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ORIGINAL

Influence of tobacco consumption: anthropometric, social and demographic variables on the spirometric values among spanish workforce

Influencia del consumo de tabaco, variables antropométricas y sociodemográficas en los valores espirométricos de trabajadores españoles

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Abstract

Introduction: The association between tobacco consumption and a high number of chronical conditions -both respiratory and non-respiratory- has been established. Among the respiratory diseases, besides cancer: Chronic-Obstructive Pulmonary Disease (COPD), and conditions affecting the small airways, have been associated with smoking habit.
Aim: to determine the influence of tobacco consumption, physical activity, and different socio-demographic (age and sex) and anthropometric (BMI) variables, on spirometry values; and to assess the utility of spirometry as an early detection instrument of respiratory conditions in the occupational environment.
Material and Methods: A prospective, observational study, including 4,310 workers attending specific annual physical on a group of Spanish companies was run during 2019. Tests were performed by specially trained healthcare workers, to obtain high-quality, reliable data output. Smoker and non-smoker workers were separately studied.
Results: Results on the influence of cumulative tobacco consumption (packages-year) on pulmonary function show a gradual worsening of pulmonary function parameters as cumulative tobacco consumption increases. Multi-variate analysis, by separately taking smoker and non-smoker groups, shows that all analysed risk factors seem to influence on pulmonary function, although they do not all have same strength in it. Those having a stronger influence are age and physical exercise among non-smokers, and cumulative consumption (packages-year) among smokers.
Conclussions: Spirometry is a good screening and follow-up method for patients with a respiratory condition, particularly those with COPD, mostly among smokers. Our study shows a clear relation between tobacco consumption and pulmonary function deterioration, both on FVC, FEV1 and FEV1/FVC. This relation is mostly established with cumulative consumption (packages-year).

Keywords: Tobacco consumption, Spirometry, biometric characters, pulmonary function worsening.

Resumen

Introducción: Se ha establecido la asociación entre el consumo de tabaco y un elevado número de enfermedades crónicas -tanto respiratorias como no respiratorias-. Entre las enfermedades respiratorias, además del cáncer La Enfermedad Pulmonar Crónica-Obstructiva (EPOC), y las afecciones que afectan a las vías respiratorias pequeñas, se han asociado al hábito de fumar.
Objetivo: determinar la influencia del consumo de tabaco, la actividad física y diferentes variables sociodemográficas (edad y sexo) y antropométricas (IMC), sobre los valores de la espirometría; y valorar la utilidad de la espirometría como instrumento de detección precoz de afecciones respiratorias en el ámbito laboral.
Material y métodos: Durante el año 2019 se realizó un estudio prospectivo y observacional, que incluyó a 4.310 trabajadores que acudieron a un reconocimiento médico anual específico en un grupo de empresas españolas. Las pruebas fueron realizadas por personal sanitario especialmente entrenado, para obtener una salida de datos fiable y de alta calidad. Se estudiaron por separado los trabajadores fumadores y no fumadores.
Resultados: Los resultados sobre la influencia del consumo acumulado de tabaco (paquetes-año) en la función pulmonar muestran un empeoramiento gradual de los parámetros de función pulmonar a medida que aumenta el consumo acumulado de tabaco. El análisis multivariado, tomando por separado los grupos de fumadores y no fumadores, muestra que todos los factores de riesgo analizados parecen influir en la función pulmonar, aunque no todos tienen la misma fuerza en ella. Los que tienen una mayor influencia son la edad y el ejercicio físico entre los no fumadores, y el consumo acumulado (paquetes-año) entre los fumadores.
Conclusiones: La espirometría es un buen método de cribado y seguimiento de los pacientes con patología respiratoria, en particular de los que padecen EPOC, sobre todo entre los fumadores. Nuestro estudio muestra una clara relación entre el consumo de tabaco y el deterioro de la función pulmonar, tanto en la CVF, como en el VEF1 y en el VEF1/CVF. Esta relación se establece sobre todo con el consumo acumulado (paquetes-año).

Palabras clave: Consumo de tabaco, Espirometría, caracteres biométricos, empeoramiento de la función pulmonar.

Introduction

Smoking was a socially acceptable behaviour until recently. However, during the last fifty years, mostly thanks to the work by Sir Richard Doll[1], the association between tobacco consumption and a high number of chronical conditions –both respiratory and non-respiratory– has been established. Among the respiratory diseases, besides cancer, the following have been associated with smoking habit: Chronic-Obstructive Pulmonary Disease (COPD), and conditions affecting the small airways[2-4]. COPD is particularly linked with tobacco addition in 90% of patients, and there is commonly coexisting structural damage of several conditions within one same patient[5]. Tobacco consumption is the most important single cause for COPD; although its influence in the disease development has been signaled on medical publications since the beginning of the past century, it will be on the second half -particularly as of the '60s when scientific community reaches consensus to consider inhaled tobacco smoke as the fundamental cause for this condition[6]. There are several known ethiopathogenic mechanisms described on the origins of COPD; the disbalance proteolysis/anti-proteolysis that causes tissue destruction and oxidative stress, another mechanism is structural cells apoptosis[7].

Only Spain, tobacco consumption produced about 52,000 deaths every year in the 2010-2014 period, mostly on male population (9 of every 10) and almost 50% due to cancer[8]. To this figures, we should add about 3,000 originated by passive smoking[9]. COPD affects daily occupational and personal activities of those who suffer from it, causing interference on physical and psycho-social performance, and[10] causing severe disabilities on patients during last stages[11].

Nowadays, there is no argument regarding pulmonary function measurements to be a cornerstone to study pulmonary conditions and their possible aftermath. Spirometry is currently considered the basic test to measure pulmonary capacity and determine mechanic ventilatory function. It is also the easiest ,most accesible and most reproducible test to perform[12-13].

This study objective is twofold: first, to determine the influence of tobacco consumption, physical activity, and different socio-demographic (age and sex) and anthropometric (BMI) variables, on spirometry values; secondly, to assess the utility of spirometry as an early detection instrument of respiratory conditions in the occupational environment.

Methodology

Prospective, observational study, including 4,310 workers attending specific annual physical on a group of Spanish companies, from different occupational sectors, who accepted to be included during 2019 (January to December). In accordance with current local legislation, written informed consent was produced for each of them, as well as approval by the Occupational Health and Safety[14].

The following inclusion criteria were considered: active workers with no respiratory pre-existing conditions, voluntary acceptance to participate the study and personal data transfer for epidemiological purposes.

The following workers' demographic data were collected: age or gender; clinical data: height, weight, body-mass index (BMI), physical activity (self-referenced) and tobacco consumption: number of cigarettes per day, years of consumption and number of packages per year.

In order to sort BMI, Spanish Society for the Study of Obesity (SEEDO) criteria were followed[15]: low weight if BMI < 18Kg/m^2, normal weight if between 18,5 and 24,99Kg/m^2, overweight if between 25 and 29,99Kg/m^2, and obesity if > 30 Kg/m^2.

In order to calculate physical activity, the American Heart Association (AHA), American College for Sports Medicine and World Health Organization recommendations were followed. They all consider regular physical activity as 30 minutes per day nonstop, or 150 minutes per week, for a moderate-intensity aerobic activity, or 75 minutes per week for an intense activity[16].

Pulmonary function was assessed through forced spirometry, and the following parameters: Forced Vital Capacity (FVC). Normal values are >80% over theoretical value. Forced Exhaled Volume in the first second (FEV1). Normal values are >80% over theoretical value. Ratio FEV1/FVC: normal values are >70-75%.

GOLD (Global Initiative for Chronic Obstructive Lung Disease)[17] consensus was followed in order to classify COPD. Stade 0, normal spirometry; Stade I-mild, FEV1/CVF <70%; stade II-moderate, FEV1/CVF <70% and FEV1 50-80%; stade III-severe, FEV1/CVF <70%, FEV1 30-50%; and stade IV-critical, if FEV1/CVF <70% and FEV1 <30%, or FEV1 <50%.

Tobacco consumption was assessed as per the number of cigarettes and time since consumption began. Tobacco exposure has a cumulative effect, hence –besides current or punctual consumption– it is of outmost interest global consumption along life. In this sense, it is very interesting the so-called "packages-year" indicator, which is calculated by multiplying number of daily cigarettes times the number of years being smoker, divided by twenty.

Working protocole

An anamnesis was performed, including personal background, age and gender; anthropometric data, such as height, weight and BMI, and data on tobacco consumption. Later, a forced spirometry was taken.

Method

Spirometries were performed with Datospir-120 (manufactured by SIBEL S.A.) spirometers. In order to obtain optimal outcomes, manufacturers' instructions for use and calibration were followed. Tests were performed by specially trained healthcare workers, to obtain high-quality, reliable data output. Generic recommendations were followed to harmonise results and reduce inter-observers' bias, both on patients' preparation and test execution, following SEPAR (Spanish Society of Pulmonology and Thoracic Surgery) and ERS (European Respiratory Society) criteria[18].

Smoker and non-smoker workers were separately studied. An univariate and multi-variate study was performed for each of them. First study values the influence of the different risk factors considered (age, gender, BMI, physical exercise, packages-year and consumption time) over the spirometry parameters (FVC, FEV1, FEV1/FVC and %FEV1/FVC<70). Multi-variate analysis estimates which among risk factors really influence pulmonary function end values.

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Statistical analysis

SPSS™ 16.0 ran uni-variate and multi-variate analysis. For uni-variate análisis, average, standard deviation and 95% confidence interval were taken. Prior to analysis, a sample normal distribution test was run through a Kolmogorov-Smirnov test. In order to compare two parametric variables, Student's-t test was used; and Chi-square to compare two ratios. Multi-variate analysis was performed through multiple regression via stepwise regression, since this allows us to elaborate a predictive model on which among the analysed risks factors really have an influence on the dependent variable –in our case, pulmonary function parameters–. We chose forward stepwise regression, since it allows us to clearly observe how the different risk factors progressively add up, and proportionally to the weighing they have on the pulmonary function parameters. We will assess –among non-smokers– real influence of gender, age, BMI and physical exercise, taken together over the pulmonary function parameters: FCV, FEV1 and FEV1/FVC. For smokers –besides the previously stated factors–, we Will add tobacco consumption. Tobacco consumption will be assessed on one side, only calculating cumulative consumption (represented by the number of packages-year), and on the other, by also measuring the number of daily cigarettes and time since consumption started.
For best tables understanding, we should focus our attention on the third box, called R squared. The value on top is the total pulmonary function parameter percentage being studied, and that can be explained by taking into account the risk factor with a higher impact; the second value (which will be greater than the first) will indicate the attributable percentage to the sum of the two most important risk factors, and so on. Last value indicates the pulmonary function parameter total percentage that can be explained by considering all the analysed risk factors that have an influence. If a risk factor under study does not appear on the box, this will mean it does not influence the pulmonary function parameter values. Risk factors are called predictor variables, and are: age, gender, BMI, physical exercise and tobacco consumption (packages-year, number of cigarettes, years consumption started)

Analysis were run on statistical package SPSS™ 27.0.

Table I: Population general features.

	Non-smokers n=2462 average (sd)	Smokers n=1848 average (sd)
Age	40,5 (11,7)	44,4 (10,7)
BMI	25,4 (8,3)	24,3 (8,1)
Number of Cigarettes		18,1 (9)
Years consumption		21,2 (10,2)
Packages/year		20,6 (8,5)
FVC	97,5 (10,8)	92,9 (11,8)
FEV1	95,2 (10,3)	86,3 (9,6)
FEV1/FVC	83,9 (5,9)	77,2 (8,3)
	%	%
Female	54,4	39,3
Male	45,6	60,7
No exercise	52,9	62,4
Yes exercise	47,1	37,6
FEV1/FVC < 70 (%)	1,4	24,5

*Packages-year ratio is obtained by multiplying the number of cigarettes by consumption years, divided by 20. FVC: Forced Vital Capacity. FEV1: Forced Espiratory Value on the 1st second of a forced exhalation. FEV1/FVC: Is the FVC percentage exhaled during the first second of forced exhalation manoeuvres.

Results

4310 participants (workers) are occupationally active within the 18-67YO age range. 2462 were non-smokers and 1848 frequent smokers. Study population features are show non **table I**.

The influence of variables gender, age, BMI and physical exercise on Pulmonary function spirometry results are displayed on table 2. FVC and FEV/FVC obtained values, both on non-smoking male and female subjects do not show statistically significant differences (P=,84 and ,93), whereas FEV1 values does seem to have a gender influence, showing higher values on females. All three parameters (FVC, FEV1 and FEV1/FVC) progressively decrease as age increases. There are statistically significant differences (P<,05) on FEV1 values among all considered age groups, whereas FVC and FEV1/

Table II: Variables of study influence on pulmonary function values among smokers and non-smokers

	Non-smokers				Smokers				
		FVC*	FEV1*	FEV1/ FVC*		FVC*	FEV1*	FEV1/ FVC*	FEV1/FVC < 70*
	n	average (sd)	average (sd)	average (sd)	n	average (sd)	average (sd)	average (sd)	%
Female	1340	97,5 (11,2)	95,8 (10,7)	83,9 (6,6)	727	92,6 (12,3)	87,1 (9,3)	78,2 (8,2)	20,5
Male	1122	97,5 (10,9)	94,4 (9,8)	83,8 (5,9)	1121	93,1 (11,4)	85,8 (9,8)	76,7 (8,3)	25,3
< 30 YO	492	99,0 (11,8)	98,7 (10,3)	86,0 (5,9)	227	97,1 (5,9)	94,6 (5,8)	81,9 (7,0)	4,8
30-39 YO	758	98,9 (10,8)	97,1 (9,9)	85,2 (6,1)	369	95,2 (7,0)	92,6 (6,7)	81,4 (7,1)	7,0
40-49 YO	616	97,5 (10,4)	94,6 (10,2)	83,2 (4,9)	578	92,0 (8,4)	86,2 (8,3)	77,1 (7,5)	22,0
50-59 YO	362	95,0 (10,5)	91,5 (9,8)	81,5 (6,3)	561	88,2 (8,6)	80,9 (8,8)	74,1 (7,8)	37,4
≥ 60 YO	234	93,4 (7,1)	88,6 (7,3)	80,6 (4,4)	113	84,4 (7,3)	76,6 (6,8)	71,4 (9,8)	52,2
Low weight	182	96,2 (9,3)	93,7 (8,7)	84,0 (5,9)	151	90,9 (9,6)	87,3 (9,5)	78,1 (9,3)	19,9
Normal weight	1080	100,7 (11,1)	98,5 (10,7)	84,9 (6,0)	681	94,4 (12,5)	87,6 (9,8)	77,8 (8,6)	23,8
Overweight	841	93,3 (9,7)	93,3 (8,9)	83,3 (6,2)	710	92,3 (11,0)	86,3 (9,2)	77,5 (7,6)	21,3
Obesity	359	92,6 (11,1)	90,0 (9,5)	82,0 (5,2)	306	90,2 (12,2)	82,7 (9,6)	75,3 (8,4)	29,4
Exercise	1160	100,1 (10,6)	97,4 (10,0)	86,0 (5,5)	694	96,3 (11,2)	90,1 (7,9)	80,0 (7,1)	9,1
No exercise	1302	95,3 (10,5)	93,1 (10,2)	81,9 (5,7)	1154	90,7 (11,7)	84,0 (9,8)	75,6 (8,6)	32,1

FVC also show statistically significant differences among all groups except those under 30YO and the interval between 30-39YO (p=,896 and ,467, respectively).

Higher values in all three pulmonary function parameters are shown among normal weigh sample population, and lowest among those with obesity. All three pulmonary function parameters show statistically significant (p<,05) differences among all BMI groups, except between low weight and obesity for FVC (p=,498), and between low weight and overweight for FEV1 and FEV1/FVC (p=,616 and ,14). FVC, FEV1 and FEV1/FVC values statistically significatively increase (p<,05) among those non-smoking individuales that regularly practice exercise.

Spirometry results and the influence of variables gender, age, BMI and physical exercise for somkers are displayed on **table II**. There are statistically significant differences (p<,05) between genders for FEV1/FVC and FEV1 (higher among women for both), and for the percentage of people with FEV1/FVC<70 -that is to say: with COPD according to GOLD criteria (higher on male). On the contrary, no statistically significant differences were observed for FVC values (p=,378). Age seems to have some influence on pulmonary function values, since a gradual worsening on all of them may be observed as age progresses, so FVC, FEV1 and FEV1/FVC decrease, whereas the FEV1/FVC%<70 increases. Differences observed among each age group are statistically significant for al pulmonary function parameters (p<,05), except for younger individuals, concretely those under 30YO and those between 30-39YO, when comparing FEV1/ FVC values. BMI influence over respiratory function parameters is not homogeneous; hence, it is observed tha FVC higher values are obtained for normal weight and overweight population; this means values are influenced by low weight and obesity; differences are statistically significant among all groups except precisely those with low weight or obese (p=,53). FEV1 displays similar values on all groups except the obese, where they are significantly lower. Then FEV1/ FVC ratio behaves alike to FEV1, showing significantly lower values on the obese too. The percentage of COPD workers is similar on all BMI groups, except the obese, where they are clearly and significantly more (p<,05), whereas the percentage of COPD workers is clearly and significantly higher among those who do not exercise.

Whereas for the influence of gender, age, BMI and physical exercise on COPD severity among smokers, we observed that the highest percentage on both sexes corresponds to those measured as 'moderate' (those with FEV1 between 50-80% of the expected value), only 0'7% among male and no female presented severe COPD. Differences encountered were statistically significant in all cases (p<,05). COPD severity increases as age grows (mild cases are less and moderate are more), and sever cases only appear on higher aged subjects. Differences are statistically significant (p<,05) on mild and moderate conditions among all age groups. Smokers with COPD who regularly exercise gobally present a lower intensity on their condition, so that mild cases predominantly prevail; this differs among those who do not exercise, where mid conditions are predominant, and even some sever cases appear. Severity distribution differences are statistically significant for both groups (p<,05). Full data are displayed on **table III**.

Results on the influence of cumulative tobacco consumption (packages-year) on pulmonaty function show a gradual worsening of pulmonary function parameters as cumulative tobacco consumption increases. This occurs in all cases: FVC, FEV1, FEV1/ FVC and FEV1/FVC<70% (see **table IV**).

Multi-variate analysis, by separately taking smoker and non-smoker groups, shows that all analysed risk factors seem to influence on pulmonary function, although they do not all have same strength in it. Those having a stronger influence are age and physical exercise among non-smokers, and cumulative consumption (packages-year) among smokers (see **table V**).

Table III: Influence of sex, age, BMI and physical exercise on COPD severity among smokers.

	n	FEV1 > 80% (mild)	FEV1 50-80% (moderate)	FEV1 < 50% (severe)	p
Female	727	26,2	73,8	0,0	<0.0001
Male	1121	31,6	67,7	0,7	
< 30 YO	227	100,0	0,0	0,0	<0.0001
30-39 YO	369	84,6	15,4	0,0	
40-49 YO	578	34,6	65,4	0,0	
50-59 YO	561	22,4	77,6	0,0	
≥ 60 YO	113	13,3	85,0	1,7	
Low weight	151	20,0	80,0	0,0	<0.0001
Normal weight	681	41,0	58,3	0,7	
Overweight	710	29,0	71,0	0,0	
Obesity	306	26,7	72,2	1,1	
Exercise	694	66,7	33,3	0,0	<0.0001
No exercise	1154	23,5	76,0	0,5	

Table IV: Pulmonary function values as per packages.year consumption.

		FVC	FEV1 FVC	FEV1/ FVC <70	FEV1/	
Packages -year	**n**	**Average (sd)**	**Average (sd)**	**Average (sd)**	**%**	**p**
< 5	243	98,1 (10,7)	96,7 (5,7)	84,6 (7,0)	1,2	<0.0001
5-9,9	303	96,6 (11,3)	93,9 (4,2)	81,5 (5,1)	2,3	
10-14,9	209	93,0 (11,3)	90,4 (5,9)	79,9 (5,6)	4,8	
15-19,9	214	90,3 (10,4)	87,4 (6,3)	79,2 (6,6)	8,4	
20-24,9	198	89,0 (11,2)	83,8 (7,1)	77,8 (8,0)	23,2	
25-29,9	192	87,2 (11,4)	81,0 (8,1)	74,3 (7,3)	35,4	
30-34,9	192	86,2 (11,5)	79,3 (7,8)	71,8 (7,1)	50,0	
35-39,9	135	85,1 (12,5)	77,8 (5,0)	70,0 (7,3)	54,8	
≥ 40	162	84,6 (9,3)	74,2 (7,1)	68,9 (6,0)	69,1	

Table V: Multi-variate analysis. Percentage of pulmonary function parameters and their relation with each risk factor.

Risk factors	Non smokers			Smokers (packages-year*)			Smokers (all**)		
	FVC	FEV1	FEV1/FVC	FVC	FEV1	FEV1/FVC	FVC	FEV1	FEV1/FVC
Gender				0,6	0,4		0,4	0,4	
Age	1,1	8,9	10,2	2,2	5,2	1		5,2	
BMI	2,6	2,1	0,2		0,1	0,2			0,1
Physical exercise	4,9	4,9	11,6	3,2	3,2	2,4	3,4	3,1	2,4
Packages-year				12,0	48,4	33,2	1,4	48,4	33,2
No. Cigarettes								1,3	0,1
Years consumption							13,0	0,8	1,8
*Total****	8,6	15,9	22,0	18,0	57,3	36,8	19,0	59,2	39,4

*Analysis only includes pachages-year. **Analysis includes packages-year, number of cigarettes and years of consumption. ***Total percentege of the considered pulmonary function parameter that can be explaind by the different risk factors under study.

Discussion

It is widely known that there is a narrow correlation between the respiratory conditions onset and tobacco consumption, and there are many studies to-date –both in the occupational and non-occupational area–, that correlate them. This link has been particularly studied for COPD[18-21].

There is also a consensus to accept spirometry as a good screening and follow-up method for patients with a respiratory condition, particularly those with COPD, mostly among smokers.

The newfangled contribution on this study is the large sample size, as well as the possibility to ascertain with a greater precision the impact of the different risk factors, mostly tobacco, over the pulmonary function; since some confounding aspects such as personal previous health problems that may affect the spirometry outcome are already eliminated, so are the presence of substances or occupational hazards that could also affect these spirometry output values. Finally, it also provides separate information about the influence of each risk factor on each of the spirometry output values, providing a numeric measurement on the influence of each factor in the final value of the pulmonary function parameter under study.

We would like to highlight as key study outcome data that, when performing the uni-variate analysis, all analysed risk factors seem to have a relation with the respiratory function parameters, except gender among non-smokers. However, when we performed a multi-variate analysis we see this changes, and age and physical exercise gain the spotlight among non-smokers, whereas it is cumulative tobacco consumption (packages-year) for smokers, and physical exercise to a lesser degree.

The close relation between BMI and pulmonary function parameters worsening we observed in our study –particularly for overweight–, concurs with other reviewed studies[22-25]. Data we found about the negative relation with low weight also concur with some reviewed study[26].

We observed that age keeps a close relation with all analysed parameters (FVC, FEV1 y FEV1/FVC); so, as our workers are older, their respiratory parameters worsen. These data also concur with practically all reviewed studies[27-32]. Study also shows there is a direct relation between age and percentage of population meeting COPD criterio as per GOLD consensus (FEV1/FVC < 70), these data were also found in other studies.[33-35]

Regular physical activity seems to positively influence spirometry values, particularly among non-smokers, whereas –although to a lesser degree– among smokers too. These data show non our study concur with most reviewed authors[26,36-37], but show discrepancias with those data obtained by others[38], where physical exercise improved different respiratory patterns, but not spirometry output.

As already mentioned, there is unanimity to correlate tobacco and pulmonary conditions, mainly COPD and lung cancer; besides, there is a wide consensus on the effects tobacco causes on the pulmonary function parameters[39]. Our study shows a clear relation between tobacco consumption and pulmonary function deterioration, both on FVC, FEV1 and FEV1/FVC. This relation is mostly established with cumulative consumption (packages-year), and apparently has les correlation with the number of cigarettes or the years of consumption. These data also repeat when we consider population under COPD criterio, where packages-year is the most influential parameter too. Data collected on scientific literatura predominantly concur with data we collected on this study[40-42], although some authors do not find correlation between tobacco consumption and COPD onset[43].

Tobacco consumption influence –measured as number of packages per year–, is the most important element to define the final spirometry value output for our researched workers group. This is particularly relevant for FEV1 and FEV1/FVC.

According to current recommendations by the Spanish Ministry of Health, as shown on the specific occupational health surveillance protocols[44], there is no indication to perform spirometry on workers with no pulmonary risk. If we consider this collective under study are those who particularly had no pulmonary occupational hazard, we believe the obtained data reinforce many occupational health professionals' opinion –among who we count–, who believe necessary to systematically integrate spirometry studies among those workers with evident risk factors, being tobacco consumption would be paramount. We also believe it could be useful the systematic spirometry test performance among all workers, as a systematic pulmonary function and evolution assessment; by having the possibility to compare a basal study (on enrolment checkup) and regular revisions throughout years, as well as the interference of both personal and occupational pulmonary risk factors.

Spirometry test inclusion, thus becomes a quick simple and cost-effective tool for respiratory conditions prevention and early diagnosis, that would reinforce one of the most important activities Occupational Health professionals develop, as it is Health promotion in the workplace, and would allow us to collaborate with Public Healthcare Services by providing with an evolutive tool among workers, to complement the diagnostic and therapeutic activities other primary or specialised care workers do, thus optimising the available resources among all healthcare workers.

Interests conflict

The researchers declare that they have no conflict of interest.

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