

Level of knowledge of hypertension among teachers of a public educational institution, Lima provinces, 2021

Diego Rolando Apaza Arzapalo ^{1,a}; Milagros Roxana Salinas Quiñonez ^{1,a}; Lilian R. Pantoja Sánchez* ^{1,b}

The present study is part of a thesis to earn the *Grado Académico de Médico Cirujano* (Doctor of Medicine degree): Apaza D, Salinas M. Title: *Nivel de conocimiento de hipertensión arterial en docentes, Institución Educativa Pública n° 20799, Chancayllo, 2021* (Level of knowledge of hypertension among teachers, Public Educational Institution No. 20799, Chancayllo, 2021) [undergraduate thesis]. Lima: School of Human Medicine, Universidad de San Martín de Porres; 2022.

ABSTRACT

Objective: To determine the level of knowledge of hypertension (HTN) among teachers of IEP No. 20799 Daniel Alcides Carrión located in Chancayllo, Chancay-Huaral, Local Education Management Unit (UGEL) No. 10, 2021.

Materials and methods: A descriptive and cross-sectional study which included the entire population of teachers of IEP No. 20799 Daniel Alcides Carrión, totaling $N = 60$. The teachers who did not provide the informed consent were excluded, leaving a sample of $N = 54$. A previously validated questionnaire was used to analyze teachers' age, sex, education level, grade level taught, place of residence, diagnosis of HTN, family history of HTN and level of knowledge of HTN. A database was created in Microsoft Excel and analyzed using descriptive statistics in IBM SPSS Statistics, thus determining the frequency, proportion and mean.

Results: The teachers' average age was 42.78 ± 8.44 and the largest age group consisted of adults aged 31 to 59 years, with 94 % ($n = 51$). Out of all individuals, 96 % ($n = 52$) had a high level of knowledge of HTN, as well as of the three evaluated dimensions. Women accounted for the highest percentage in the sample, with 74.10 % ($n = 40$). Concerning their education level, 66 % ($n = 36$) had a professional title and, according to their grade level taught, their percentage distribution was similar in preschool, primary and secondary schools. As for the history of HTN, 53.70 % ($n = 29$) had a personal or family history of the condition and 14.80 % ($n = 8$) had a diagnosis of HTN.

Conclusions: Teachers of IEP No. 20799 mainly had a high level of knowledge of HTN during the year 2021 and no difference was found with respect to the teachers' level of knowledge that was related or not to the history of HTN.

Keywords: Hypertension; Knowledge; Faculty (Source: MeSH NLM).

Nivel de conocimiento de hipertensión arterial en docentes de una institución educativa pública, Lima provincias, 2021

RESUMEN

Objetivo: Determinar el nivel de conocimiento sobre hipertensión (HTA) en docentes del IEP n.° 20799 Daniel Alcides Carrión de Chancayllo, Chancay-Huaral, Unidad de Gestión Educativa Local (UGEL) n.° 10, 2021.

Materiales y métodos: Estudio descriptivo, transversal. Incluyó a toda la población de docentes del IEP n.° 20799 Daniel Alcides Carrión, que sumó $n = 60$. Se excluyeron a los docentes que no entregaron el consentimiento informado y quedó una muestra de $n = 54$. Se utilizó un cuestionario validado previamente, donde se analizó edad, sexo, nivel educativo del docente, grado educativo de enseñanza, lugar de residencia, diagnóstico de HTA, antecedente familiar de HTA y nivel de conocimiento de HTA. Se elaboró una base de datos en Excel y se analizó descriptivamente en SPSS, determinando frecuencia, proporción y media.

Resultados: La edad promedio de los docentes fue $42,78 \pm 8,44$ y la edad predominante fue la adulta (31-59 años), con un 94 % ($n = 51$). El 96 % ($n = 52$) presentó un nivel alto de conocimiento de HTA, así como en las 3 dimensiones evaluadas. Las mujeres representan un mayor porcentaje en la muestra, con 74,10 % ($n = 40$); según el grado de instrucción, 66 % ($n = 36$) son titulados; de acuerdo con el grado educativo de enseñanza, los porcentajes son similares tanto en inicial, primaria y

1 Universidad de San Martín de Porres (USMP), School of Human Medicine. Lima, Peru.

a Medical student.

b Pediatrician, master's degree in Health Services Management, professor at the USMP.

*Corresponding author

secundaria. Según los antecedentes de HTA, 53,70 % (n = 29) presenta algún antecedente personal o familiar; 14,80 % (n = 8) tiene diagnóstico de HTA.

Conclusiones: El nivel de conocimiento de la hipertensión arterial que presentaron los docentes de la IEP n.° 20799 durante el año 2021 fue predominantemente alto y no se encontró diferencia con respecto al nivel de conocimiento de los docentes asociados o no a los antecedentes de hipertensión.

Palabras clave: Hipertensión; Conocimiento; Docentes (Fuente: DeCS BIREME).

INTRODUCTION

Hypertension (HTN) is a chronic systemic disease that mainly affects blood vessels. This occurs due to an imbalance of factors causing vasodilation and vasoconstriction, which results in constant high blood pressure. It is considered a silent killer because most patients who suffer from this disease are asymptomatic. The most affected organs which may lead to death are the heart and brain. According to the American College of Cardiology/American Heart Association (ACC/AHA), someone is defined as having HTN if he/she has a systolic blood pressure ≥ 130 mmHg and a diastolic blood pressure ≥ 80 mmHg ⁽¹⁻³⁾.

According to the World Health Organization (WHO), in 2021, the age range of patients diagnosed with HTN was 30-79 years, most of whom came from middle- and low-income countries. Cerebrovascular diseases, with 51 %, followed by heart diseases with 45 %, were the leading causes of death ⁽⁴⁾.

In 2019, according to the Encuesta Demográfica y de Salud Familiar (ENDES - Demographic and Family Health Survey), 68.10 % of respondents had a diagnosis of HTN, the coast had the highest percentage of people diagnosed with HTN and it mostly affected the female population, with 11.70 % ⁽⁵⁾.

Currently, several agencies such as the WHO and the Pan American Health Organization (PAHO), together with the governments of each country, have projected the reduction of HTN cases thanks to the knowledge, promotion, prevention and management of such disease. If people had the appropriate information, they would take preventive measures or decide which continuous treatment to follow if they were diagnosed with HTN, so that it could be controlled without complications in the future. However, there is still a barrier concerning this information, which causes a lack of knowledge of HTN ⁽²⁾.

Chumo, in a hospital in Lima, identified the level of knowledge of HTN in outpatients aged 30 to 39 years, out of whom 97.70 % of the respondents had a low level of knowledge ⁽⁶⁾. Ataucusi et al., in a nursing home for older adults, found that 82 % of the respondents had a low level of knowledge of HTN ⁽⁷⁾.

Centurión found that, out of all the patients of a health

center (HC) in Chiclayo, 70 %, 20 % and 10 % had a medium, low and high level of knowledge of HTN, respectively ⁽⁸⁾. Díaz et al. found that, out of all users of a HC, 49 %, 41 % and 10 % had a high, medium and low level of knowledge of HTN, respectively ⁽⁹⁾. Ramírez stated that, in a health micro network, 26.3 %, 50 % and 23.60 % showed a high, medium and low level of knowledge of HTN, respectively ⁽¹⁰⁾.

Studies conducted to date suggest that there are different levels of knowledge of HTN since patients diagnosed with HTN have more knowledge of the disease than those who do not suffer from it. Peru shows similar data based on studies which were mostly conducted in health facilities. Therefore, this research is aimed to determine the level of knowledge of HTN in another population group such as the teachers of Institución Educativa Pública (Public Educational Institution) No. 20799 Daniel Alcides Carrión, located in Chancayllo, which will contribute to learn the level of knowledge of this pathology in the Peruvian population.

MATERIALS AND METHODS

Study design and population

An observational, descriptive and cross-sectional study conducted in Institución Educativa Pública No. 20799 Daniel Alcides Carrión, which belongs to UGEL No. 10, has three education levels and a staff of 60 teachers, and is located in the urban population center of Chancayllo, province of Huaral. The study included all the teachers that worked at the institution in year 2021 and excluded those who did not provide the informed consent.

The study included the entire population; nevertheless, the sample size was calculated using a formula for a finite population since the institution had a staff of 60 teachers. The formula from the study entitled *Nivel de conocimiento sobre hipertensión arterial en usuarios de 20-39 años que acuden a consulta externa del Hospital Apoyo II Santa Rosa setiembre-diciembre 2018* (Level of knowledge of hypertension among users aged 20 to 39 years who visit the outpatient service of Hospital Apoyo II Santa Rosa, September-December, 2018) yielded a *p* value of 0.5 and the minimum sample size, which totaled 47 teachers ⁽⁶⁾. Fifty-four valid survey responses were obtained, slightly over the minimum sample size.

Level of knowledge of hypertension among teachers of a public educational institution, Lima provinces, 2021

With the authorization of the educational institution, the survey was sent to the 60 teachers by electronic media, i.e., to their e-mail or WhatsApp number. The latter was more commonly used because we were provided with the telephone numbers of the teachers. A total of 54 teachers responded the survey, all of which were taken into account for the research because they were valid.

Variables and measurements

A questionnaire taken from the study conducted by Chumo was used as instrument. Cronbach’s alpha coefficient for internal consistency was used to measure its reliability,

obtaining a coefficient of 0.86, which makes it a good measuring tool. The questionnaire had the variables *age, sex, education level, grade level taught, place of residence, (personal and family) history of HTN* and 20 questions divided into three dimensions: *general aspects, risk factors* and *preventive measures*, which helped to determine the level of knowledge of HTN. Each question used an ordinal scale coded with correct responses (2 points) and incorrect responses (1 point). The results showed a high (28-40 points), medium (14-27 points) and low (0-13 points) level of knowledge of HTN ⁽⁶⁾ (Table 1).

Table 1. Questions and values according to the dimensions to assess the level of knowledge of HTN

DIMENSION: GENERAL ASPECTS	
1. You consider that hypertension is	<ul style="list-style-type: none"> a. A disease that increases blood pressure above normal levels and mainly affects the heart. b. A disease that increases blood pressure above normal levels without affecting the heart. c. A disease that lowers blood pressure above normal levels and mainly affects the heart. d. You do not know.
2. A person has hypertension when their blood pressure is higher than	<ul style="list-style-type: none"> a. 110/65 mmHg. b. 140/90 mmHg. c. 119/80 mmHg. d. You do not know.
3. Regarding the symptoms, the following statement is correct:	<ul style="list-style-type: none"> a. Hypertension does not cause symptoms in most cases. b. Hypertension causes symptoms such as redness all over the skin. c. Hypertension always causes symptoms such as pain in the heart. d. You do not know.
4. If high blood pressure reaches a serious stage, the following symptoms may appear:	<ul style="list-style-type: none"> a. Difficulty breathing. b. Nose bleeding. c. Headache. d. All of the above.
5. Hypertension increases blood pressure progressively. As a result,	<ul style="list-style-type: none"> a. Arteries are damaged and narrowed. b. There is impaired consciousness due to blockage of the arteries leading to the brain. c. The brain does not receive adequate amounts of oxygen or nutrients. d. All of the above.
6. Patients may present cardiac risks; therefore, it is necessary to take into account that	<ul style="list-style-type: none"> a. The higher your cardiac risk or the more uncontrolled your blood pressure is, the more frequently you should measure it. b. The higher your cardiac risk or the more uncontrolled your blood pressure is, the less frequently you should measure it. c. The higher your cardiac risk or the more uncontrolled your blood pressure is, you should measure it only once a day. d. You do not know.
DIMENSION: RISK FACTORS	
7. In your opinion, what are the factors that contribute to suffer from hypertension?	<ul style="list-style-type: none"> a. Having both parents with diabetes or hypertension. b. Having a hereditary factor does not contribute to suffer from hypertension. c. Having a partner with diabetes or hypertension. d. You do not know.

8. Which of the following actions promotes the risk of hypertension?
 - a. Doing little or limited physical exercise.
 - b. Sleeping a long nap after lunch.
 - c. Spending hours in front of the computer or books.
 - d. All of the above.
9. Which of the following factors contributes to hypertension?
 - a. Sport.
 - b. Rest.
 - c. Sedentarism.
 - d. You do not know.
10. Which of the following actions increases the risk of hypertension?
 - a. Lifting weights.
 - b. Excessive running.
 - c. Excessive weight gain.
 - d. You do not know.
11. Hypertension can be caused by
 - a. Excessive alcohol consumption and continuous smoking.
 - b. Alcohol consumption and smoking, once a month at most.
 - c. Alcohol consumption and smoking, even very rarely.
 - d. You do not know.
12. Which of the following products do you think that should be avoided to control hypertension?
 - a. Alcohol, vegetables and greens.
 - b. Coffee, alcohol, sodas and a low-salt diet.
 - c. Coffee, alcohol, fatty foods and a high-salt diet.
 - d. You do not know.
13. Which is an emotional risk factor for hypertension?
 - a. Sadness.
 - b. Stress.
 - c. High cholesterol.
 - d. You do not know.

DIMENSION: PREVENTIVE MEASURES

14. Which of the following situations concerning body weight helps to prevent hypertension?
 - a. Having overweight.
 - b. Controlling your weight.
 - c. Having low weight.
 - d. You do not know.
15. How can you prevent hypertension from a dietary perspective?
 - a. Lowering the intake of fatty and fried foods.
 - b. Lowering the intake of red meat and fish.
 - c. Lowering the intake of fruits and vegetables.
 - d. You do not know.
16. Which of the following dietary changes helps to regulate blood pressure?
 - a. Eating more fruits, vegetables, fried foods, dairy products and whole grains.
 - b. Drinking a glass of red wine after meals every day.
 - c. Eating more vegetables, fruits, low-fat dairy products and whole grains.
 - d. You do not know.
17. Which of the following statements is false?
 - a. The intake of high-fiber foods helps to prevent hypertension.
 - b. The intake of salt helps to prevent hypertension.
 - c. High cholesterol is a risk factor for complications of hypertension.
 - d. You do not know.
18. Carrying out the following actions will help to prevent hypertension:
 - a. Taking a walk and doing relaxation exercises every day.
 - b. Taking a 15-minute walk once a week.
 - c. Being standing up, at work or at home, most of the day.
 - d. You do not know.

Level of knowledge of hypertension among teachers of a public educational institution, Lima provinces, 2021

19. What is the minimum advisable time to walk every day to prevent hypertension?				
a. At least 30 minutes.				
b. At least 60 minutes.				
c. 10 to 20 minutes.				
d. You do not know.				
20. About the intake of products and hypertension, you can state that				
a. Consuming wine helps to prevent hypertension.				
b. Lowering alcohol consumption and smoking helps to prevent hypertension.				
c. Lowering alcohol consumption is enough to prevent hypertension, even if you keep smoking.				
d. You do not know.				
VALUES BY DIMENSIONS				
	General aspects	Risk factors	Preventive measures	Final value (scale)
High level of knowledge	9-12	10-14	10-14	28-40
Medium level of knowledge	5-8	5-9	5-9	14-27
Low level of knowledge	0-4	0-4	0-4	0-13

Statistical analysis

Data obtained from the survey was collected by means of Google Forms, then transferred to an Excel database and later to IBM SPSS Statistics software. Since it was a descriptive study, a univariate analysis was performed to find the frequency distribution, i.e., the proportion. A bivariate analysis was then performed using the chi-square test, taking into account the statistical significance of $p < 0.05$.

Ethical considerations

The approval of the Institutional Research Ethics Committee of Universidad de San Martín de Porres (No. 112-2021-COVID) was obtained, and then the principal of Institución Educativa Pública No. 20799 Daniel Alcides Carrión in Chancayllo (official

letter No. 090-2021-D-I.E. Pub.Int. No. 20799 “D.A.C”-CH) was contacted.

The participants received and signed an online informed consent form prior to taking part in the research survey. The survey on Google Forms platform collected anonymous responses.

RESULTS

The teachers’ mean age was 42.78 ± 8.44 and the largest age group consisted of adults (aged 31 to 59 years), totaling 94 %. It was observed that 96 % of the participants had a high level of knowledge of HTN (Table 2).

Table 2. Level of knowledge of HTN among teachers of IEP No. 20799 Daniel Alcides Carrión, Chancayllo, Huaral, 2021

Level of knowledge of HTN	N = 54	n	%
High		52	96.30
Medium		2	3.70
Low		0	0.00

A higher percentage of high level of knowledge of HTN could be observed in the three dimensions assessed: *general aspects*, *risk factors* and *preventive measures*, with 90.74 %, 85.19 % and 87.04 %, respectively. Additionally, low levels of knowledge of HTN were not observed in such dimensions (Table 3).

Table 3. Level of knowledge of HTN according to its dimensions assessed among teachers of IEP No. 20799 Daniel Alcides Carrión, Chancayllo, Huaral, 2021

Dimensions	Level of knowledge of HTN N = 54		
	High n (%)	Medium n (%)	Low n (%)
General aspects	49 (90.74)	5 (9.26)	0 (0)
Risk factors	48 (88.89)	6 (11.11)	0 (0)
Preventive measures	52 (96.30)	2 (3.70)	0 (0)

It was observed that the largest age group consisted of adults, totaling 94 %. Concerning the education level, 66 % ($n = 36$) had a professional title and, according to the grade level taught, the percentages were similar in preschool, primary and secondary schools. The history of HTN showed that 53.70 % ($n = 29$) had a personal or family history of HTN and 46.30 % did not have any history of HTN (Table 4).

Among the teachers who showed a high level of knowledge of HTN, the largest age group were adults, totaling 96.10 %. All males ($n = 14$) had a high level of knowledge of HTN. As for teachers' education level, 94.10 % ($n = 16$) and 96.30 % ($n = 35$) had a master's degree and a professional title, respectively, and they

showed a high level of knowledge of HTN. Only a low percentage of both groups had a medium level. Out of the teachers who had a family history of HTN, 90.50 % ($n = 19$) and only 9.50 % ($n = 2$) showed a high and medium level of knowledge of HTN, respectively. All the teachers with a personal history of HTN (diagnosed with HTN) showed a high level of knowledge of HTN. All primary teachers had a high level of knowledge of HTN.

A significant association between the level of knowledge of HTN and the age group, sex, education level, personal or family history and grade level taught was not found according to the chi-square test, showing results $p > 0.05$ (Table 4).

Table 4. Level of knowledge of HTN by sociodemographic characteristics and a personal or family history of HTN among teachers of IEP No. 20799, Chancayllo, 2021

Characteristics $N = 54$	Level of knowledge of HNT		
	High n (%)	Medium n (%)	Total n (%)
Age ($X \pm SD$) (42.78 \pm 8.44)			
Young adults (< 30 years)	1 (100)	0 (0)	1 (1.90)
Adults (31-59 years)	49 (96.1)	2 (3.90)	51 (94.40)
Older adults (60-75 years)	2 (100)	0 (0)	2 (3.70)
Sex			
Female	38 (95)	2 (5)	40 (74.10)
Male	14 (100)	0 (0)	14 (25.90)
Education level			
Bachelor's degree	1 (100)	0 (0)	1 (1.90)
Master's degree	16 (94.10)	1 (5.90)	17 (31.50)
Professional title	34 (96.30)	2 (3.70)	36 (66.70)
History of HTN			
Family (1st, 2nd, 3rd degree)	19 (90.50)	2 (9.50)	21 (38.90)
Personal (diagnosed with HTN)	8 (100)	0 (0)	8 (14.80)
No history	25 (100)	0 (0)	25 (46.30)
Grade level taught			
Preschool	20 (95.20)	1 (4.80)	21 (38.90)
Primary school	18 (100)	0 (0)	18 (33.30)
Secondary school	14 (93.30)	1 (6.70)	15 (27.80)

DISCUSSION

It was shown that 96.30% and only 3.70% of the teachers had a high and medium level of knowledge of HTN, respectively. The results differ from those of the study conducted by Chumo, which was performed with outpatients aged 30 to 39 years, out of whom 97.70% and 2.30% had a low and high level of knowledge of HTN, respectively⁽⁶⁾. On the other hand, Orihuela et al. found that 6.70% of older adults had a high level of knowledge of HTN. This difference is explained by the training of this research population—i.e., teachers—compared with the population of other studies⁽¹¹⁾. Likewise, in the research work carried out by Huamán in Red de Salud Utcubamba (Utcubamba Health Network), it was observed that most users (89.70%) had a low level of knowledge while 4% had a medium level of knowledge of HTN⁽¹²⁾.

In the study conducted by Wolde et al., 55.30%, 17.90% and 26.80% had a low, medium and high level of knowledge of HTN, respectively. This differs from our study—in which 96.30% of the teachers had a high level of knowledge of HTN—because 47.27% of the population studied by Wolde were illiterate⁽¹³⁾. Anyanti et al. found in their research that 41.90% of the respondents had a good level of knowledge of HTN; however, this percentage was lower than that of the present study since the population studied by Anyanti did not pursue higher education⁽¹⁴⁾.

The study conducted by Alejos et al. differs from our study in that patients with HTN showed a low (52.50%) and high (7.50%) level of knowledge of HTN since most of them only completed primary and secondary school. In the present research, it was observed that the teachers had a high knowledge of HTN, whether they suffered from HTN or not, which may be related to their education level, socioeconomic status and lifestyle⁽¹⁵⁾. The study conducted by Fanelli et al. found a low level of knowledge of HTN as only 15% had a good level. Such result differs from this study since the assessed population consisted of a community of people with different education levels, lifestyle and socioeconomic status⁽¹⁶⁾.

The results of our study, conducted in teachers with a professional title—which accounted for 66.70%—and a high level of knowledge of HTN, differ from the study by Montes et al. since only 14% of its participants were teachers with a professional title and the rest had different jobs. Montes reported that 43.31% of the participants had a medium level of knowledge of HTN, which differs from our study since 96% had a high level of knowledge of HTN. This is because not the entire population studied by Montes had higher education; therefore, it can be inferred that higher education has an impact on the knowledge of the disease⁽¹⁷⁾.

In the study conducted by Pastor, 83% of the population was

diagnosed with HTN and had an adequate level of knowledge of HTN. This agrees with our study because those diagnosed or having relatives with this disease mostly had a high level of knowledge of HTN⁽¹⁸⁾. On the contrary, Ojeda found that the highest percentage of patients diagnosed with HTN had a medium level (64.60%) followed by a high level (14.80%) of knowledge of HTN⁽¹⁹⁾. Furthermore, Soplopuco et al. found that 62.80% of the study subjects had an inadequate knowledge of HTN though they had been diagnosed with the disease, which also differs from our study⁽²⁰⁾.

Palacios researched the association between the level of knowledge of HTN and self-care among older adults, finding a low level of knowledge. This differs from our study because the teachers had a high level of knowledge of HTN (96.30%). Such situation may be due to the fact that both study populations are not the same since the population of adult teachers pursued higher education and the population of the study by Palacios consisted of older adults and only 8% had higher education⁽²¹⁾.

Concerning the level of knowledge of HTN according to age, 96.10% and 3.90% of the adult teachers (31 to 59 years) had a high and medium level of knowledge, respectively. Furthermore, the study by Baglietto-Hernández et al. conducted in a group of patients aged 45 to 60 years showed that 80% had a good level of knowledge of HTN⁽²²⁾. In her study, Pérez showed that people between 30 and 60 years who visited an occupational medicine clinic had a medium (46.70%), low (34.70%) and high (18.50%) level of knowledge of HTN⁽²³⁾. The study conducted by Melnikov revealed that older patients with more years of education generally had more knowledge of HTN. Such results are somewhat similar to those of this study as it was observed that the older the population, the higher the level of knowledge of HTN, although there was no statistical significance⁽²⁴⁾.

A high level of knowledge of HTN was observed in both sexes in the current research, which differs from the study conducted by Centurión, whose population evidenced that 66% of both males and females had a medium level of knowledge and 14% a high level of knowledge of HTN. This is probably because the population studied by Centurión were not as educated as the teachers from our study⁽⁸⁾.

As to the level of knowledge of HTN associated with a history of HTN, there is evidence of a high level of knowledge in teachers both with and without a family or personal history; therefore, having a high level of knowledge of HTN does not depend upon having a family or personal history of HTN ($p > 0.05$). In a study conducted in patients diagnosed with HTN, Córdova et al. found a medium level followed by a high level of knowledge of HTN; this differs from our study since all the teachers with a history of HTN showed a high level of knowledge of HTN⁽²⁵⁾. Arámbulo researched

the association between adherence to treatment and knowledge of HTN, finding that those who had an adequate knowledge of HTN had better adherence to the treatment as well. On the contrary, our results showed that teachers who did not have a personal and family history of HTN had a high level of knowledge of the disease ⁽²⁶⁾. The study conducted by Rampamba et al., in which more than a half of its population had a personal and family history of HTN, revealed that most of them had neither education nor knowledge of HTN ⁽²⁷⁾. This differs from our research, which found a high level of knowledge of HTN in a population with higher education, whether they had a personal or family history of HTN or not.

Estrada et al. showed that those who had a higher education level had a good level of knowledge of HTN compared with those who had a lower education level: this is similar to the result of this study since the high level of knowledge of HTN prevailed in teachers who had a higher education level ⁽²⁸⁾. Samajen et al. and Campoverde researched populations with basic education and the result was a poor level of knowledge of HTN. This differs from the present study, wherein its population pursued higher education and had a high level of knowledge of HTN, which demonstrates that education is related to knowledge, though the statistical analysis was not significant ($p > 0.05$). In this case, it is worth delving into the topic in future studies with specific methodology ^(29,30).

Table 5. Comparison of studies on the level of knowledge of HTN

Level of knowledge of HTN	Study N = 54		Chumo ⁽⁶⁾ N = 130		Orihuela ⁽¹¹⁾ N = 30		Huamán ⁽¹²⁾ N = 39		Wolde ⁽¹³⁾ N = 385		Alejos ⁽¹⁵⁾ N = 200		Montes ⁽¹⁷⁾ N = 64	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
High	52	96.30	0	0	2	6.70	0	0	103	26.80	15	7.50	32	50
Medium	2	3.70	3	2.30	11	36.70	4	10.30	69	17.90	80	40	19	29.68
Low	0	0	127	97.70	17	56.70	35	89.7	213	55.30	105	52.50	13	20.31
	Ojeda ⁽¹⁹⁾ N = 291		Palacios ⁽²¹⁾ N = 202		Pérez ⁽²³⁾ N = 75		Centurión ⁽⁸⁾ N = 154		Córdova ⁽²⁵⁾ N = 85		Samajen ⁽²⁹⁾ N = 174		Campoverde ⁽³⁰⁾ N = 45	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
High	43	14.80	10	5.2	14	18.60	15	10	30	35.30	77	44.25	1	2.20
Medium	188	64.60	52	25.70	35	46.70	108	70	55	64.70	83	47.70	29	64.40
Low	60	20.60	140	69.30	26	34.70	31	20	0	0	14	8.04	15	33.30
	Anyanti ⁽¹⁴⁾ N = 778		Fanelli ⁽¹⁶⁾ N = 2731		Pastor ⁽¹⁸⁾ N = 100		Soplopuco and Tejada ⁽²⁰⁾ N = 137		Baglietto-Hernández ⁽²²⁾ Males N = 274		Females N = 153		Arámbulo ⁽²⁶⁾ N = 230	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Good/adequate	326	41.91	410	15	83	83	51	37.20	87	71.90	122	79.73	128	55.70
Poor/inadequate	452	58.09	2321	85	17	17	86	62.80	31	25.61	29	18.95	102	44.30
	Rampamba ⁽²⁷⁾ N = 253		Estrada ⁽²⁸⁾ N = 980											
	n	(%)	n	(%)										
Good/adequate	70	27.70	415	42.30										
Poor/inadequate	183	72.30	565	57.70										

On the other hand, one of the limitations of this study was the fact that the collected data could not be extrapolated to other educational institutions due to its limited sample size, even though it included almost the entire population of teachers of the educational institution, so the results are only valid for said population. Likewise, another limitation was that the survey did not specify the history of HTN, for example, when such disease was diagnosed.

The strength of this research was being one of the few studies about the level of knowledge of HTN conducted in teachers in Peru.

In conclusion, the level of knowledge of HTN among teachers of Institución Educativa Pública No. 20799 in year 2021 was mainly high, and it did not show a significant association between the level of knowledge of HTN and the age group, sex, education level, personal or family history and grade level taught.

Further research is needed—with this study carried out in a population different from that of health institutions as background—so that other approaches regarding the level of knowledge of HTN can be taken to have a broader view of the topic.

Acknowledgement: We express our gratitude to César A. Ramírez Carranza, principal of Institución Educativa Pública No. 20799 Daniel Alcides Carrión in Chancayllo, for authorizing the conduction of this study, and particularly to the teachers who supported us with their participation.

Author contributions: AADR y SQMR designed the study, managed permits, analyzed the collected data, and wrote the draft and manuscript final version. LRPS designed the study, analyzed the collected data, and wrote the draft and manuscript final version. All the authors approved the final version and take responsibility for the content of the article.

Funding sources: This article was funded by the authors.

Conflicts of interest: The authors declare no conflicts of interest.

BIBLIOGRAPHIC REFERENCES

1. Basile J, Bloch MJ. Overview of hypertension in adults [Internet]. UpToDate. 2021 [cited on September 4, 2022]. Available from: https://www.uptodate.com/contents/overview-of-hypertension-in-adults?search=hipertensi%C3%B3n%20arterial&source=search_result&selectedTitle=1-150&usage_type=default&display_rank=1#H3
2. World Health Organization. Hypertension [Internet]. 2021 [cited on August 7, 2022]. Available from: <https://www.who.int/news-room/fact-sheets/detail/hypertension>
3. Rubio-Guerra AF. Nuevas guías del American College of Cardiology/ American Heart Association Hipertension para el tratamiento de la hipertensión. ¿Un salto en la dirección correcta? Med Int Méx [Internet]. 2018;34(2):299-303. Available from: https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0186-48662018000200011
4. Organización Panamericana de la Salud. Hipertensión [Internet]. 2021 [cited on August 29, 2022]. Available from: <https://www.paho.org/es/temas/hipertension>
5. Instituto Nacional de Estadística e Informática (INEI). Perú: Enfermedades No Transmisibles y Transmisibles, 2019 [Internet]. 2019 [cited on September 12, 2022]. Available from: https://proyectos.inei.gob.pe/endes/2019/SALUD/ENFERMEDADES_ENDES_2019.pdf
6. Chumo Yanayaco GT. Nivel de conocimiento sobre hipertensión arterial en usuarios de 20-39 años que acuden a consulta externa del Hospital apoyo II Santa Rosa setiembre-diciembre 2018 [undergraduate thesis]. Piura (Perú): Universidad Cesar Vallejo; 2018. Retrieved from: <https://repositorio.ucv.edu.pe/handle/20.500.12692/25785>
7. Ataucusi Navarro S, Nieto Estela JM. Nivel de conocimiento sobre la hipertensión arterial en la Casa del Adulto Mayor Asociación Corazones Contentos, Lurín- 2019 [undergraduate thesis]. Chíncha (Perú): Universidad Autónoma de Ica; 2019. Retrieved from: <http://repositorio.autonomaica.edu.pe/handle/autonomaica/606>
8. Centurión Puicón SR. El nivel de conocimiento sobre hipertensión arterial en adulto mayores en el Centro de Salud José Quiñones Gonzáles mayo-octubre 2019 [undergraduate thesis]. Chiclayo (Perú): Universidad Particular de Chiclayo; 2019. Retrieved from: <http://repositorio.udch.edu.pe/handle/UDCH/567>
9. Díaz Saldaña MM, Infante Sánchez EH. Conocimiento sobre hipertensión arterial y práctica de autocuidado - programa adulto mayor [undergraduate thesis]. Trujillo (Perú): Universidad Nacional de Trujillo; 2020. Retrieved from: <http://dspace.unitru.edu.pe/handle/UNITRU/15942>
10. Ramírez Tuya OM. Nivel de conocimiento sobre hipertensión arterial y el autocuidado del adulto mayor hipertenso de la microrred Chavín-Ancash, 2018 [undergraduate thesis]. Perú: Universidad Inca Garcilaso de la Vega; 2019. Retrieved from: <http://repositorio.uigv.edu.pe/handle/20.500.11818/3916>
11. Orihuela Artica DI, Orihuela Velasquez YA. Nivel de conocimiento sobre hipertensión arterial en adultos mayores que acuden al Centro de Salud de Chupaca 2021. Universidad Roosevelt. Retrieved from: <http://repositorio.uroosevelt.edu.pe/handle/20.500.14140/701>
12. Huamán Martínez RM. Nivel de conocimiento sobre prevención de hipertensión arterial en adultos atendidos en el centro de salud Utcubamba, Amazonas - 2021 [undergraduate thesis]. Bagua Grande (Perú): Universidad Politécnica Amazónica; 2021. Retrieved from: <https://repositorio.upa.edu.pe/handle/20.500.12897/91>
13. Wolde M, Azale T, Debalkie Demissie G, Addis B. Knowledge about hypertension and associated factors among patients with hypertension in public health facilities of Gondar city, Northwest Ethiopia: Ordinal logistic regression analysis. PLoS One. 2022;17(6):e0270030.
14. Anyanti J, Akuiyibo SM, Fajemisin O, Idogho O, Amoo B. Assessment of the level of knowledge, awareness and management of hypertension and diabetes among adults in Imo and Kaduna states, Nigeria: a cross-sectional study. BMJ Open. 2021;11(3):e043951.
15. Alejos Garcia ML, Maco Pinto JM. Nivel de conocimiento sobre hipertensión arterial en pacientes hipertensos [graduate thesis]. Lima (Perú): Universidad Peruana Cayetano Heredia; 2017. Retrieved from: <https://repositorio.upch.edu.pe/handle/20.500.12866/1007>
16. Fanelli E, Ravetto Enri L, Pappaccogli M, Fasano C, Di Monaco S, Pignata I, et al. Knowledge on arterial hypertension in general population: Results from a community pharmacy screening program. Nutr Metab Cardiovasc Dis. 2021;31(4):1081-6.
17. Montes Quiroz A, Leal Cortes E, Sillas González DE, Benítez Guerrero V, Ruiz García M, Magaña Lemus L, et al. Nivel de conocimientos sobre hipertensión arterial (HTA) de adultos de una comunidad rural

- de Nayarit. S F J of Dev [Internet]. 2022;3(2):2024-35. Available from: <http://dx.doi.org/10.46932/sfjdv3n2-034>
18. Pastor Mendoza HJ. Nivel de conocimiento sobre hipertensión arterial en pacientes hipertensos adultos [undergraduate thesis]. Trujillo (Perú): Universidad Nacional de Trujillo; 2018. Retrieved from: <https://dspace.unitru.edu.pe/handle/UNITRU/15521>
 19. Ojeda Zegarra OF. Nivel de conocimiento de la hipertensión arterial y la adherencia al tratamiento en pacientes hipertensos tratados en la microrred de salud norte de la ciudad de Tacna 2019 [undergraduate thesis]. Tacna (Perú): Universidad Privada de Tacna; 2019. Retrieved from: <https://repositorio.upt.edu.pe/handle/20.500.12969/1005>
 20. Soplopucó Díaz MK, Tejada Peche CL. Asociación entre conocimiento sobre hipertensión arterial y adherencia al tratamiento en pacientes hipertensos de centros de salud, Lambayeque 2021 [undergraduate thesis]. Lambayeque (Perú): Universidad Nacional Pedro Ruiz Gallo; 2021. Retrieved from: <https://repositorio.unprg.edu.pe/handle/20.500.12893/9222>
 21. Palacios Zurita M. Conocimiento y prácticas de autocuidado sobre hipertensión arterial en adultos mayores del servicio de medicina del Hospital Regional Docente Las Mercedes enero-junio 2019 [undergraduate thesis]. Chiclayo (Perú): Universidad Particular de Chiclayo; 2019. Retrieved from: <http://repositorio.udch.edu.pe/handle/UDCH/431>
 22. Baglietto-Hernández JM, Mateos-Bear A, Nava-Sánchez JP, Rodríguez-García P, Rodríguez-Weber F. Nivel de conocimiento en hipertensión arterial en pacientes con esta enfermedad de la Ciudad de México. Med Int Méx [Internet]. 2020;36(1):1-14. Available from: <https://www.medigraphic.com/pdfs/medintmex/mim-2020/mim201b.pdf>
 23. Pérez Bohorquez AM. Nivel de conocimiento sobre hipertensión arterial en personas de 30-60 años que asisten a la clínica ocupacional Servisalud durante la pandemia, Jesús María 2021 [undergraduate thesis]. Callao (Perú): Universidad Nacional del Callao; 2021. Retrieved from: <http://repositorio.unac.edu.pe/handle/20.500.12952/6383>
 24. Melnikov S. Differences in knowledge of hypertension by age, gender, and blood pressure self-measurement among the Israeli adult population. Heart Lung. 2019;48(4):339-46.
 25. Córdova Angulo MG, Domínguez Criollo MJ. Asociación del conocimiento sobre hipertensión arterial (HTA) y adherencia al tratamiento en pacientes del club de hipertensos del Centro de Salud N° 1 del Distrito Chambo-Riobamba 06D01 [undergraduate thesis]. Cuenca (Ecuador): Universidad de Cuenca; 2019. Retrieved from: <http://dspace.ucuenca.edu.ec/handle/123456789/31972>
 26. Arámbulo Bayona RHA. Conocimiento sobre hipertensión arterial y su asociación con adherencia al tratamiento Hospital Cayetano Heredia Piura 2018 [undergraduate thesis]. Piura (Perú): Universidad Privada Antenor Orrego; 2020. Retrieved from: <https://repositorio.upao.edu.pe/handle/20.500.12759/6052>
 27. Rampamba EM, Meyer JC, Helberg E, Godman B. Knowledge of hypertension and its management among hypertensive patients on chronic medicines at primary health care public sector facilities in South Africa; findings and implications. Expert Rev Cardiovasc Ther. 2017;15(8):639-47.
 28. Estrada D, Sierra C, Soriano RM, Jordán AI, Plaza N, Fernández C. Grado de conocimiento de la hipertensión en pacientes hipertensos. Enfermería Clínica [Internet]. 2020;30(2):99-107. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S2445147919300566>
 29. Samajen Juwag LC, Guerrero Yovera RG. Nivel de conocimiento sobre hipertensión y autocuidado del adulto mayor del Centro de Salud Morro Solar-Jaén, 2018 [undergraduate thesis]. Chiclayo (Perú): Universidad Particular de Chiclayo; 2019. Retrieved from: <http://repositorio.udch.edu.pe/handle/UDCH/607>
 30. Campoverde Valle SA. Nivel de conocimiento del adulto sobre

prevención de hipertensión arterial en el Caserío Quebrada Seca-Lancones. Universidad San Pedro. Retrieved from: http://200.48.38.121/bitstream/handle/USANPEDRO/11829/Tesis_60695.pdf?sequence=1&isAllowed=y

Corresponding author:

Lilian R. Pantoja Sánchez

Address: Calle Monte Abeto 325, Santiago de Surco. Lima, Perú.

Telephone: +51 947 570 786


E-mail: rospe2005@yahoo.es

Reception date: November 14, 2022

Evaluation date: December 07, 2022

Approval date: January 23, 2023

© The journal. A publication of Universidad de San Martín de Porres, Peru.

 Creative Commons License. Open access article published under the terms of Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0>).

ORCID iDs

Apaza Arzapalo Diego Rolando  <https://orcid.org/0000-0002-2002-2181>

Salinas Quiñonez Milagros Roxana  <https://orcid.org/0000-0002-5553-4179>

Lilian Rosana Pantoja Sánchez  <https://orcid.org/0000-0003-2348-1057>