Original Article

Study of cardiovascular risk in university workers

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ABSTRACT

Objetive: to analyze the differential cardiovascular risk profile between university professors and administration and service workers.

Methods: A retrospective observational study of a sample of 1,245 workers from a public university in Madrid. Sociodemographic variables (sex, age), physiological variables (BMI, systolic and diastolic blood pressure, glucose, total cholesterol, HDL and LDL) and lifestyle variables (physical activity, alcohol consumption and smoking) were analyzed. The Mann-Whitney U test and the Chi-Square test were used.

Results: 66.7% (n = 830) were university professors compared to 33.3% (n = 415) of administration and service workers. In this last group there was a higher proportion of women (62.9% vs 52.2%, p<0.001), a higher median age (53 [24-66] vs 45 [23-73], p<0.001). Regarding the cardiovascular risk variables, the administration and service workers group presented a higher percentage of smokers (21.7% vs 11.3%, p<0.001), a lower proportion of daily drinkers (7.0% vs 8.5%, p< 0.003), higher BMI (25 vs 24.1 p<0.001), higher LDL cholesterol levels (116 vs 111 p<0.03) and total cholesterol (194.2 vs 188 p<0.004). This group also presented higher levels of systolic (121 vs 118 p<0.001) and diastolic blood pressure (74 vs 71 p<0.001).). No differences were found in the rest of the variables.

Conclusions: Lipid levels, blood pressure and smoking are significantly higher in PAS. It is necessary to study the possible influence of working conditions on the cardiovascular risk of these workers.

Keywords: Administration and service workers; Heart Disease Risk Factors; Occupational Health, university professors.

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Introduction

This work represents an approach to the knowledge of cardiovascular risk in university workers and its relationship with their job. The main tasks of university professors are teaching and research, while administration and service workers are responsible for administrative management, provision of services or support for teaching and research, more sedentary tasks. More sedentary jobs are associated with an increase in cardiovascular risk factors. This consequence is independent of sociodemographic factors, diet, body mass index (BMI) and physical activity since it would not be regulated by greater caloric intake, but by lower energy expenditure (1, 2, 3).

Cardiovascular diseases are a set of disorders that affect the heart and blood vessels. At the beginning of the 21st century, they became the main cause of mortality and morbidity and mortality worldwide (4). According to the latest statistics published by the National Institute of Statistics of Spain, in 2021, 26.4% of deaths were due to diseases of the circulatory system (5).

Atherosclerotic cardiovascular disease occurs as atheroma plaques accumulate, formed mainly by fat on the walls of the arteries. This can progressively evolve and cause more serious cardiovascular diseases such as heart disease, peripheral artery disease and stroke.

According to the 2021 European Society of Cardiology (ESC) Guideline on the prevention of cardiovascular disease in clinical practice, the rate of atherosclerotic disease is decreasing considerably in Europe, although it still causes high rates of morbidity and mortality. Among the main risk factors are cholesterol along with low-density lipoproteins (LDL-C), high blood pressure, obesity, diabetes mellitus and smoking. This guide points out other factors such as

psychosocial stress, ethnicity, frailty, coronary artery calcium, family history, socioeconomic factors, environmental pollution and body composition. Among the non-modifiable factors would be age and gender (6).

In 2022, Brotons et al., in their research, developed a model called IBERLIFERISK2 to calculate cardiovascular risk in the Spanish working population from 18 to 75 years of age. The risk predictors included in this model are: occupation, smoking, alcohol consumption, body mass index, family history of cardiovascular disease and diabetes, kidney disease, antihypertensive and lipid-lowering treatments, blood pressure levels, and cholesterol (7).

The study of risk factors and primary prevention of these diseases is essential to reduce the morbidity and mortality of these diseases. The main interventions are recommendations on healthy lifestyles in terms of nutrition, eating a balanced diet, rich in fruits and vegetables and healthy fats, eliminating alcohol consumption, sugars and processed foods, quit smoking and avoid being overweight and sedentary, leading an active lifestyle (8, 9).

In relation to university workers, regarding the risk factors previously mentioned with respect to the general population, the most prevalent would be due to their working conditions: sedentary lifestyles, work stress and unbalanced food available in university canteens and cafeterias (10). In 2016, a study carried out at the University of Alicante highlighted the need to consume olive oil and exercise as protectors of cardiovascular risk, considering that the work environment of university workers favors healthy lifestyle habits (11). In 2020, López Gónzalez et al., carried out a study with 4,738 professors from different universities in Spain, which concluded that cardiovascular risk in university professors is

mainly related to lack of physical activity and an unbalanced diet, which increases the risk of overweight and obesity (1).

The aim of this study was to determine the levels of cardiovascular risk factors in university workers.

Material and Methods

Design, population and sample

Retrospective observational study of a sample of 1245 workers from a public university in Madrid from January 2023 to December 2023. Data collection was carried out from the initial and periodic health examinations carried out in the Prevention Service of the Complutense University in 2023. The sample is classified into two groups, university professors and administration and service workers.

Variables and Statistical analysis

The variables collected were the following

- Sociodemographic variables:

    ·sex

    ·age

- Physiological variables:

    ·Body Mass Index (BMI)

    ·systolic and diastolic blood pressure

    ·glucose

    · total cholesterol, HDL and LDL cholesterol

- Lifestyle variables:

    ·physical activity (no physical activity, one day a week, two days a week, three days a week, four days a week, five days a week, six days a week, seven days a week)

    · alcohol consumption (non-alcohol consumption, daily, weekends, sporadic consumption, former drinker)

    · smoking habit (non smoker, smoker, former smoker)

Ethical considerations

The development of this study was authorized by the Research Ethics Committee of the Complutense University (Reference: CE_20230713_14_SAL.). The data were processed in accordance with Regulation (EU) 2016/679 of the European Parliament and of the Council, of April 27, 2016, regarding the protection of natural persons with regard to the processing of personal data and free circulation of this data. Informed consent is not required as it is a retrospective study. The data has been collected anonymously without obtaining any data that would identify any worker.

Statistical analysis

Descriptive statistics were performed on the variables, with measures of central tendency and dispersion for quantitative variables, and frequency distribution for qualitative variables. The Mann-Whitney U test and the Chi-Square test were used. The level of statistical significance in the different analyses wasset at $p < 0.05$ and the confidence level at 95%. The data will be analyzed using SPSS and Jamovi programs.

Results

Descriptive analysis

A total of 1,245 subjects were included in the study, 66.7% (n = 830) were university professors compared to 33.3% (n = 415) of administration and service workers. In the group of administration and service workers there was a greater proportion of women (62.9%) compared to 52.2% of university professors. The median age is higher in the group of administration and service workers. (53 [24-66] vs 45 [23-73], p<0.001).

Regarding the cardiovascular risk variables, the group of administration and service workers had a higher percentage of smokers (21.7% vs 11.3%, p<0.001), a higher BMI (25 [16.9-42.8] vs 24.1 [16.7-46.7], p<0.001), higher levels of LDL cholesterol (116 [33-232] vs 111 [24-266], p<0.03) and total cholesterol (194.2 [89] -334] vs 188 [105-372], p<0.004). In the group of

university professors, daily alcohol consumption is higher (8.5% vs 7.0%, p< 0.003). Table 1 describes the average value obtained for each variable according to lifestyle.

Table 1. Lyfestyles variables

		2023 (N=1245)				
		Universtiy Professors (n=830)		Administration and Service Workers (n=415)		p Value
		n	%	n	%	
Sex	Men	397	**47,8%**	154	37,1%	**<0,001**
	Women	433	52,2%	261	**62,9%**	
Physical activity (University Professors n=821, Administration and Service workers n=413)	No physical activity	191	23,3%	106	25,7%	0,234
	One day a week	88	10,7%	22	5,3%	
	Two days a week	165	20,1%	73	17,7%	
	Three days a week	141	17,2%	80	19,4%	
	Four days a week	89	10,8%	43	10,4%	
	Five days a week	65	7,9%	41	9,9%	
	Six days a week	28	3,4%	13	3,1%	
	Seven days a week	54	6,6%	35	8,5%	
Alcohol consumption (Men n=538, Women n=674)	No alcohol consumption	203	25,1%	135	**33,6%**	**0,003**
	Daily	69	**8,5%**	28	7,0%	
	Weekends	116	**14,3%**	35	8,7%	
	Sporadic consumption	421	**52,0%**	203	50,5%	
	Former drinker	1	0,1%	1	0,2%	
Smoking habit (Men n=550, Women n=693)	Non smoker	608	**73,30%**	241	58,20%	**<0,001**
	Smoker	94	11,30%	90	**21,70%**	
	Former smoker	127	15,30%	83	**20,00%**	

The administration and service workers group also presented higher levels of systolic (121 [87-193] vs 118 [79-174], p<0.001) and diastolic blood pressure (74 [49-117] vs 71 [48-113], p<0.001).). No differences were found in the rest of the variables. Table 2 shows the descriptive analysis carried out on the physiological variables.

Table 2. Physiological variables

| | 2023 | | | | |
| | University Professors (n=830) | | Administration and Service workers (n=415) | | p Value |
	Median	Max-Min	Median	Max-Min	
Age	45	23-73	53	24-66	**<0,001**
Weight (Univ Prof=829, Adm.ServWorkers=415)	70	41-142	70	41-124	0,438
Height (Univ Prof=829, Adm.ServWorkers=415)	169	147-198	166	147-197	<0,001
SBP (Univ Prof=828, Adm.ServWorkers=414)	118	79-174	121	87-193	**<0,001**
DBP (Univ Prof=828, Adm.ServWorkers=414)	71	48-113	74	49-117	**<0,001**
BMI (Univ Prof=829, Adm.ServWorkers=415)	24,1	16,7-46,7	25	16,9-42,8	**<0,001**
Glucose	85	62-141	85	61-234	0,114
Cholesterol	188	105-372	194,2	89-334	**0,004**
LDL cholesterol	111	24-266	116	33-232	**0,031**
HDL cholesterol	59	33-114	60	34-108	0,362

SBP: systolic blood pressure; DBP: diastolic blood pressure; BMI: Body Mass Index

Discussion

The results of this study have found that cholesterol, blood pressure and smoking levels are significantly higher in the group of administration and service workers. In relation to physical activity, in the group of teachers (23.3%) does not carry out physical activity and in the group of non-teaching staff (25.7%), although there are no statistically significant differences between both groups, it is worth highlighting the importance of lack of physical activity as a cardiovascular risk (3,6,12,).

According to a descriptive cross-sectional study, carried out in Spain, whose objective was to analyze the risk factors in workers at the University of Alicante, with a sample of 124 people

aged between 25 and 68 years, it was found that the majority of workers carried out physical activity. They usually did not smoke and were of normal weight, except for men over 44 years of age (11). In our study the BMI is not higher in any of the two groups of 25 and the highest percentage in both groups are non-smokers.

In another cross-sectional study carried out in 2023 at the University of Alicante, the following cardiovascular risk factors were evaluated: overweight/obesity, high blood pressure, hypercholesterolemia, type 2 diabetes mellitus, sedentary lifestyle and smoking in teaching and research workers, administration and service workers. and students, adding a total of 98 people. Differences were found in the prevalence of risk factors for cardiovascular disease among the studied population, as occurred in our study (13).

There are similar studies on the prevalence of cardiovascular risk at an international level, a study carried out at the University of Colombia in 2021 focused on administrative staff, whose most striking results are that 47.46% did not perform physical activity (14). Another study from Ecuador focused on health sciences university professors, in which the average total cholesterol exceeded normal levels (15).

In Spain, Martínez-Sánchez and Balaguer described in 2016 a healthy university model that would be implemented at the University of Cataluña (16) with the objective of establishing interventions and health promotion programs together with the occupational risk prevention service of university.

It is important to consider the sedentary lifestyle in university workers and inadequate diets. As well as the continuous work demands on teaching and research workers. Based on an adequate identification of risk factors, the need to implement health promotion and prevention strategies to minimize non-communicable diseases would be a priority.

LIMITATIONS

The main limitation of this study is the absence of variables such as the type of contract, salary and purchasing power and diet, which suggests that in the future similar studies should be carried out with these variables to specifically determine cardiovascular risk and be able to implement adequate prevention and health promotion measures.

CONCLUSIONS

From this study the following conclusions can be drawn: Lipid levels, blood pressure and smoking are significantly higher in administration and services workers. It is necessary to study the possible influence of working conditions on the cardiovascular risk of these workers.

REFERENCES

1. López González AA, Riutord Sbert P, Arroyo Bote S, González San Miguel H, Rigo Vives MM, Ramirez Manent JI. Determination of different cardiovascular risk scales in Spanish teaching staff: associated variables. Med. Segur. Trab. [Internet]. 2021; 67 (263): 99-111. Available from: http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0465-546X2021000200099&lng=es.

2. Milione H, Parodi Roberto, Buchaca Faxas E, Rojas Orellana L, Fortuna Peralta ML, Coral Cristaldo C et al. Sedentarismo y riesgo cardiovascular. Medicina (B. Aires2023; 83 (Suppl 1): 11-13. Available from: http://www.scielo.org.ar/scielo.php?script=sci_arttext&pid=S0025-76802023000100011&lng=es.

3. Arnett DK, Blumenthal RS, Albert MA, et al., 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation. 2019 Sep 10;140(11): e596- e646. DOI: 10.1161/CIR.0000000000000678.

4. Teo KK, Rafiq T. Cardiovascular Risk Factors and Prevention: A Perspective From Developing Countries. Can J Cardiol. 2021 May; 37 (5): 733-743. doi: 10.1016/j.cjca.2021.02.009.

5. INE: Instituto Nacional de Estadística [Internet]. Madrid: INE; 2023.Available from: https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176780&menu=ultiDatos&idp=1254735573175

6. Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Bäck M, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. 2021; 42 (34):3227-3337. doi: 10.1093/eurheartj/ehab484.

7. Brotons C, Moral-Peláez I, Vicuña J, Ameixeiras C, Fernández-Lavandera C, Sánchez-Chaparro MÁ. Update and validation of the lifetime cardiovascular risk in Spain: IBERLIFERISK2. Clin Investig Arterioscler. 2022 Nov 4: S0214-9168(22)00128-0. English, Spanish. doi: 10.1016/j.arteri.2022.09.003.

8. Pérez-Rodrigo C, Hervás Bárbara G, Gianzo Citores M, Aranceta-Bartrina J. Prevalencia de obesidad y factores de riesgo cardiovascular asociados en la población general española: estudio ENPE. Rev Esp Cardiol. 2022; 75 (3): 232-241. https://doi.org/10.1016/j.recesp.2020.12.013.

9. Mostaza JM, Pintó X, Armario P, Masana L, Ascaso JF, Valdivielso P. Standards for global cardiovascular risk management arteriosclerosis. Clin Investig Arterioscler. 2019 Jul;31 Suppl 1:1-43. English, Spanish. doi: 10.1016/j.arteri.2019.03.004.

10. Balcázar-Rueda E, Gerónimo E, Vicente-Ruiz MA, et al. Factores de riesgo cardiovascular en docentes universitarios de ciencias de la salud. Salud Quintana Roo. 2017; 10 (37): 7-12. Available from: https://www.medigraphic.com/pdfs/salquintanaroo/sqr-2017/sqr1737b.pdf

11. Norte Navarro AI, Sansano Perea M, Martínez Sanz JM, Sospedra López I, Hurtado Sánchez JA, Ortiz Moncada R. Estudio de factores de riesgo de enfermedad cardiovascular en trabajadores universitarios españoles. Nutr Hosp. 2016 Jun 30; 33 (3): 273. DOI: 10.20960/nh.273

12. Johansen MY, MacDonald CS, Hansen KB, et al. Effect of an intensive lifestyle intervention on glycemic control in patients with type 2 diabetes: A Randomized Clinical Trial. JAMA. 2017 Aug 15;318(7):637- 646. DOI: 10.1001/jama.2017.10169. 6.

13. Lozano-Casanova M, Martínez-Sanz JM, Sospedra I, Hurtado JA, Ortiz-Moncada R, Laguna-Pérez A, Norte A. Prevalence of Cardiovascular Risk Factors in a University Population: Differences Between Faculty, Administrative Staff and Students. Rev Esp Nutr Hum Diet. 2023; 27(2): 135-43. doi: https://doi.org/10.14306/renhyd.27.2.1895

14. Contreras Jauregui FA, Rivero Olmos JM. Aptitud física y factores de riesgo cardiovascular en los administrativos universitarios. AFDH [Internet]. 202312(1):1-17. Avalaible from: https://ojs.unipamplona.edu.co/index.php/afdh/article/view/1057.

15. Ponce Ruiz JG, Miniet Castillo AE, Anaya González JL, Gordillo Alarcón AS: Riesgo cardiovasvular en docentes profesionales de la salud. Universidad Técnica del Norte, Ibarra, 2021-2022. Rev haban cienc méd [Internet]. 2022; Available from: http://www.revhabanera.sld.cu/index.php/rhab/ article/view/4709

16. Martínez-Sánchez Jm, Balaguer A. Universidad saludable: una estrategia de promoción de la salud y salud en todas las políticas para crear un entorno de trabajo saludable. Arch Prev Riesgos Labor [Internet]. 2016 Sep; 19 (3): 175-77. Available from: http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1578-25492016000300004&lng=es. https://dx.doi.org/10.12961/aprl.2016.19.03.4.