved. For those over 18 years of age, the

variable takes values from 2 to 9; the higher the value, the higher the level (INE).

**Figure 3**  
Sample distribution by social class.



Note : the lower the index, the higher the social class.

Social class: the EHISS 2020 incorporates two questions about current and last job. Their answers allow to extract the categories in six social classes, where class I groups the highest level and class VI the lowest (INE).

With regards to missing values for the independent variables, there were 3,405 for social class, 154 for cohabitation and 1 for foreign nationality. For the rest of the independent variables, there were no missing data across the study sample.

*Statistical analysis*

A descriptive analysis was performed, to calculate the proportions of subjects allocated to each subgroup of the different variables (see table 4). The dependent variables (physical activity, tobacco and alcohol use) were also compared in pairs, to assess potential correlation between them. Afterwards, binary logistic regression models were run for each of them, controlled by the seven independent variables previously specified, as well as the dependent variables which could be potentially correlated (see tables 1, 2 and 3). All analyses were carried out using IBM SPSS Statistics 28.

**Table 1**

*Sample distribution. Tobacco vs Alcohol use.*

Alcohol use	Tobacco use	
	No	Yes
No	6.404	1.037
Yes	10.513	3.565

Note:  $p < 0,001$  for the chi-square test.

**Table 2**

*Sample distribution. Physical activity vs Alcohol use.*

Alcohol use	Physical activity regularly	
	No	Yes
No	6.865	577
Yes	11.624	2.458

Note:  $p < 0,001$  for the chi-square test.

**Table 3**

*Sample distribution. Tobacco use vs Physical activity.*

Physical activity	Tobacco use	
	No	Yes
No	14.431	4.056
Yes	2.488	548

Note:  $p < 0,001$  for the chi-square test.

## RESULTADOS

### *Study population*

Table 4 presents a wide overview of the sample for study and prevalence for the dependent variables. Of the 21,569 adults interviewed in the EHIS 2020, 53% were female versus 47% male, 8.5% had foreign nationality versus 91.5% with Spanish nationality only, 51.9% lived as a couple versus 48.1% living alone. The distributions of age, education and social class are shown in figures 1, 2 and 3 respectively.

### *Prevalences for the dependent variables*

78.6 % of respondents declared not to smoke versus 21.4% who reported to smoke daily or occasionally. Regarding alcohol, the prevalence of non-drinkers was 34.5% versus 65.4% of drinkers. Lastly, 14.1% of respondents reported to do physical activity

several times per week during their spare time versus 78.6% not doing or doing so only occasionally. Table 4 presents all possible pairwise breakdowns between dependent and independent variables.

### *Logistic regression*

Table 5 presents the main findings from the three logistic regression models. Sex, age, foreign nationality, cohabitation, education and social class had statistically significant effects ( $p < 0.05$ ) in the three models. With regards to the autonomous region of residence, some regions also had a statistically significant effect in a number of cases, but no clear pattern was identified. The results showed that Physical activity, Alcohol and Tobacco use are mutually correlated between them.

## DISCUSIÓN

This study confirms statistical association between the analyzed socioeconomic factors and physical activity, tobacco and alcohol use, in adult Spanish population. Their results are sensible, when compared to other studies looking at these lifestyle habits with different designs.

### *Alcohol use*

These socioeconomic conditions were found to have a higher risk for alcohol use: male sex, younger age, Spanish nationality, living as a couple, higher education and higher social class. Prior studies provide consistent evidence that people with lower socioeconomic level are less prone to alcohol consumption (Rosón Hernández, 2008). Another study in Spanish population reported that for both genders, the risk of binge drinking decreased with age and increased with higher education level (Galán et al., 2014).

The Global Burden of Disease Study 2016 (GBD-2016-Alcohol-Collaborators, 2018) assessed alcohol consumption for population older than 15 years. It reported 78% and 55% prevalence of alcohol consumption for males and females in 2016. Similar figures could be estimated from the EHIS 2020 (77% and 56% for adult males and females respectively). With regards to the intensity of alcohol consumption, the EHIS 2020 seems to have



underreported data, from which 1.0 and 0.4 average standard drinks per day could be estimated for male and female. Nevertheless, the Global Burden of Disease Study 2016 (GBD-2016-Alcohol-

Collaborators, 2018) reported 5.8 and 2.7 average standard drinks per day, respectively.

**Table 4**

*Sample distribution (frequencies). Pairwise breakdown between dependent and independent variables.*

	Tobacco use		Alcohol use		Physical activity	
	No	Yes	No	Yes	No	Yes
<b>Sex</b>						
Male	75%	25%	23%	77%	84%	16%
Female	82%	18%	44%	56%	88%	12%
<b>Foreign nationality</b>						
No	78%	22%	34%	66%	86%	14%
Yes	81%	19%	41%	59%	88%	12%
<b>Cohabitation</b>						
Living as a couple	80%	20%	32%	68%	87%	13%
Living alone	77%	23%	38%	62%	85%	15%
<b>Age</b>						
18-32	74%	26%	26%	74%	76%	24%
33-47	72%	28%	27%	73%	81%	19%
48-62	71%	29%	29%	71%	87%	13%
63-77	87%	13%	38%	62%	89%	11%
78 or more	97%	3%	61%	39%	96%	4%
<b>Education</b>						
2	94%	6%	85%	15%	97%	3%
3	89%	11%	63%	37%	97%	3%
4	83%	17%	48%	52%	93%	7%
5	71%	29%	34%	66%	89%	11%
6	76%	24%	27%	73%	82%	18%
7	70%	30%	25%	75%	83%	17%
8	75%	25%	22%	78%	80%	20%
9	84%	16%	21%	79%	77%	23%
<b>Social Class</b>						
I	85%	15%	18%	82%	76%	24%
II	83%	17%	21%	79%	76%	24%
III	77%	23%	26%	74%	82%	18%
IV	74%	26%	26%	74%	86%	14%
V	74%	26%	32%	68%	89%	11%
VI	74%	26%	44%	56%	91%	9%
<b>Autonomous Region</b>						
Andalusia	77%	23%	47%	53%	91%	9%
Aragon	81%	19%	41%	59%	96%	4%
Principality of Asturias	78%	22%	27%	73%	77%	23%
Balearic Islands	74%	26%	35%	65%	98%	2%
Canary Islands	78%	22%	44%	56%	87%	13%
Cantabria	80%	20%	28%	72%	83%	17%
Castille and Leon	82%	18%	32%	68%	91%	9%
Castilla-La Mancha	79%	21%	43%	57%	92%	8%
Catalonia	78%	22%	31%	69%	84%	16%
Valencian Community	78%	22%	29%	71%	76%	24%
Extremadura	74%	26%	40%	60%	98%	2%
Galicia	81%	19%	34%	66%	86%	14%
Madrid	82%	18%	30%	70%	87%	13%
Region of Murcia	74%	26%	35%	65%	85%	15%
Chartered Community of Navarr	77%	23%	21%	79%	73%	27%
Basque Country	82%	18%	22%	78%	76%	24%
La Rioja	77%	23%	26%	74%	93%	7%
Ceuta/Melilla	79%	21%	54%	46%	83%	17%

*Note: for Education, the higher the value, the higher the level. For Social Class, the higher the value, the lower the level.*



**Table 5.***Results of the 3 logistic regression models.*

	Smoker	Alcohol drinker	Physical activity.
Female	0.80	Sex 0.43	0.75
One year elder	0.97	Age 0.98	0.98
Foreigner	0.58	Nationality 0.62	0.70
Live alone	1.29	Cohabitation 0.90	1.16
One level higher	0.92	Education 1.14	1.13
One level lower	1.10	Social class 0.91	0.89
Benchmark*	Valencian Community (21.9%)	Autonomous Region Castille and Leon (68.0%)	Canary Islands (13.2%)
Andalusia		0.41	0.57
Aragon		0.58	0.19
Principality of Asturias			1.67
Balearic Islands		0.68	0.12
Canary Islands		0.48	x
Cantabria			
Castille and Leon		x	0.68
Castilla-La Mancha		0.59	0.56
Catalonia		0.80	
Valencian Community	x		1.81
Extremadura		0.64	0.13
Galicia		0.73	
Madrid	0.81	0.77	0.65
Region of Murcia		0.68	
Chartered Community of Navarre			1.92
Basque Country	0.79		1.53
La Rioja			0.38
Ceuta/Melilla		0.27	
Smoker	x	Tobacco 1.60	0.62
Drinker	1.65	Alcohol x	1.57
Physical activity	0.59	Physical activity 1.54	x

*Note* : a binary logistic regression model was run for each of the dependent variables and they are reported in columns. They were controlled by the seven independent variables previously specified (reported in rows). For each dependent variable, the other two dependent ones were included as covariates of the logistic regression models, since they could be potentially correlated (see tables 1, 2 and 3). These covariates are reported in the last three rows of this table. The figures of the table correspond with those results (odds ratios) of the logistic models which reached statistical significance ( $p < 0.05$ ). A blank cell denotes a particular result (odds ratio) of a logistic regression model which did not reach statistical significance. An "x" appears in those cells for which a comparison would not make sense (eg. when "Smoker" is considered the dependent variable, "Smoker" cannot be a covariate in that logistic regression model).



### *Tobacco use*

Predictors for tobacco use would be: male sex, younger age, Spanish nationality, living alone, lower level of education and lower level of social class. A prior study (Martín Álvarez et al., 2021), based in the SNHS 2014 for population older than 15 years, found that for the same dependent dichotomous variable, the following regressors associated with a higher prevalence of cigarette consumption are: being male, being aged between 36 and 65, being divorced, belonging to a lower social class, not having university studies, being unemployed and having worse economic situation. There are some differences in the variable age, which could be explained because that study defined it as a categorical variable (Martín Álvarez et al., 2021), whereas ours set it as a continuous one for adult population. That may have had an impact in the results. It would be worth mentioning three international studies (Barbeau et al., 2004; Hitchman et al., 2014; Nargis et al., 2019), suggesting some predictors for smoke initiation and cessation (like, young age, lack of employment, lower affordability, residence in deprived areas, or smoking friends).

Another study (Tarrazo et al., 2017) found a 21.8% prevalence of smokers in Spanish population older than 15 years in 2015, which is close to our estimated 21.4% prevalence of smokers older than 18 years. As highlighted before for alcohol consumption, we found again underreported data in the EHIS 2020: by extrapolating from its sample, it could be estimated that the Spanish adult population smoked around 100.8 million cigarettes during 2020. Nevertheless, the Spanish Ministry of Finance and Civil Service reported sales of more than 43,100 million of cigarettes during that year (Spanish-Ministry-of-Finance-and-Civil-Service). The difference is large, even if the official data includes consumption by non-adult population and visitors, and it excludes sales in the autonomous region of Canary Islands. These facts bring an additional component of support for our decision to consider tobacco and alcohol use as dichotomous variables.

### *Physical activity*

Predictors for higher level of physical activity would be male sex, younger age, Spanish nationality, living as a couple, higher education and higher social class.

A national study had reported a correlation between having university studies and decreasing the physical inactivity during the spare time (Maestre-Miquel et al., 2014). Other national and international studies were also found (Casado-Pérez et al., 2015; Haenle et al., 2006) however, all their designs were different from ours, what raises caution to compare their results.

### *Other considerations*

The COVID-19 pandemic does not seem to have had any remarkable impact on the results of this work. The EHIS 2020 was conducted between July of 2019 and July of 2020 (INE). The first case of COVID-19 in Spain was reported the 1<sup>st</sup> of February of 2020 (Spanish-National-Security-Department) and there were 278,782 cases reported by end of July (Spanish-Ministry-of-Health), what would account for lower than 1% of the total Spanish population. We had previously conducted a analogous analysis with data from the Spanish National Health Survey conducted in 2016-2017 (INE), with very similar results, despite some differences in the methodology.

In many cases, it was found a statistically significant association between autonomous regions and the dependent variables of the analysis. However, no clear pattern was identified. For each of the analyses, the other 2 dependent variables also showed statistically significant association. These facts suggest to consider autonomous region, physical activity, tobacco and alcohol use, as control variables.

The results presented here contribute to the identification of socioeconomic factors, as predictors for physical activity, tobacco and alcohol use, in adult Spanish population. Besides, the research could be replicated in any countries conducting the European Health Interview Survey.

A number of limitations to this study need to be discussed. Like all cross-sectional studies, the EHIS 2020 allows to identify statistical associations, but not to establish cause-effect relationships. Self-reported information can have an influence in interviewees to provide answers which could be socially conditioned (like consumption of alcohol or tobacco being lower than the actual ones, as





highlighted earlier). Recall bias could also be present, although this may be less likely, since we used information related to the respondent's present at the moment of the interview. Finally, the study design worked well to identify associations, but not to provide information about the intensity of the lifestyle habits analyzed.

## CONCLUSIONES (CONCLUSIONS)

Tobacco and alcohol consumption are big public health threats, worldwide and in Spain. Physical activity is proven to help prevent and/or treat a number of diseases. Despite the limitations of the literature, the evidence suggests that sex, age, foreign nationality, cohabitation, education and social class are associated to these three lifestyle habits in the Spanish adult population. Thus, policy makers would need to explore new formats and different types of information contents for the groups at risk, ensuring that the information is accessible and understandable for them. Future research would benefit by estimating the actual impact of socioeconomic factors in physical activity, tobacco and alcohol use, from the perspective of patients, health systems and society.

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