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Influence of tobacco consumption, age and sex on cardiovascular risk levels

Influencia del consumo de tabaco, la edad y el sexo en los niveles de riesgo cardiovascular

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Abstract

Introduction: For the World Health Organization, cardiovascular disease is responsible for the highest number of deaths in the world.
Material and methods: Descriptive and transversal study in 418343 workers from different Spanish regions in which the influence of sociodemographic variables such as age and sex and tobacco use is valued on the values of different parameters related to cardiovascular risk. Parameters related to overweight and obesity, atherogenic indices, risk scales such as SCORE, REGICOR or vascular age, fatty liver risk scales and metabolic syndrome are determined.
Results: In smokers the prevalence of altered values is lower on scales related to overweight and obesity, atherogenic indices, high blood pressure, lipid profile, metabolic syndrome and fatty liver scales. Cardiovascular risk scales such as SCORE, REGICOR and vascular age have worse values in smokers.
Conclusions: Age and sex influence the appearance of all the parameters studied .There is variability in the results of cardiovascular risk, obesity and fatty liver when related to tobacco consumption.

Keywords: Cardiovascular risk, tobacco, sociodemographic variables.

Resumen

Introducción: La Organización Mundial de la Salud describe las enfermedades cardiovasculares con las responsables del mayor número de muertes en el mundo.
Material y métodos: Estudio descriptivo y transversal en 418.343 trabajadores de diferentes regiones españolas en el que se valora la influencia de variables sociodemográficas como edad y sexo y consumo de tabaco en los valores de diferentes parámetros relacionados con riesgo cardiovascular. Se determinan parámetros relacionados con sobrepeso y obesidad, índices aterogénicos, escalas de riesgo como SCORE, REGICOR o edad vascular, escalas de riesgo de hígado graso y síndrome metabólico
Resultados: En los fumadores la prevalencia de valores alterados es inferior en las escalas relacionadas con sobrepeso y obesidad, índices aterogénicos, hipertensión arterial, perfil lipídico, síndrome metabólico y escalas de hígado graso. Las escalas de riesgo cardiovascular como SCORE, REGICOR y edad vascular presentan peores valores en los fumadores.
Conclusiones: La edad y el sexo influyen en la aparición de todos los parámetros estudiados. Existe variabilidad en los resultados de riesgo cardiovascular, obesidad e hígado graso cuando se relacionan con el consumo de tabaco.

Palabras clave: Riesgo cardiovascular, tabaco, variables sociodemográficas.

Introduction

According to the World Health Organisation's Global Status Report on Health, cardiovascular diseases are responsible for the greatest number of deaths in the world[1]. In developed countries, especially the United States and Europe, one person dies every 39 seconds[2], and in Spain there are 51,870 deaths per year due to this cause.

Although its frequency is higher in people over 60 years of age, one in four deaths under this age is related to them. This suggests that the increase in the prevalence of cardiovascular disease may be secondary to an increase in the different risk factors, also influenced by multiple extra-health factors: political, economic, socio-cultural and environmental[3-5].

Among the risk factors, tobacco use, high cholesterol, high blood pressure, insufficient physical activity, obesity and diabetes are the major contributors to the development of CVD[6].

The world's population is growing at the same time as the population is ageing, leading to an increase in the different cardiovascular risk factors (CVRFs) that have an impact on the health status of the general population. Cardiovascular disease (CVD) is currently one of the main public health concerns in all countries and involves different sectors of society, as health promotion should extend throughout an individual's life, from the earliest ages, when healthy lifestyle habits begin to be acquired, to adulthood and old age[7].

As the working stage is a considerable period in people's lives and their behavioural habits will have an impact on both their current and future health. The aim of this study is to estimate cardiovascular risk in the Spanish working population and its relationship with sociodemographic variables and tobacco consumption.

Material and methods

Retrospective, cross-sectional study in a sample of 418,343 workers from different Spanish regions and different productive sectors during the period from January 2019 to June 2020. Participants were selected among those who attended periodic occupational health check-ups.

Inclusion criteria

- Age between 18 and 80 years.
- Be in active employment.
- Agree to participate in the study.
- Consent to the use of the data for epidemiological purposes

Socio-demographic variables were collected: age (years) and sex (male/female). Lifestyle habits: tobacco consumption, a smoker was considered to be a person who had regularly consumed at least 1 cigarette/day (or the equivalent in other types of consumption) in the last month, or who had given up consumption less than one year ago.

Parameters related to cardiovascular risk: overweight and obesity, atherogenic indices, CV risk scales: SCORE, REGICOR or vascular age, fatty liver risk scales and metabolic syndrome.

All measurements were taken by the healthcare staff of the different occupational health units participating in the study, after standardising the measurement techniques. Weight and height: a scale-measuring device is used: SECA model 700; Abdominal waist circumference is measured in cm with a tape measure: SECA model 20; BMI is calculated by dividing weight by height in metres squared. Obesity is considered to be 30 or more.

To estimate the percentage of body fat we use the CUN BAE[8] equation (Clínica Universitaria de Navarra Body Adiposity Estimator) whose formula is:

$$44{,}988 + (0{,}503 \times \text{edad}) + (10{,}689 \times \text{sexo}) + (3{,}172 \times \text{IMC}) - (0{,}026 \times \text{IMC}^2) + (0{,}181 \times \text{IMC} \times \text{sexo}) - (0{,}02 \times \text{IMC} \times \text{edad}) - (0{,}005 \times \text{IMC}^2 \times \text{sexo}) + (0{,}00021 \times \text{IMC}^2 \times \text{edad})$$

A value of 0 is applied to the male and 1 to the female. The CUN BAE cut-off points for obesity are from 25% in men and 35% in women.

Blood pressure was examined in the supine position with a calibrated OMRON M3 automatic sphygmomanometer after 10 minutes of rest. Three determinations were made at one-minute intervals and the mean value of the three determinations was obtained. Blood samples were obtained by peripheral venipuncture after fasting for 12 hours and were sent to the reference laboratories where they were processed within 48-72 hours. Blood glucose, total cholesterol and triglycerides were determined by automated enzymatic methods, expressing the values in mg/dl. HDL was calculated by precipitation with dextran-sulphate Cl2Mg, and values were expressed in mg/dl. LDL is estimated by the Friedewald formula (provided triglycerides are below 400 mg/dl) and expressed in mg/dl.

Fórmula de Friedewald:
LDL= colesterol total –HDL– triglicéridos/5

Blood glucose values are classified according to the recommendations of the American Diabetes Association[9], with hyperglycaemia being considered to be 125 mg/dl or higher or if the person is taking hypoglycaemic treatment.

Three atherogenic indices are calculated: Cholesterol/HDL (high values from 5 in men and 4.5 in women), LDL/HDL and Triglycerides/HDL (high values from 3)[10].

Metabolic syndrome is determined using three models:

1st NCEP ATP III (National Cholesterol Educational Program Adult Treatment Panel III) is considered to exist if three or more of these factors are present: waist circumference greater than 88 cm in women and 102 in men, triglycerides from 150 mg/dl or specific treatment, blood pressure from 130/85 mm Hg or antihypertensive treatment, HDL less than 40 mg/dl in women or less than 50 in men or specific treatment and fasting blood glucose from 100 mg/dl or with specific treatment.

2nd International Diabetes Federation (IDF)[11] the presence of central obesity (waist circumference over 80 cm in women and 94 cm in men) is essential, in addition to two of the other factors indicated above for ATP III (triglycerides, HDL, blood pressure and glycaemia).

3rd JIS Model[12] criteria similar to NCEP ATPIII but with waist circumference cut-off points from 80 cm in women and 94 cm in men.

The REGICOR scale is an adaptation of the Framingham scale to the Spanish population[13] and assesses the risk of suffering a cerebrovascular event over a 10-year period. It allows calculation between 35 and 74 years of age. The risk is considered moderate at 5% and high at 10% and above[14].

SCORE scale for low-risk countries is the one used in Spain[15-16] and determines the risk of suffering a fatal cerebrovascular event in a 10-year period. It allows calculation between 40 and 65 years of age. Moderate risk is defined as 4% and high risk as from 5%. For vascular age, calibrated tables[17] are used to assess the degree of ageing of the arteries and can be calculated from the age of 30.

Visceral adiposity index (VAI)[18]

Male:

$$VAI = \left(\frac{WC}{39{,}68 + (1{,}88 \times BMI)}\right) \times \left(\frac{TG}{1{,}03}\right) \times \left(\frac{1{,}31}{HDL}\right)$$

Female:

$$VAI = \left(\frac{WC}{39{,}58 + (1{,}89 \times BMI)}\right) \times \left(\frac{TG}{0{,}81}\right) \times \left(\frac{1{,}52}{HDL}\right)$$

The Body Roundnes index19 (BRI) is calculated using the following formula where WC represents waist circumference, BMI represents BMI and height represents height.

$$BRI = 364{,}2 - 365{,}5 \times \sqrt{1 - \left(\frac{(WC/(2\pi))^2}{(0{,}5\ height)^2}\right)}$$

Lipid accumulation product (LAP)[20]

- Men: (waist circumference (cm) – 65) x (trigycerides (mMol)).
- Women: (waist circumference (cm) – 58) x (trigycerides (mMol))

Fatty liver index (FLI)[21] Determination of the risk of non-alcoholic fatty liver disease is determined by the formula:

$$FLI = (e^{0.953*\log_e(\text{triglycerides}) + 0.139*BMI + 0.718*\log_e(\text{ggt}) + 0.053*\text{waist circumference} - 15.745}) / (1 + e^{0.953*\log_e(\text{triglycerides}) + 0.139*IMC + 0.718*\log_e(\text{ggt}) + 0.053*\text{waist circumference} - 15.745}) \times 100$$

High risk is considered to be 60

Atherogenic dyslipidaemia[22] is characterised by high triglyceride concentrations (>150 mg/dl), low HDL (<40 mg/dl in men and <50 mg/dl in women) and normal or slightly elevated LDL. If LDL values are high (>160 mg/dl) we speak of lipid triad.

Statistical analysis

A descriptive analysis of the categorical variables is carried out, calculating the frequency and distribution of responses for each of them. For quantitative variables, the mean and standard deviation are calculated, and for qualitative variables, the percentage is calculated. The bivariate analysis of association was carried out using the 2 test (with correction of Fisher's exact statistic when conditions required it) and Student's t-test for independent samples. For the multivariate analysis, binary logistic regression was used with the Wald method, with the calculation of Odds ratios and the Hosmer-Lemeshow goodness-of-fit test. The statistical analysis was carried out with the SPSS 27.0 programme, the accepted level of statistical significance being 0.05.

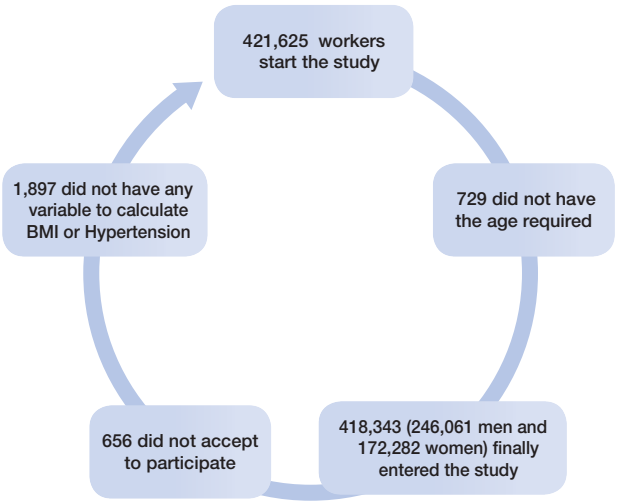
Ethical considerations and aspects

The study was approved by the Clinical Research Ethics Committee of the Illes Balears health area no. IB 4383/20. All procedures were performed in accordance with the ethical standards of the institutional research committee and the 2013 Declaration of Helsinki. All patients signed written informed consent documents before participating in the study.

Results

Of the 421,625 workers who were invited to participate in the study, 1,897 were excluded as they did not have all the variables needed to calculate cardiovascular risk indicators, 656 did not agree to participate and 729 were under 18 or over 80 years of age and were therefore discarded. The final number of workers included in the study was 418,343 (246,061 men and 172,282 women) (**Figure 1**).

Figure 1: Participant flow chart.



The characteristics of the sample and the values of the sociodemographic, anthropometric, clinical and analytical parameters of our population are presented in **table I**.

The parameters related to overweight and obesity (BMI, CUN BAE, and BRI) show somewhat lower values in the group of smokers of both sexes; however, the CVR scales (vascular age, REGICOR and SCORE) show much higher values among smokers, both in women and men. The results for fatty liver (FLI and LAP) in female smokers are lower than in non-smokers, while in men the FLI shows very little difference between smokers and non-smokers. Atherogenic indices, in general, are somewhat lower in smokers of both sexes. **Table II**.

The prevalence of overweight and obesity is lower in both men and women among smokers, as is the case for metabolic syndrome. Similar results were found for arterial hypertension and lipid profile (with the exception of triglycerides in men) which give better results in smokers. Elevated cholesterol/HDL and LDL/HDL atherogenic indices are more frequent in non-smokers of both sexes, while high triglycerides/HDL is more frequent in smokers. Elevated CVR scores on the REGICOR and SCORE scales are much more frequent among men and women who smoke. In contrast, high-risk FLI is less frequent among smokers, with a very high difference between the two female sex groups (**Table III**).

In the multivariate analysis by means of binary logistic regression, male sex, age from 50 years onwards and tobacco consumption were established as covariates. Age and sex show influence on the occurrence of all parameters analysed, in the case of age the Odds ratios range from 1.51 (95% CI 1.49-1.53) for waist/height >0.50 to 73.44 (95% CI 69.96-77.08) for moderate-high SCORE, while in sex they range from 1.10 (95% CI 1.09-1.12) for high cholesterol to 16.02 (95% CI 15.36-16.70) for moderate-high SCORE. Tobacco appears as a mild protective factor for overweight and obesity parameters and high HBP and high LDL and moderate inducer for high triglycerides, atherogenic dyslipidaemia, lipid triad, atherogenic triglycerides/HDL and high REGICOR. In the SCORE scale, smoking greatly increases the risk (Odds ratio 7.62 CI 95% 7.35-7.90). The other parameters analysed were not influenced by smoking (**Table IV**).

Discussion

The results of our work show that the prevalence of high levels of overweight and obesity is lower in both women and men among smokers. These results are in line with other studies in which this discrepancy is observed between the prevalence of these health outcomes in relation to lifestyle and tobacco use, where caution is recommended when using data obtained from these databases when relating aspects such as the prevalence of tobacco use and overweight/obesity[23].

However, CVR scales (vascular age, REGICOR and SCORE) show much higher values among smokers in both women and men. Tobacco use has been considered by some authors as the forgotten factor in the calculation of cardiovascular risk despite the fact that

Tabla I: Characteristics of the sample.

	Women n=172282 Mean (dt)	Man n=246061 Mean (dt)	Total n=418343 Mean (dt)	p
Age	39,58 (10,78)	40,57 (11,06)	40,16 (10,96)	<0.0001
Height	161,83 (6,49)	174,62 (6,97)	169,35 (9,25)	<0.0001
Weight	66,23 (13,98)	81,36 (14,71)	75,13 (16,23)	<0.0001
Waist	74,77 (10,55)	86,16 (11,09)	81,47 (12,23)	<0.0001
SBP	117,43 (15,66)	128,17 (15,53)	123,74 (16,45)	<0.0001
DBP	72,59 (10,40)	77,75 (10,96)	75,62 (11,03)	<0.0001
Cholesterol	190,62 (35,82)	192,55 (38,87)	191,75 (37,65)	<0.0001
HDL	56,75 (8,65)	50,30 (8,49)	52,96 (9,13)	<0.0001
LDL	116,10 (34,80)	118,03 (36,69)	117,23 (35,93)	<0.0001
Triglycerides	89,11 (46,18)	123,71 (86,39)	109,46 (74,56)	<0.0001
Glucose	87,80 (15,14)	93,28 (21,26)	91,02 (19,17)	<0.0001
ALT	20,21 (13,56)	31,00 (20,20)	26,64 (18,58)	<0.0001
AST	18,15 (7,91)	24,42 (13,30)	21,71 (11,73)	<0.0001
GGT	20,41 (19,69)	35,77 (39,25)	29,56 (33,64)	<0.0001
	%	%	%	p
16-29 years	20,67	18,78	19,56	<0.0001
30-39 years	29,67	27,55	28,42	
40-49 years	29,61	30,05	29,87	
50-59 years	16,81	19,72	18,52	
60-80 years	3,24	3,90	3,63	
Non-smokers	67,17	66,62	66,85	<0.0001
Smokers	32,83	33,38	33,15	

Table II: Mean values of CVR-related parameters according to tobacco use by gender.

	Women			Men		
	Non smoker n=115727 Mean (dt)	Smoker n=56555 Mean (dt)	p	Non smoker n=163920 Mean (dt)	Smoker n=82141 Mean (dt)	p
Age	39,71 (10,79)	39,32 (10,76)	<0.0001	40,75 (11,05)	40,22 (11,07)	<0.0001
BMI	25,34 (5,16)	25,20 (5,14)	<0.0001	26,71 (4,47)	26,57 (4,46)	<0.0001
Waist to height ratio	0,46 (0,06)	0,46 (0,06)	<0.0001	0,49 (0,06)	0,49 (0,06)	<0.0001
CUN BAE scale	35,25 (7,13)	35,02 (7,14)	<0.0001	25,57 (6,61)	25,29 (6,64)	<0.0001
Body roundness index	2,76 (1,20)	2,74 (1,19)	<0.0001	3,31 (1,17)	3,30 (1,17)	<0.0001
Visceral adiposity index	2,70 (1,65)	2,72 (1,66)	<0.0001	7,36 (6,40)	7,46 (6,63)	<0.0001
Years lost of vascular age SCORE	2,67 (4,31)	7,39 (5,40)	<0.0001	5,27 (5,48)	12,65 (6,95)	<0.0001
SCORE	0,36 (0,71)	0,71 (1,33)	<0.0001	1,32 (1,64)	2,69 (3,01)	<0.0001
Years lost vascular age Framingham	-1,93 (10,81)	6,69 (12,06)	<0.0001	2,93 (8,59)	14,33 (9,88)	<0.0001
REGICOR scale	2,85 (2,20)	2,97 (2,23)	<0.0001	3,15 (2,15)	3,65 (2,50)	<0.0001
Fatty liver index	18,22 (21,77)	18,16 (21,77)	<0.0001	37,86 (27,48)	37,64 (27,52)	<0.0001
Lipid accumulation product	18,10 (18,23)	18,03 (18,43)	<0.0001	31,69 (32,90)	31,98 (33,71)	<0.0001
Atherogenic index cholesterol/HDL	3,45 (0,88)	3,44 (0,87)	<0.0001	3,96 (1,13)	3,96 (1,16)	<0.0001
Atherogenic index triglycerides/HDL	1,63 (0,98)	1,63 (0,98)	<0.0001	2,60 (2,09)	2,64 (2,15)	<0.0001
Atherogenic index LDL/HDL	2,12 (0,79)	2,11 (0,78)	<0.0001	2,45 (0,96)	2,44 (0,97)	<0.0001

Table III: Prevalence of altered values of CVR-related parameters according to tobacco consumption by gender.

	Women			Men		
	Non smoker n=115727 %	Smoker n=56555 %	p	Non smoker n=163920 %	Smoker n=82141 %	p
Waist to height ratio >0,50	21,72	21,18	<0.0001	41,65	41,20	<0.0001
Overweight BMI	27,49	26,92	<0.0001	41,79	41,00	<0.0001
Obesity BMI	16,51	16,04	<0.0001	19,84	19,14	<0.0001
Overweight CUN BAE	27,17	26,72	<0.0001	28,33	28,49	<0.0001
Obesity CUN BAE	48,18	47,17	<0.0001	52,40	50,76	<0.0001
Hypertension	13,74	13,12	<0.0001	29,01	28,35	<0.0001
Cholesterol ≥ 200	37,11	36,56	<0.0001	40,24	39,90	<0.0001
LDL ≥ 130	32,21	31,48	<0.0001	36,31	35,74	<0.0001
Triglycerides ≥ 150	7,99	7,94	<0.0001	23,75	24,13	<0.0001
Diabetes	1,33	1,33	<0.0001	3,57	3,53	<0.0001
Metabolically unhealthy	50,67	50,02	<0.0001	68,99	68,47	<0.0001
Metabolic syndrome ATPIII	9,66	9,44	<0.0001	16,94	16,67	<0.0001
Metabolic syndrome IDF	9,41	9,23	<0.0001	13,21	13,22	<0.0001
Metabolic syndrome JIS	11,21	10,98	<0.0001	27,75	27,31	<0.0001
Atherogenic dyslipidemia	4,00	3,93	<0.0001	7,54	8,11	<0.0001
Lipid triad	0,99	1,01	<0.0001	2,04	2,50	<0.0001
Cholesterol/HDL moderate-high	11,83	11,17	<0.0001	16,74	16,42	<0.0001
Triglycerides/HDL high	7,06	7,10	<0.0001	26,60	26,83	<0.0001
LDL/HDL high	13,13	12,63	<0.0001	25,93	25,83	<0.0001
SCORE moderate-high	2,09	10,39	<0.0001	19,61	41,87	<0.0001
REGICOR moderate-high -very high	17,69	18,42	<0.0001	19,79	26,85	<0.0001
FLI high risk	7,73	1,28	<0.0001	24,25	24,08	<0.0001

Table IV: Multivariate analysis using binary logistic regression.

	≥ 50 years			Male			Smokers		
	OR	IC 95%	p	OR	IC 95%	p	OR	IC 95%	p
Waist to height ratio >0,50	1,51	1,49-1,53	<0.0001	2,56	2,53-2,60	<0.0001	0,98	0,97-0,99	0.012
Obesity BMI	1,75	1,72-1,78	<0.0001	1,22	1,20-1,24	<0.0001	0,97	0,95-0,98	<0.0001
Obesity CUN BAE	4,57	4,49-4,64	<0.0001	1,13	1,11-1,14	<0.0001	0,96	0,95-0,97	<0.0001
Hypertension	3,78	3,72-3,84	<0.0001	2,60	2,56-2,64	<0.0001	0,98	0,96-0,99	0.008
Cholesterol ≥ 200	2,87	2,83-2,91	<0.0001	1,10	1,09-1,12	<0.0001			ns
LDL ≥ 130	2,92	2,88-2,96	<0.0001	1,16	1,15-1,18	<0.0001	0,98	0,97-0,99	0.024
Triglycerides ≥ 150	1,91	1,88-1,95	<0.0001	3,58	3,51-3,65	<0.0001	1,02	1,01-1,04	0.010
Diabetes	6,57	6,40-6,75	<0.0001	1,97	1,91-2,03	<0.0001			ns
Metabolically unhealthy	3,91	3,83-3,98	<0.0001	1,86	1,83-1,90	<0.0001			ns
Metabolic syndrome ATPIII	2,31	2,26-2,36	<0.0001	1,43	1,40-1,46	<0.0001			ns
Metabolic syndrome IDF	3,78	3,71-3,84	<0.0001	3,08	3,03-3,14	<0.0001			ns
Metabolic syndrome JIS	2,56	2,49-2,62	<0.0001	1,96	1,90-2,02	<0.0001	1,07	1,04-1,10	<0.0001
Atherogenic dyslipidemia	2,79	2,66-2,92	<0.0001	2,13	2,02-2,25	<0.0001	1,20	1,14-1,26	<0.0001
Lipid triad	3,29	3,23-3,35	<0.0001	1,49	1,47-1,52	<0.0001			ns
Cholesterol/HDL moderate-high	2,25	2,21-2,29	<0.0001	4,76	4,66-4,85	<0.0001	1,02	1,00-1,04	0.014
Triglycerides/HDL high	3,19	3,14-3,25	<0.0001	2,33	2,29-2,37	<0.0001			ns
LDL/HDL high	73,44	69,96-77,08	<0.0001	16,02	15,36-16,70	<0.0001	7,62	7,35-7,90	<0.0001
SCORE moderate-high	2,09	2,06-2,13	<0.0001	1,27	1,24-1,29	<0.0001	1,33	1,30-1,35	<0.0001
REGICOR moderate-high -very high	1,78	1,75-1,82	<0.0001	3,76	3,68-3,85	<0.0001			ns

its crucial role is acknowledged, and that its approach and treatment should be a priority in both primary and secondary prevention of cardiovascular disease (CVD). Despite this, hypertension, diabetes or dyslipidaemia are usually addressed preferentially, accompanied by the advice "you should stop smoking"[24]. The results obtained in our study demonstrate the impact of smoking on cardiovascular risk, which are supported by previous studies showing that smoking reduction is not associated with a reduction in the risk of cardiovascular and pulmonary mortality and morbidity. Reducing smoking by 50% or less has little or no effect on morbidity and mortality. The review conducted by Underner et al. between 1980 and 2018 shows that smoking cessation is the only effective strategy to reduce the harm caused by smoking[25].

In relation to fatty liver disease (FLI), our results find a lower frequency of FLI among smokers, with much more pronounced differences between groups of women. These results do not agree with those obtained in the literature review in which a systematic review and meta-analysis significantly associate smoking with non-alcoholic fatty liver disease, although it leaves open the option of prospective studies exploring the underlying mechanisms of this association. This review states that passive smoking increases the risk of non-alcoholic fatty liver disease by about 1.38-fold, and that the effects of cigarette smoking in active smokers (current, former and total smokers) are smaller than those in passive smokers. The different criteria and disparity of results suggest that further studies should be conducted to assess the effects of passive and active smoking on non-alcoholic fatty liver disease[26].

In our results, male sex and age over 50 years increase CVR in smokers. Prospective studies relating CV risk associated with tobacco consumption confirm a higher risk of all cardiovascular disease subtypes in active smokers and a greater severity for women than for men when they suffer a major coronary event[27].

Scientific studies show that the prevalence of the main cardiovascular risk factors and non-communicable diseases is higher among older people and men, but more preventive actions and programmes are recommended in all cases, such as health education for workers[28].

Smoking increases the risk of all types of CVD, doubling the probability of suffering from them, and is the leading cause of avoidable illness, death and disability in Spain[29]. Among the different cardiac pathologies, paroxysmal tachycardia is a recently identified smoking-related risk. Where comparisons can be made, the relative risks of fatal and non-fatal outcomes associated with smoking are similar. And smoking cessation significantly reduces the risk.

In today's society, smoking remains a widespread and established habit, and government action is insufficient to contain this pandemic. Tobacco use represents an essential trigger for a high proportion of premature CVD events and action against it should be a public health priority[30].

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