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Lifestyle And Metabolic Syndrome In Administrative Staff Of The First Republican University Of Peru And America

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ABSTRACT

Objective: To correlate the lifestyle and metabolic syndrome factors in the administrative workers of the universidad nacional of Trujillo.

Material and Methods: A stratified random sample of 168 administrative workers (men and women) from the universidad nacional of Trujillo, located in northern Peru, was selected during 2023. A questionnaire was developed to evaluate the lifestyle based on the level of physical activity, and a data collection form was used to record the metabolic syndrome factors.Results: The majority of men and women were active (42.48%), while 33.34% were sedentary and 24.18% had a very active lifestyle. Likewise, men and women presented with overweight (>26 kg/m2), high limits of triglycerides (<200 mg/dl), high LDL (>160 mg/dl), and hypertension (>120/80 mmHg). Women also presented with low HDL (<50 mg/dl). A negative correlation was found between lifestyle and the factors of glucose, total cholesterol, LDL-c, VLDL-c, TC/HDL ratio, and blood pressure ($p<0.05$). Conversely, a positive correlation exists between lifestyle and HDL-c ($p<0.05$). Conclusion: A lifestyle with a higher level of physical activity shows glucose, cholesterol, LDL, VLDL, and blood pressure values that are lower than pathological (negative correlation), while HDL levels will be healthy (positive correlation) in the administrative staff of the universidad nacional de Trujillo.

Keywords: Physical activity, metabolic syndrome, dyslipidemia, obesity, diabetes.

INTRODUCTION

Sedentary behavior is a modifiable risk factor with diverse impacts on population health and has been associated with functional alterations in older adults (mobility, balance, polypharmacy) (1). Furthermore, a study with 109,659 Canadian participants showed that sedentary behavior was associated with a 6% increase in chronic multimorbidity (OR=1.06) (2). However, a prevalence of 83.8% has been described in Indonesia, associated only with high stress but not with chronic diseases (3).

On the other hand, the prevalence of metabolic syndrome (MS) varies according to diagnostic criteria and population context. In Vietnam (4), prevalences between 8.4% and 16% were reported in workers, with hypertriglyceridemia (83.4%) and abdominal obesity (74.5%) highlighted as predominant factors. In China, a study (5) documented a higher frequency in women, older adults, and urban residents, associated with elevated BMI and family history. Researchers in Bangladesh (6) found MS in 19.7% of healthy adults, a condition that increases to 70.2% in hypertensive patients, with low HDL in over 80% of the sample. In Sierra Leone, prevalences of 8.5%–14.3% have been reported (7), with waist circumference identified as the main diagnostic factor.

Two recent studies examined metabolic health and physical activity patterns in different populations (8, 9). In Mexico, MS affects 45.3% of adults, with similar rates between men (43.7%) and women (46.8%). There is a high frequency of abdominal obesity (79.8%) and dyslipidemia (77.1%). Women and adults over 40 years old showed the highest prevalence rates (8). In Spain, physical activity patterns among adults with overweight and obesity showed mínima improvements between 2014 and 2020, with an increase in daily walking and regular

exercise rates. However, physical inactivity was strongly associated with the risk of obesity ; inactive individuals were 42% more likely to be obese compared to those of normal weight (9).
For this reason, the research objective was to correlate the lifestyle, based on the level of physical activity, and the factors of Metabolic Syndrome in the administrative workers of the universidad nacional of Trujillo, during 2023.

MATERIALS AND METHODS

Type and Design of Research
This was a correlational and cross-sectional study.

Population and Sample
The population consisted of administrative staff from the main campus of the universidad nacional de Trujillo, located in northern Peru, during 2023. A sample of 168 participants was calculated using the formula for finite population (confidence level = 95%, Z=1.96). The ages were 49.09±8.83 and 43.13±11.92 years in men and women, respectively. Participants attended the sample collection in a fasting state, without having consumed stimulants (caffeine or nicotine) or performed physical exercise.

Data Collection Instruments
The instrument consisted of a questionnaire for lifestyle assessment (10) and a data collection form to record the values of metabolic syndrome factors: BMI, glucose, cholesterol, HDL, LDL, VLDL, triglycerides, Total Cholesterol/HDL ratio, and blood pressure according to ATP III (11). (Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults, 2001).Lifestyle Assessment A list of routine activities was developed, and a pre-established factor and the time dedicated to each activity over a 24-hour period were assigned (10). Lifestyle was evaluated according to the level of physical activity (LPA)classified as: Sedentary (LPA≥1.4<1.6: work and leisure activities with no or minimal movement). Active (LPA≥1.6<1.9: sedentary work and leisure activities with moderate or vigorous physical effort). Very Active (LPA≥1.9<2.5: vigorous and intense work and leisure activities).

Anthropometric Assessment and Blood Pressure Measurement
For the anthropometric assessment, weight and height were measured using a digital platform scale with a stadiometer, and BMI (kg/m2) was then calculated (12). For measuring blood pressure, an automatic oscillometric device with a cuff (1 mmHg sensitivity) was used. The participant urinated beforehand and remained seated at rest for 5 minutes. The cuff was centered on the brachial artery, placing the distal part 1 to 2 cm above the cubital fossa. The arm then rested on a cushion on the table, positioned at the level of the heart. Finally, the device was activated, and two readings were taken to obtain an average (13).

Biochemical Assessment
To measure the biochemical markers, participants attended the biochemistry laboratory where the blood sample was collected in BD Vacutainer tubes via puncture of the basilic or cephalic veins. The serum was analyzed using the enzymatic colorimetric method. The reading obtained in the spectrophotometer for glucose, cholesterol, HDL, LDL, VLDL, and triglycerides was then used to calculate their concentration (14).

Data Analysis
Groups were formed for men, women, and the total number of participants. The distribution of lifestyle according to the level of physical activity (LPA) was analyzed. The mean, standard deviation, and coefficient of variation of the metabolic syndrome factors were also calculated. Subsequently, Pearson's R test (α=0.05) was performed to find correlations between lifestyle and the studied factors. Data was processed with the IBM SPSS Statistics version 26 software.

Ethical Considerations
The research adhered to the regulations of the Research Ethics Committee of the Faculty of Biological Sciences of the National University of Trujillo and the Declaration of Helsinki (15). Workers were informed about the sample collection procedures and voluntarily signed the consent form.

RESULTS AND DISCUSSION

Table 1. Distribution of lifestyle according to the level of physical activity (LPA) in administrative workers of the universidad nacional of Trujillo.

Sex	Lifestyle (LPA)							
	Sedentary		Active		Very Active		Total	
	n	%	n	%	n	%	n	%
Men	8	30.77	11	42.31	7	26.92	26	100
Women	43	33.86	54	42.52	30	23.62	127	100
Total	51	33.34	65	42.48	37	24.18	153	100

Table 1 shows the lifestyle, according to LPA, in the administrative workers of the universidad nacional of Trujillo. The majority of men and women were active (42.48%), while one-third (33.34%) were sedentary, and only about a quarter (24.18%) had a very active lifestyle.

Table 2. Univariate analysis of metabolic syndrome factors in administrative workers of the universidad nacional of Trujillo.

Sex	Risks FactorS	Mean	SD	CV
Men	BMI (kg/m²)	26.65	5.61	14%*
	Glucose (mg/dl)	75.30	13.64	18%*
	Total Cholesterol (mg/dl)	177.40	36.94	21%*
	HDL-col (mg/dl)	46.31	5.94	13%*
	LDL-col (mg/dl)	119.18	31.20	26%*
	VLDL-col (mg/dl)	29.76	12.35	41%
	Triglycérides(mg/dl)	171.01	76.31	45%
	Total Cholesterol/HDL Ratio	3.83	0.52	14%*
	Blood Pressure (mmHg)	155/111	0.12	9%*
Women	BMI (kg/m²)	26.62	7.17	16%*
	Glucose (mg/dl)	81.72	38.26	47%
	Total Cholesterol (mg/dl)	180.05	47.00	26%*
	HDL-col (mg/dl)	45.29	5.38	12%*
	LDL-col (mg/dl)	126.52	37.78	30%
	VLDL-col (mg/dl)	25.91	9.98	39%*
	Triglycérides(mg/dl)	179.01	94.67	53%
	Total Cholesterol/HDL Ratio	3.98	0.66	17%*
	Blood Pressure (mmHg)	135/106	0.10	8%*
Total	BMI (kg/m²)	26.62	6.07	15%*
	Glucose (mg/dl)	80.63	35.36	44%
	Total Cholesterol (mg/dl)	179.60	45.35	25%*
	HDL-col (mg/dl)	45.80	5.66	12%*
	LDL-col (mg/dl)	122.85	34.49	28%*
	VLDL-col (mg/dl)	27.84	11.17	40%
	Triglycérides(mg/dl)	177.65	91.63	52%
	Total Cholesterol/HDL Ratio	3.92	0.59	15%*
	Blood Pressure (mmHg)	142/109	0.11	9%*

*homogeneous distribution (CV<30%)

Table 2 reveals that the administrative workers showed a mean BMI of 26.62±6.07 kg/m2 , glucose of 80.63±35.36 mg/dl , HDL-c of 45.8±5.66 mg/dl , LDL-c of 122.85±34.49 mg/dl , triglycerides of 177.65±91.63 mg/dl , TC/HDL (Castelli index) of 3.92±0.59 , and blood pressure of 142/109 mmHg.Consequently, men and women presented with overweight (>26 kg/m2), high limits of triglycerides (<200 mg/dl), high LDL (>160 mg/dl), and hypertension (>120/80 mmHg). Additionally, women

presented with low HDL (<50 mg/dl). In contrast, all participants had a low cardiovascular risk according to the Castelli index (men <5 and women <4.5). These factors indicate that the administrative staff had excessive weight, high triglycerides and LDL, and hypertension. Furthermore, the women had low HDL levels.

Table 3. Correlation between lifestyle and metabolic syndrome factors in administrative workers of the universidad nacional of Trujillo.

Sex	Indicadores	Estilo de vida	
		r	p-value
Men	BMI (kg/m²)	0.139	0.000
	Glucose (mg/dl)	0.169	0.003
	Total Cholesterol (mg/dl)	-0.046	0.000
	HDL-col (mg/dl)	0.184	0.000
	LDL-col (mg/dl)	-0.006	0.012
	VLDL-col (mg/dl)	-0.067	0.000
	Triglycérides(mg/dl)	-0.007	0.083
	Total Cholesterol/HDL Ratio	-0.002	0.063
	Blood Pressure (mmHg)	-0.193	0.000
Women	BMI (kg/m²)	0.357	0.004
	Glucose (mg/dl)	0.058	0.000
	Total Cholesterol (mg/dl)	0.086	0.000
	HDL-col (mg/dl)	0.216	0.001
	LDL-col (mg/dl)	0.204	0.000
	VLDL-col (mg/dl)	-0.113	0.000
	Triglycérides(mg/dl)	0.003	0.066
	Total Cholesterol/HDL Ratio	-0.063	0.071
	Blood Pressure (mmHg)	0.06	0.000
Total	BMI (kg/m²)	0.081	0.000
	Glucose (mg/dl)	-0.104	0.014
	Total Cholesterol (mg/dl)	-0.067	0.000
	HDL-col (mg/dl)	0.065	0.002
	LDL-col (mg/dl)	-0.071	0.000
	VLDL-col (mg/dl)	-0.112	0.000
	Triglycérides(mg/dl)	-0.156	0.072
	Total Cholesterol/HDL Ratio	-0.18	0.088
	Blood Pressure (mmHg)	-0.28	0.004

Table 3 shows a negative correlation between lifestyle and the factors of glucose ($r=-0.104$), total cholesterol ($r=-0.067$), LDL-c ($r=-0.071$), VLDL-c ($r=-0.112$), TC/HDL ratio ($r=-0.18$), and blood pressure ($r=-0.28$) ($p<0.05$) in the administrative workers of the UNT. Conversely, a positive correlation exists between lifestyle and HDL-c ($r=0.065$) ($p<0.05$). No correlation was found with triglycerides ($p>0.05$). Therefore, a higher level of physical activity means that the concentrations of glucose, cholesterol, HDL, LDL, and blood pressure will have optimal values.

DISCUSSION

The results reveal that the lifestyle of the administrative workers at the universidad nacional of Trujillo was predominantly active (42.48%), while one-third (33.34%) reported sedentary behavior, and only 24.18% were very active (Table 1). In France, follow-up data from 2006 to 2016 revealed that 29% of men and 47% of women did not meet physical activity recommendations, and 80% reported spending at least three hours daily in front of screens, increasing sedentary behavior in recent years (16). In the Kurdistan region of Iraq, 33% of women were sedentary, consequently showing low levels of physical activity; 31.5% did enough activity

related to work and transport, and only 14.8% exercised regularly in their free time (17). Similarly, a study by (18) showed high levels of sedentary behavior (66.6%) and physical inactivity (47.2%) among administrative and academic staff at a higher education institution in Mexico. Indeed, 59.3% remained seated for more than 5 hours daily during their workday.

On the other hand, (19) analyzed 73,506 people in New Taipei, China. They found that non-sedentary occupations reduced the risk of MS among younger adults (≤40 years, OR=0.88, $p<0.05$), while sedentary occupations (of high socioeconomic status) increased the risk among older adults (>60 years, OR=1.39, $p<0.05$). A study by (20) involving 650 urban academic professionals (according to ATP III criteria) in West Bengal, India, demonstrated that

sedentary lifestyles contribute to the risk of obesity ($p<0.05$).

The analysis of metabolic syndrome factors (Table 2) exposes that the administrative staff presented with excess weight, high triglycerides and LDL, and hypertension (>120/80 mmHg). Moreover, women had low HDL levels. The prevalence of metabolic syndrome in South Korean adults was 25.6% and 12.4% in men and women, respectively (21). In a population in northern Taiwan, (22) identified a high prevalence of MS, slightly higher in men (40.8%) than in women (36.0%). Similarly, (23) reported a high prevalence of overweight (32.8%) and obesity (23%) in Saudi Arabian adults, with a differential distribution by sex (male overweight: 41% vs. female; 28.9% obesity in both). Additionally, in a highly educated population in Shanghai, an overall dyslipidemia prevalence of 29.10% was revealed. Men showed a significantly higher frequency than women (39.64% vs. 12.43%, $p<0.01$). The lipid profile values were elevated triglycerides (15.86%), high total cholesterol (6.43%), elevated LDL (5.37%), and low HDL (14.68%) (24).

It should be noted that occupational differences influence the prevalence of metabolic syndrome. (25) reported that Iranian university staff showed almost double the prevalence of metabolic syndrome compared to automotive industry workers (13.1% versus 6.1%, according to ATP III criteria). Geographic location also influences risk profiles; South African rural populations showed higher MS risk factors (52.2%) compared to urban populations (39.7%), even though urban areas show greater physical inactivity (26). Furthermore, predictors of obesity include advanced age, male sex, and low income, while moderate exercise and regular walking showed a protective effect (23). The main risk factors associated with dyslipidemia include advanced age, married status, sedentary behavior, consumption of animal viscera, active smoking, hypertension, diabetes, and obesity (24).

Regarding the findings, studies demonstrate a relationship between lifestyle and metabolic syndrome outcomes and risk. Sedentary time has been associated with MS in men and women, with elevated triglycerides (21). According to (27),

waist circumference and smoking are positively correlated with the triglycerides/HDL ratio, while physical activity is negatively associated, especially in women.

In more specific contexts, (28) suggests that lifestyle factors related to MS are a rural environment, low educational level, past smoking, absence of fruits and vegetables in the diet, consumption of sugary soft drinks, and alcohol intake. Similarly, in the SUN cohort study of 10,807 participants, those with the highest healthy lifestyle scores had a 34% lower risk of developing MS compared to those with the lowest scores (29). It should be noted that among people who already have MS, adherence to a healthy lifestyle reduces the risk of mortality. According to the National Health and Nutrition Examination Survey (NHANES), high lifestyle scores were associated with a lower risk of mortality (30).

CONCLUSIONS

The research found that a lifestyle with a higher level of physical activity means that the indicators of metabolic syndrome—such as glucose, cholesterol, LDL, VLDL, and blood pressure—will be lower than pathological (negative correlation), while HDL will be at a healthy level (positive correlation) in the administrative staff of the universidad nacional of Trujillo.

Conflicts of Interest

The authors declare that the research was conducted without any conflict of interest, and all are in agreement with their participation and placement in this publication.

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