International Journal of Metabolic Syndromes

Research Article

Assessment of Anthropometric, Clinical and Analytical Parameters in Cardiovascular Apparently Healthy Workers: Relationship with Sociodemographic Variables and Healthy Habits

Angel Arturo Lopez-Gonzalez[1,2]*, Mª Victoria Ramírez Iniguez de la Torre[3], Mª Teofila Vicente Herrero[2,4], Luisa Capdevila García[5]

[1]*Research Group on Occupational Health, Institut Universitari d'Investigació in Ciencies de la Salut (IUNICS)*

[2]*Occupational Health Service of the Health Service of the Balearic Islands. Spain*

[3]*Prevention Service Correos Group. Albacete-Cuenca. Spain*

[4]*Prevention Service Correos Group. Valencia, Spain*

[5]*Prevention Service MAPFRE. Valencia, Spain*

***Address for Correspondence:** Angel Arturo Lopez-Gonzalez, Occupational Health Service of the Health Service of the Balearic Islands, Son Llatzer Hospital, Tel: +34687548105; E-mail: angarturo@gmail.com

Submitted: 16 August 2017; **Approved:** 31 August 2017; **Published:** 02 September 2017

Citation this article: Lopez-Gonzalez AA, de la Torre M, VRI, Vicente Herrero MT, García LC. Assessment of Anthropometric, Clinical and Analytical Parameters in Cardiovascular Apparently Healthy Workers: Relationship with Sociodemographic Variables and Healthy Habits. Int J Metab Syndr. 2017;1(1): 001-007.

ABSTRACT

Background: Cardiovascular apparently healthy workers are those who claim not to suffer or to be diagnosed of pathology related to cardiovascular risk.

Objectives: To determine the prevalence of elevated values of different parameters related to CVR in cardiovascular apparently healthy workers

Methods: A descriptive study on 55,063 Spanish Mediterranean area workers was performed. Anthropometric (body mass index, waist to weight ratio), clinical (hypertension) and analytical (lipids, glycaemia) variables are determined along with its relationship with socio demographic variables (sex, age, social class, education) and healthy habits (tobacco, physical exercise and feeding).

Results: 15.3% of apparently healthy workers have obesity (12.7% in women and 17.3% in men), 14.5% hypertension (7.5% in women and 19.9% in men). 11.4% high cholesterol (9.6% in women and 12.7% in men), 14.4% high LDL-c (13.7% in women and 14.9% in men), 7.2 % high triglycerides (2.2% in women and 11.1% in men) and 1.2% high glycemia (0.7% in women and 1.6% in men).

Sex, age, tobacco, physical exercise and feeding are the most related variables to these pathologies.

Conclusions: An important percentage of cardiovascular apparently healthy workers present pathologies related to cardiovascular risk.

Keywords: Cardiovascular Risk Factors; Obesity; Hypertension; Hypercholesterolemia; Diabetes

BACKGROUND

Cardiovascular Diseases (CVD) are the leading cause of death in Spain and have a significant socioeconomic impact [1,2]. In the Balearic Islands, they represent the leading cause of death and were responsible for 27% of deaths in 2008 due to ischemic heart disease and 7% of overall mortality due to cerebrovascular disease [3].

High blood pressure, dyslipidemia and smoking are the three modifiable risk factors that are most commonly associated with coronary disease [4,5]. Diabetes is considered a high risk factor for macrovascular disease [6,7], and is related to early death by CVD [8].

The ERICE study [9], shows that in the Balearic Islands, cardiovascular risk factors have a higher prevalence than that observed in the rest of the Spain (47.8% for hypertension, 24.2% for hypercholesterolemia, 11.7% for diabetes and 27% for obesity) which represents a high risk profile for its population [10].

The DARIOS study of 2011 shows that the Balearic Islands is one of the Spanish regions with the highest prevalence of hypertension and smoking in men [11]. According to the latest Balearic Health Survey (ESIB) [12], of 2007, 83.5% of the population had visited a health professional in the last year. In adults the main reason for consultation was for diseases perceived by the patient (41.4%). These data suggest that, in the case of asymptomatic health problems such as hypertension, diabetes or dyslipidemia, the young and active population with altered cardiovascular risk factors and, therefore, with elevated cardiovascular risk, does not consult their physician of primary care so it does not access treatment programs or preventive recommendations for cardiovascular diseases.

Finding high rates of under diagnosis of cardiovascular risk factors would imply the need to implement strategies for the prevention of cardiovascular diseases and the promotion of healthy lifestyles, alternatives to those currently existing for active young working people.

The definition of "apparently healthy workers" refers to those who state that they do not suffer from or are not diagnosed with cardiovascular disease (hypertension, diabetes, dyslipidemia) or previous cardiovascular pathologies (stroke, ischemic heart disease...) [13].

In Spain, studies have been carried out on the prevalence of cardiovascular risk factors in the working population [14]. But always including the total population, both workers already diagnosed of high risk factors or cardiovascular diseases themselves, as well as individual workers without a previous diagnosis of high cardiovascular risk. Therefore, existing studies have not focused on those who ignore if they present any factors related to cardiovascular risk.

In other countries, studies have not been performed in apparently healthy labour people but in the general population [15].

OBJECTIVES

The purpose of our study is to estimate the prevalence of altered anthropometric, clinical and analytical parameters in apparently healthy workers, as well as to determine the existing relationship with sociodemographic variables and healthy habits.

METHODS

Study Design and Subjects

A descriptive and cross-sectional study was carried out on 55,063 workers (24,176 women and 30,887 men) from the regions of Balearic Islands and Valencia, in the period between January 2015 and December 2016. Workers were selected from those who attended the obligatory regular medical examinations. The Safety and Health committees of the different companies were notified; and informed consent was requested to every subject who entered the study in order to obey the current legislation.

Inclusion/Exclusion Criteria

As criteria for inclusion were considered: acceptance to participate in the study, being an active worker between 18 and 70 years and not having a previous diagnosis of hypertension, diabetes or dyslipidemia. Each participant was asked explicitly if they had previously informed health personnel that their blood pressure, lipid profile, or blood glucose levels were high or if they were in pharmacological treatment for these pathologies.

Exclusion criteria included: Not accepting to be included in the study, not having performed the blood test, not belonging to any of the participating companies and being diagnosed with any CVD or related pathologies (diabetes, hypertension, dyslipidemia).

In the mentioned period 61,227 medical examinations were carried out and 6,164 workers were discarded (85 for not allowing their data to be used, 112 for not being extracted for blood sample, 232 for not being in the age bracket considered in the study and 5,735 for suffering some of the diseases).

Determination of Variables

An anamnesis with a complete clinical history was performed, including: personal and family history, previous treatments, smoking, food, physical activity, anthropometric data - weight, height, Body Mass Index (BMI), waist circumference, blood pressure and sociodemographic data (age, level of education and social class).

The different anthropometric and clinical measurements and the extractions for the analytics were performed by the health personnel of the different occupational health units involved in the study. Blood tests were performed in two laboratories, one in each region to avoid interlaboratory bias.

The international recommendations were followed to determine the different anthropometric parameters.

The height and weight were determined by an approved scale-heightometer. The Spanish Society for the Study of Obesity (SEEDO) [16], criteria were used, considering obesity when the BMI was equal to or greater than 30 kg/m2 and overweight when the values were between 25.0 and 29.9 kg/m2. The abdominal waist circumference was calculated with a tape measure placed parallel to the floor at the level of the last floating rib, that is, the contour of the natural waist taken between the upper part of the hip bone (iliac crests) and the lower rib, measured during normal breathing with the subject standing and with a relaxed abdomen. Waist-To-Height Ratio (WHtR) was calculated by dividing WC by height in cm.

Cholesterol and triglycerides were determined by automated enzymatic methods, C-HDL was determined by precipitation with Cl2Mg dextran sulphate, Low Density Lipoprotein Cholesterol (LDL-C) was calculated using the Friedwald formula (provided the triglycerides were <400 mg/dl). Borderline values were considered when cholesterol was between 200 and 239 mg/dl, LDL-c between 130-159 mg/dl and triglycerides between 150 and 199 mg/dl; and high values when cholesterol was equal to or greater than 240 mg/dl, LDL-c was equal to or greater than 160 mg/dl and triglycerides equal to or greater than 200 mg/dl.

Glucose was determined by an enzymatic method and was considered Impaired Fasting Glucose (IFG) at values between 100 and 125 mg/dl and hyperglycemia when the values were equal to or greater than 126 mg/dl repeated at least twice.

Blood sampling was performed in the same session and in the same place, after a 12-hour night fast. The samples were sent to the reference laboratory and processed for a maximum of 72 hours, preserving them at a temperature of -20° C.

Blood pressure was determined using a calibrated OMRON M3 automatic sphygmomanometer, after a rest period of 10 minutes in supine position, with three measurements taken at intervals of 1 minute between them, and the mean of the three measurements being calculated. Hypertension was considered when values were equal to or greater than 140/90 mmHg. Hypertension is classified according to the seventh report of the Joint National Committee (JNC-7) criteria: Hypertension 1 : Systolic blood pressure 140-159 mmHg or diastolic blood pressure 90-99 mmHg Hypertension 2: Systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥ 100mmHg.

Tobacco use, feeding and physical exercise were determined by structured clinical interview and performed during medical examination. A person who smoked regularly at least one cigarette a day in the last month and an ex-smoker who had been smoking for at least 12 months was considered a smoker. According to the American College of Sport Medicine and the American Heart Association, heart-healthy physical activity is considered when the person habitually performs 30 minutes of moderate physical activity at least 5 days a week or 20 minutes of vigorous activity three days a week [17]. The frequency of consumption of fruit (three or more pieces) and vegetables or vegetables (at least two servings) was questioned, and it was considered correct if this consumption was daily.

Concerning education degrees, three categories were established: primary (elementary or uneducated), secondary and university.

Age is classified into four categories: from 20 to 29 years, 30 to 39 years, 40 to 49 years and ≥50 years. Social class was determined from the national classification of occupations of the year 2011 (CNO-2011) and taking into account the classification established by the Spanish Society of Epidemiology [18]. The abbreviated classification is used in three categories: class I (directors, managers and university professionals), class II (intermediate occupations and self-employed) and class III (manual workers).

Statistic Analysis

When the variable is continuous, the means are compared using the Student's t-test if the variable follows a normal distribution, or with the non-parametric Mann-Whitney U test if the normality principle is not met. If the variable is qualitative, the proportions are compared using the Pearson chi-square test. For the multivariate analysis logistic regression is used with the calculation of odds ratios. A p value of less than 0.05 was accepted as significance level in all analysis.

RESULTS

The characteristics of the sample in terms of anthropometric, clinical and analytical parameters as well as healthy habits are shown in (Table 1).

The prevalence of elevated values of the different parameters analysed in this study (obesity, hypertension, dyslipidemia and hyperglycaemia) is presented in (Table 2).

In (Tables 3), we present how the different clinical and analytical anthropometric parameters are broken down according to the analyzed socio-demographic variables (age, social class and level of studies).

In both sexes, all altered parameters increase their prevalence as age increases. If we consider social class, in women all altered parameters -except for elevated glycaemia- are less prevalent in social class I; and get worse going down the social class In men, this same situation is not observed since although in most cases the lowest prevalence of altered parameters are seen in class I, an important part of these low prevalence are also seen in class III.

A similar situation to that observed in social class is appreciated when analyzing the academic level. In both sexes, the altered parameters are much more frequent in those who do not regularly perform physical activity or who do not have heart-healthy feeding, while tobacco consumption does not always imply worse parameters as shown in (Table 4).

Table 1: Anthropometric, clinical and analytical characteristics of participants in the study

	women n=24176		men n=30887		
	mean (SD)	CI 95%	mean (SD)	CI 95%	p-value
age	38.6 (9.8)	38.5-38.7	39.1 (10.0)	39.0-39.2	< 0.0001
BMI	24.7 (4.7)	24.7-24.8	26.5 (4.1)	26.5-26.6	< 0.0001
Waist	75.1 (9.7)	74.9-75.2	88.3 (9.5)	88.2-88.4	< 0.0001
BP systolic	113.6 (14.3)	113.4-113.8	124.1 (14.9)	123.9-124.3	< 0.0001
BP diastolic	69.8 (10.1)	69.7-70.0	75.3 (10.6)	75.2-75.4	< 0.0001
Cholesterol	191.7 (36.2)	191.2-192.1	196.3 (38.9)	195.9-196.7	< 0.0001
HDL-c	55.2 (9.2)	55.1-55.3	50.9 (7.5)	50.8-51.0	< 0.0001
LDL-c	119.4 (36.8)	118.9-119.9	121.5 (37.6)	121.1-121.9	< 0.0001
triglycerides	85.5 (43.8)	84.9-86.0	121.4 (85.0)	120.5-122.4	< 0.0001
glycemia	84.2 (12.7)	84.1-84.4	88.5 (16.1)	88.3-88.7	< 0.0001
	%		%		
smokers	33.1		37.5		< 0.0001
no exercise	45.2		53.0		< 0.0001
no feeding	47.1		57.2		< 0.0001

Table 2: Prevalence of elevated values of the different parameters.

	women n=24176	men n=30887	total n=55063	
	%	%	%	p-value
obesity	12.7	17.3	15.3	<0.0001
hypertension	7.5	19.9	14.5	<0.0001
Cholesterol ≥ 240 mg/dL	9.6	12.7	11.4	<0.0001
c-LDL ≥ 160 mg/dL	13.7	14.9	14.4	<0.0001
Triglycerides ≥ 200 mg/dL	2.2	11.1	7.2	<0.0001
Glucose ≥ 126 mg/dL	0.7	1.6	1.2	<0.0001

The multivariate analysis using logistic regression establishes the most disadvantaged group as the reference group: male sex, age 50 and older, social class III, primary education, smoking, non-regular physical activity, and poor diet in fruit and vegetables. The odds ratios (OR) are established with their confidence intervals and it is seen that for obesity they affect all factors except the educational level; being the highest odds ratio for physical activity. In index waist to height ratio ≥0.50 all variables influence and especially male sex and no physical activity. In the occurrence of hypertension all variables except social class have influence, with the highest values of odds ratio in age and sex being appreciated. Complete data are presented in (Table 5).

The appearance of high analytical parameters is favoured by male sex, tobacco consumption and non-regular physical activity in all cases. Age influences all but high blood sugar. Feeding does not influence high blood glucose or low HDL-c while social class only influences hyperglycaemia. Complete data are shown in (Table 6).

DISCUSSION

A significant proportion of cardiovascular apparently healthy workers who came for medical examinations at work have Cardiovascular Risk Factors (CVR factors). The prevalence of CVR is higher in men and increases with age. In our study, the low prevalence of CVR factors found could be related to previously discarding workers with pathology and the important percentage of subjects less than 35 years (32.7%) included in the study.

The gradual increase in all parameters associated to the age that we have found in our study coincides with that observed by other authors [19,20]. Another aspect in which we also agree with almost all authors [10,20], is that the prevalence of CVR factors is greater in men, and it is also very noticeable. One factor that could explain, at least in part, these differences is that, according to the 2007 ESIB, women do more frequent medical appointments and, therefore, have better controlled parameters than men [12].

The prevalence of hypertension, hypercholesterolemia and hyperglycaemia found in our study was lower than that from other studies conducted in the general population, both Spanish [11] and Balearic [10], although in both studies the mean age of participants was about 10 years higher than in our study. The age of our workers also are lower than that of a study carried out on Spanish working population [14], also in this case, workers with previously known pathology had not had been eliminated. The prevalence of altered values found in our study is similar to those found in others when the younger population is included [20].

Tobacco consumption, as in the previous research of other authors, is more frequent in young people and in men and tends to decrease significantly with age [21-25] - in our study this decrease in consumption occurs from the 55 years -Unlike what was found in other studies [10,26], the prevalence of obesity in our sample was higher in males.

We have not found much research evaluating CVR factors in apparently healthy population; although a study carried out in the Mexican population [15] and another in Nigeria [27], in the general population and with similar ages to our study, but not excluding those who followed treatments, showed higher prevalence in obesity, hypercholesterolemia, hyperglycaemia and hypertension than in our population. A previous study conducted by our group in a different and smaller sample and following the same methodology showed results similar to those found in this study [13].

The lack of standardization of the age groups included in the different studies, as well as the risk factors that were studied and the limits considered as pathological for each factor of CVR in each of them, also made it difficult to directly compare our results with other studies.

Although our study evaluates the prevalence of CVR factors in a working population in the Spanish Mediterranean area, a possible limitation of the study is the impossibility of extrapolating our results at the total Spanish labour population.

The main objective of our study was to show the percentage of apparently healthy workers with CVR factors. Given the study design and the variables analyzed, we cannot establish the real causes of the high percentage of any of these factors although the data suggest that a possible explanation could be the previous misuse of health services as shown by the Health survey of the Balearics 2007 [12]. This survey shows that the visits of people of working age mainly focus on the diagnosis and treatments of the pathologies perceived by the patient; but are not used to assess preventive health status.

The main contribution of this study is twofold: firstly, it shows the role of occupational health units in the early detection of CVR factors through labor medical examinations, and, secondly, it highlights the

Table 3: Prevalence of high anthropometric, clinical and analytical parameters according to sociodemographic variables.
overweight: 25-29.9 kg/m². obesity ≥ 30 kg/ m² . Cholesterol borderline: 200-239 mg/dl. Cholesterol high: ≥ 240 mg/dl. HDL-c low < 40mg/dl. LDL-c borderline: 130-159 mg/dl. LDL-c high: ≥ 160 mg/dl. Triglycerid borderline: 150-199 mg/dl. Triglycerid high: ≥ 200 mg/dl. IFG (Impaired Fasting glucose): 100-125 mg/dl. Diabetes ≥ 126 mg/dl. WHtR: waist to height ratio. IFG: impaired fasting glucose. Hypertension 1: Systolic blood pressure 140-159 mmHg or diastolic blood pressure 90-99 mmHg Hypertension 2: Systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥ 100mmHg.

	20-29 years	30-39 years	40-49 years	≥ 50 years	p-value	Social class I	Social class II	Social class III	p-value	Primary education	Secondary education	University	p-value
women	**n=4962**	**n=8272**	**n=7298**	**n=3644**		**n=3596**	**n=8054**	**n=12526**		**n=11075**	**n=9965**	**n=3136**	
overweight	17.9	21.6	30.2	38.5	<0.0001	18.0	23.6	29.8	<0.0001	30.4	23.9	17.3	<0.0001
obesity	9.0	11.7	13.9	17.1	<0.0001	6.7	9.4	16.4		16.4	10.6	6.1	<0.0001
WHtR>0.5	12.2	17.3	25.3	31.9	<0.0001	13.6	22.9	21.7	<0.0001	25.0	18.4	13.9	<0.0001
Pre Hypertension	26.5	28.9	39.3	46.4	<0.0001	25.6	33.0	37.4	<0.0001	38.9	32.0	24.4	<0.0001
Hypertension 1	1.8	3.0	7.2	15.0	<0.0001	2.1	5.4	7.2		7.7	4.9	2.1	<0.0001
Hypertension 2	0.3	0.9	2.2	4.2	<0.0001	0.6	1.3	2.2		2.3	1.3	0.5	<0.0001
cholesterol borderline	17.3	24.4	35.9	45.7	<0.0001	24.8	30.0	30.8	<0.0001	31.8	28.9	24.2	<0.0001
cholesterol high	3.4	5.2	10.7	25.5	<0.0001	6.4	9.5	10.5		10.7	9.4	6.2	<0.0001
HDL-c low	1.8	3.4	3.9	5.5	<0.0001	2.4	4.0	3.5	0.001	3.7	3.7	2.4	<0.0001
LDL-c borderline	13.7	19.8	28.8	34.7	<0.0001	18.2	24.1	24.6		25.5	23.1	17.7	<0.0001
LDL-c high	4.7	8.6	15.7	33.5	<0.0001	9.3	13.3	15.2		15.6	13.1	9.0	<0.0001
triglycerid borderline	2.9	3.3	4.4	6.4	<0.0001	2.5	4.2	4.3	<0.0001	4.7	3.7	2.5	<0.0001
Triglycerid high	1.4	1.6	2.4	4.2	<0.0001	1.4	2.0	2.5		2.5	2.1	1.2	<0.0001
IFG	2.6	4.3	7.9	12.7	<0.0001	4.2	5.6	7.3	<0.0001	7.8	5.2	4.4	<0.0001
diabetes	0.3	0.4	0.9	1.6		0.8	0.4	0.8		0.5	0.9	0.9	<0.0001
men	**n=5844**	**n=10640**	**n=9208**	**n=5195**		**n=2356**	**n=7215**	**n=21316**		**n=21431**	**n=7406**	**n=2050**	
overweight	32.0	43.7	49.7	51.2	<0.0001	45.1	47.2	43.6	<0.0001	43.8	46.3	46.6	<0.0001
obesity	10.3	15.7	20.1	23.6	<0.0001	12.1	16.2	18.2		18.1	16.2	12.6	<0.0001
WHtR>0.5	32.4	45.0	55.6	63.3	<0.0001	45.7	50.7	48.6	<0.0001	49.4	47.5	47.8	<0.0001
Pre Hypertension	55.1	55.1	56.1	50.2	<0.0001	55.4	55.3	54.2	<0.0001	54.1	55.8	55.7	<0.0001
Hypertension 1	8.9	11.8	17.6	25.4	<0.0001	12.1	16.2	15.3		15.7	14.9	12.3	<0.0001
Hypertension 2	1.4	2.6	5.6	11.1	<0.0001	3.1	4.9	4.8		4.8	4.7	3.3	<0.0001
cholesterol borderline	15.7	30.2	39.0	42.1	<0.0001	29.5	35.0	31.4	<0.0001	31.5	34.3	30.6	<0.0001
cholesterol high	2.5	9.2	18.3	21.8	<0.0001	11.3	13.5	12.6		12.9	12.5	12.0	<0.0001
HDL-c low	4.5	6.5	9.4	13.9	<0.0001	10.3	8.2	8.0	<0.0001	7.9	8.2	11.4	<0.0001
LDL-c borderline	12.1	23.2	29.4	33.5	<0.0001	25.3	27.0	23.8		23.8	26.7	26.6	<0.0001
LDL-c high	3.4	10.8	20.7	25.8	<0.0001	13.8	15.8	14.7		14.9	14.9	14.6	<0.0001
triglycerid borderline	6.7	10.1	13.9	15.5	<0.0001	9.0	11.8	11.7	<0.0001	11.7	11.5	9.4	<0.0001
Triglycerid high	4.7	9.7	14.7	14.6	<0.0001	7.0	11.0	11.5		11.6	10.7	7.0	<0.0001
IFG	6.8	10.3	16.4	23.4	<0.0001	10.3	11.8	14.6	<0.0001	14.5	11.9	10.8	<0.0001
diabetes	0.4	0.7	1.7	4.5	<0.0001	1.3	1.5	1.6		1.1	3.0	1.7	<0.0001

Table 4: Prevalence of high anthropometric, clinical and analytical parameters according to healthy habits.
overweight: 25-29.9 kg/m². obesity ≥ 30 kg/ m² . Cholesterol borderline: 200-239 mg/dl. Cholesterol high: ≥ 240 mg/dl. HDL-c low < 40mg/dl. LDL-c borderline: 130-159 mg/dl. LDL-c high: ≥ 160 mg/dl.. Triglycerid borderline: 150-199 mg/dl. Triglycerid high: ≥ 200 mg/dl. IFG (Impaired Fasting glucose): 100-125 mg/dl. Diabetes ≥ 126 mg/dl. WHtR: waist to height ratio. IFG: impaired fasting glucose. Hypertension 1: Systolic blood pressure 140-159 mmHg or diastolic blood pressure 90-99 mmHgHypertension 2: Systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥ 100mmHg.

women	**smoker**	**no smoker**	**p-value**	**no exercise**	**yes exercise**	**p-value**	**no feeding**	**yes feeding**	**p-value**
overweight	23.8	27.1	<0.0001	42.9	12.0	<0.0001	38.6	14.8	<0.0001
obesity	10.8	13.6	<0.0001	28.0	0.0	<0.0001	26.9	0.0	<0.0001
WHtR>0.5	18.8	21.9	<0.0001	40.5	4.7	<0.0001	39.2	4.5	<0.0001
Pre Hypertension	32.8	34.8	0.001	42.5	27.3	<0.0001	41.5	27.6	<0.0001
Hypertension 1	5.6	6.0	<0.0001	9.6	2.7	<0.0001	9.3	2.7	<0.0001

Hypertension 2	1.5	1.8	<0.0001	3.1	0.5	<0.0001	3.0	0.5	<0.0001
cholesterol borderline	28.8	30.0	0.088	38.0	22.8	<0.0001	39.7	20.7	<0.0001
cholesterol high	9.4	9.6	0.112	21.1	0.0	<0.0001	20.3	0.0	<0.0001
HDL-c low	3.2	3.7	0.034	7.8	0.0	<0.0001	5.4	1.9	<0.0001
LDL-c borderline	23.1	23.7	0.004	26.0	21.4	<0.0001	27.9	19.6	<0.0001
LDL-c high	12.8	14.1	<0.0001	29.3	0.8	<0.0001	28.4	0.6	<0.0001
triglycerid borderline	4.4	3.8	<0.0001	8.9	0.0	<0.0001	8.5	0.0	<0.0001
Triglycerid high	2.6	2.0	<0.0001	4.8	0.0	<0.0001	4.6	0.0	<0.0001
IFG	6.0	6.5	0.363	9.6	3.6	<0.0001	9.3	3.6	<0.0001
diabetes	0.7	0.7	0.212	1.1	0.3	<0.0001	1.1	0.3	<0.0001
men	**smoker**	**no smoker**	**p-value**	**no exercise**	**yes exercise**	**p-value**	**no feeding**	**yes feeding**	**smoker**
overweight	41.0	46.7	<0.0001	51.8	36.4	<0.0001	50.8	36.2	<0.0001
obesity	15.0	18.7	<0.0001	32.7	0.0	<0.0001	30.2	0.0	<0.0001
WHtR>0.5	45.5	50.9	<0.0001	68.8	26.5	<0.0001	65.6	26.5	<0.0001
Pre Hypertension	53.8	55.1	<0.0001	54.7	54.5	<0.0001	54.8	54.3	<0.0001
Hypertension 1	15.0	15.4	<0.0001	20.5	9.3	<0.0001	19.6	9.4	<0.0001
Hypertension 2	4.3	4.9	<0.0001	7.3	1.7	<0.0001	7.0	1.6	<0.0001
cholesterol borderline	30.9	32.8	<0.0001	37.2	26.3	<0.0001	40.0	21.4	<0.0001
cholesterol high	13.6	12.3	<0.0001	24.0	0.1	<0.0001	22.1	0.2	<0.0001
HDL-c low	12.4	5.7	<0.0001	15.0	0.6	<0.0001	12.3	2.8	<0.0001
LDL-c borderline	23.6	25.3	0.004	25.0	24.3	<0.0001	27.3	21.2	<0.0001
LDL-c high	14.9	14.8	0.117	26.2	2.0	<0.0001	25.5	0.6	<0.0001
triglycerid borderline	13.0	10.6	<0.0001	21.7	0.0	<0.0001	19.9	0.3	<0.0001
Triglycerid high	13.6	9.5	<0.0001	20.9	0.0	<0.0001	19.3	0.1	<0.0001
IFG	13.5	13.7	0.117	17.8	8.9	<0.0001	17.2	8.9	<0.0001
diabetes	1.8	1.5	<0.0001	2.5	0.6	<0.0001	2.3	0.6	<0.0001

Table 5: Multivariate analysis for anthropometric and clinical parameters.

	obesity		**WHtR>0.50**		**Hypertension**	
	OR (CI 95%)	**p-value**	**OR (CI 95%)**	**p-value**	**OR (CI 95%)**	**p-value**
women	2.97 (2.84-3.10)	<0.0001	3.97 (3.80-4.15)	<0.0001	2.88 (2.72-3.05)	<0.0001
20-29 years	1.70 (1.58-1.83)	<0.0001	1.74 (1.62-1.87)	<0.0001	4.18 (3.81-4.59)	<0.0001
30-39 years	1.24 (1.16-1.32)	<0.0001	1.38 (1.30-1.47)	<0.0001	3.15 (2.94-3.38)	<0.0001
40-49 years	1.04 (0.98-1.11)	0.218	1.14 (1.07-1.21)	<0.0001	1.84 (1.72-1.96)	<0.0001
Social class I	1.45 (1.21-1.75)	<0.0001	1.01 (0.83-1.24)	0.901	1.23 (0.92-1.65)	0.159
Social class II	1.45 (1.36-1.55)	<0.0001	0.66 (0.61-0.70)	<0.0001	0.92 (0.85-0.99)	0.047
university	1.02 (0.84-1.24)	0.858	1.05 (0.85-1.30)	0.660	1.31 (0.96-1.79)	0.086
Secondary education	0.90 (0.84-0.96)	0.002	1.52 (1.42-1.63)	<0.0001	1.23 (1.13-1.34)	<0.0001
no smoker	0.65 (0.62-0.68)	<0.0001	0.83 (0.79-0.86)	<0.0001	0.98 (0.93-1.03)	0.386
yes exercise	7.97 (7.43-8.55)	<0.0001	4.07 (3.78-4.38)	<0.0001	2.13 (1.92-2.36)	<0.0001
yes feeding	1.56 (1.46-1.67)	<0.0001	1.93 (1.79-2.08)	<0.0001	1.31 (1.17-1.45)	<0.0001

need for further studies to respond to the unresolved hypotheses and to explain why these workers have not been previously evaluated. These studies could also give us information on the frequency of use of the health services and their accessibility. Once these data are known we could fully analyze the reason we obtained such rates of under diagnosed CVR factors.

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