PREVALENCE OF ARTERIAL HYPERTENSION AND ITS RISK FACTORS IN YOUNG ADULTS OF PARAGUAY

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ABSTRACT

Early detection of arterial hypertension is critical for preventing the occurrence of cardiovascular diseases. A cross-sectional, observational, descriptive study was performed in order to determine the prevalence of arterial hypertension and cardiovascular risk factors among young university students in Paraguay. WHO hypertension parameters were used to classify the hypertension status. The research demonstrated that 18.6% of the students were classified in the prehypertension and 2.2% of the population had already a hypertension stage I status. 25.8% of the students had exceed the normal body mass index and 67.4% had a family history of hypertension. The values of blood pressure and family history were very unusual among youth population and in relation to similar population around the world.

Key words: High blood pressure, Risk factors, Youth, Students.

INTRODUCTION

Blood Arterial Hypertension (BAHT) is a disease that presents nonspecific symptoms, and is therefore considered a silent threat, but can be detected, prevented, controlled and monitored with simple tools and non-invasive procedures. In general, 50% of current hypertensive patients are unaware of their diagnosis, that is, they do not know that they have it, and from the 50% of people that knows that they had BAHT, only about

half of them go to a doctor's office. On the other hand, only half of the people with BAHT that are treated, follow professional advice and appropriate procedures that allow them to regularly maintain normal blood pressure values. This means that only about 13% of patients with hypertension are evaluated, detected, controlled and adequately treated[1].

BAHT was considered until a few years ago as an almost exclusive disease of adults, which in most cases suffered a "primary or idiopathic hypertension" that is, a disease that occurs without a specific factor or basis that justifies it. The few cases in which this disease was diagnosed in children or teens were due to a "secondary hypertension" that is a consequence of other basic diseases such as, for example, metabolic type in diabetes or those of renal origin among others. Currently, cases of "primary or essential hypertension" are constantly increasing, especially in the population of adolescents (age range between 12 and 18 years)[2], It is clinically known that BAHT doubles the risk of ischemic coronary heart disease (including acute myocardial infarction and sudden death) and triples the risk of congestive heart failure[3].

BAHT is, together with obesity, hypercholesterolemia and tobacco consumption, one of the main recognized "Risk Factors of Ischemic Heart Disease", and the main danger factor stroke, both hemorrhagic and ischemic one; which can cause death or serious disabling consequences.

Most studies on hypertension have a fairly clear vision when it comes to adult patients, the same does not happen when hypertension occurs in children, teenagers and young people, despite the fact that a considerable number of researches indicate that the essential hypertension of the adult begins in early life and with a clear genetic background, suggesting that the value of pressure in the first decades of life is an indicator of risk of being hypertensive in adults[4]

BAHT is then the main Risk Factor in both cardiovascular and stroke accidents, which are the main causes of death and disability. One way to reduce the incidence of this risk is to develop prevention strategies, where the regular measurement of blood pressure and educational campaigns.

The prevalence of hypertension is high all over the World and on the American Continent causes an appreciable number of disabilities and deaths in the population. The WHO Expert Committee estimates that between 8 and 18% of the world's adult population suffers from high blood pressure. The prevalence of secondary hypertension ranges from 1% to 5% of the total hypertensive population.

In South American in general and Paraguay Republic in particular, according to data from the First National Survey of Risk Factors for Noncommunicable Diseases conducted by the Ministry of Public Health and Social Welfare, in 2011 and published in 2012, 32.2% of the population were ever informed by the health personnel that they suffered from BAHT, and that prevalence was the prevalence more in females that males (37.9% vs 25.3%)[5].

Reports indicating high blood pressure in early stages of life are becoming more frequent[6]. Blood Arterial Hypertension is a process, that might starts from life conception, and that is could be detected from childhood and adolescence. The recent introduction of the term "prehypertension", has placed an emphasis on the promotion of health and prevention of BAHT[7], since up to half or one third of adolescents may present cardiovascular risk for heart attack, disease coronary, with the consequent socio-economic impact on health systems in different terms[8]. The limited knowledge about epidemiology and the impact of tension figures from an early age is a question that does not yet have an accurate answer[9]. Preliminary reports suggest the premature development of organic damage is left ventricular hypertrophy and coronary heart disease[10], which pose a public health challenge to implement effective community measures in the population of children and young people.

One of the accepted ways to reduce the incidence of this risk is based on developing prevention strategies in the population, where on the other hand, the regular measurement of Blood Pressure is another fundamental

tool, observing the need to deploy information and educational campaigns in order to prevent the incidence of the main factors that cause or may cause at some time a sustained increase in BAHT in people.

Cardiovascular diseases, and within them hypertension, should be considered a priority health problem in the American Continent since it has an enormous social and economic repercussions.

This is even more evident if it is consider the fact that an appreciable number of patients when they seek medical attention for hypertension or are detected by the health team in care centers, already present complications and damage of target organs, which is explained, in part, by the absence of symptomatology of this disorder in its initial stages. That is why it is so important early detection and education to the community, and if possible the search for preventive measures.

The Faculty of Chemical Science at National University of Asuncion (FCQUNA) is promoting, through agreements and programs with the Ministry of Health of Paraguay actions to promote healthy habits, eating and physical activity in youth and young adults.

A work is carried out in several stages, whose objectives were to establish the frequency of arterial hypertension and aware toe population about the associated risk factors for students. The earlier in the age of the individuals it is detected and controlled, the less probabilities of having cardiovascular problems and more probability of recognizing risks, reducing cardiovascular morbidity and mortality in the young adult.

In order to know which is the prevalence of BAHT among young University Students in Paraguay and which are the risk factors associated to this disease, we performed an epidemiologic research.

MATERIALS AND METHODS

Study design: Descriptive observational Study based on a transverse cut, with an analytical stage.

Universe of the population studied: students on their first year in the Faculty of Chemical Sciences, National University of Asunción.

Period of Study: January 2015 with a follow up until January 2019

Sampling: For convenience. Not probabilistic.

Sample size: From the universe of the population, the number of units of analysis that will make up the sample will be calculated using the following formula[11]

$$n = (Z^2)(p)(q)(N) / (N)(e^2)+(Z^2)(p)(q)$$

Where:
n = Sample size
Z = 95% confidence level (Z: 1.96).
p = Probability of BAHT in young university student (on the basis that there are no previous studies defining the probability of occurrence of the event will be considered a value of 0.5).
q = Probability against the occurrence of BAHT in university students (based on the absence of previous studies that define the probability against the occurrence of the event will be considered a value of 0.5).
N = Universe of university students at National University of Asuncion, Paraguay
e = 5% estimated error

Inclusion criteria:
Students with the following characteristics will be included:
• Age: 18 years old.
• Sex: men and women with or without treatment for high blood pressure.
• Freshman students from Faculty of Chemical Sciences, in 2015.

Exclusion criteria:
Students with the following characteristics will be excluded:
• Age: under 18 years old.
• Do not accept to participate in the study and do not sign the consent.

Variables
Gender: classified in female and male

Age: It is the number of years of the patient's life measured from birth.

Weight: In kilograms. **Source:** digital scale register.

Size: Height in meters. Registered with tape measure in the pharmaceutical interview.

Body mass index: Parameter used to measure overweight and obesity in adults both individual and population data. The BMI is the weight in kilograms divided by the square of the height in meters (Kg / m2)[12]

Health Problems: A health problem is defined as any complaint, observation or fact that the patient and / or the doctor perceives as a deviation from normality, which has affected, affects, or may affect the functional capacity of the patient[13]

Blood Pressure Measurement: pressure inside the blood vessels (aorta and arteries), in mmHg.

Risk factors: Recommendations based on The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure[7] (JNC 7) and the National Cardiovascular Prevention Program were used.

Socio-demographic data: measured by NBI parameters[14]

Data collection instruments
The non-invasive measurement of blood pressure was performed, and in addition to the weight and height for each individual, in order to calculate the Body Mass Index (BMI), which correlated with the cases of BAHT. Personal surveys were also carried out to gather information about their eating habits, hereditary factors and healthy lifestyle habits, such as, for example, if they perform some type of physical activity, time spent, and the search for other factors such as smoking, drink intake alcoholic, stimulants, consumption of hypertensive drugs, in order to analyze their possible influence on blood pressure.

Blood pressure was determined according to "The Seventh Report of the Joint National Committee on prevention, detection and treatment of high blood pressure National Institutes of Health"[7], 2003; as: optimal pressure: less than 120/80 mm Hg; prehypertension: between 120/80 and 139/89 mm of Hg, and hypertension: equal to or greater than 140/90 mm of Hg.

The blood pressure measurement was performed using a mercurial sphygmomanometer with the following protocol recommended by the Guide for the practical management of arterial hypertension and adult cardiovascular diseases, of the Ministry of Public Health and Social Welfare.

Two questionnaires were applied, a general one for the student, to record age, sedentary lifestyle, history of risk and socio-demographic data, family history of cardiovascular risk and a questionnaire related to the knowledge that the young person has about the pathology. The questionnaires used are those used in thesis works [15].

Anthropometric measurements: The weight will be adjusted to the nearest decigram and the size to the nearest centimeter, the student being in an upright position, barefoot, with an electronic scale. Measurement of waist circumference.

The materials used to record the data:
• Mercurial blood tester.
• Electronic scale.
• Anthropometric tape.
• Height digital device.
The BMI body mass index = weight / height2, was considered underweight under 18; normal: between 18 and 24; overweight: between 25 and 29, and obesity: 30 and older.

Two questionnaires were applied, one general for the student, to register: age, sedentary lifestyle, history of risk and socio-demographic data, family history of cardiovascular risk and a questionnaire related to the knowledge that the young person has about the pathology.

A patient information letter was designed that was read to the patient and if he wanted to participate in the study signed the informed consent form and was an indispensable condition for inclusion in the study, before The proposed questionnaire is applied.

The data was digitized in the Microsoft® Office Excel 2007 software.
In order to establish the relationship between variables, the Chi-square statistical test was used to determine the relationship between them or not, for the analysis only qualitative variables were considered, considering the blood pressure variable as the outcome variable.

For the analysis of the data obtained, the ethical principles in which the patient is the main beneficiary of the pharmacist's decisions and actions were taken into account. The information collected through interviews with the student was confidential, protecting the identity of the student.

The Ethics Committee of the Faculty of Chemical Sciences of the National University of Asunción, evaluated the proposal of this work and considered that no ethical incompatibilities CEI-218/16 were detected.

RESULTS

According to the sample size formula, 89 students were enrolled in the present research in order to consider the sample statically valuable.

Sociodemographic characteristics:

The sociodemographic characteristics are shown in table 1. In relation to the gender of the patients who were part of the study, most of them were women, who in a greater proportion came from cities of the Central and Asunción department, reflexing the reality of the situation in the University freshman students.

The average age was 20.62 years old, all of them were single, and the majority of the students only spoke Spanish or Guarani, and did not have medical insurance.

Table 1: Sociodemographic characteristics of patients

Variables	(n = 89)
Age at the time of the study	20,62
Gender	**n (%)**
Female	64(72)
Male	25(28)
Civil status	
Single	89(100)
Married	0

Health insurance	
Yes	22(25)
No	61 (69)
Not responding	6 (6)
Place	
Asuncion	20(22)
Central Department	64(72)
Others place	5(6)
Languages	
Spanish only	51(57)
Spanish and Guarani	38(43)

When analyzing systolic blood pressure 76.4% of the students had a normal level according to the recommendations of JNC7, and 18% of them were classified in a Pre hypertension stage (range 120 to 139 mmHg).

Table 2: Value of the Blood Pressure of students who entered in the year 2015

Systolic BP (mmHg)	n (%)
Normal (≤120)	68(76,4)
Pre hypertension (120 to 139)	16(18,0)
HTA Stage 1 (140 to 159)	2(2,2)
No data	3(3,4)
Diastolic BP (mmHg)	**n (%)**
Normal (≤120)	85(95,5)
Pre hypertension (120 to 139)	0
HTA Stage 1 (140 to 159)	0
No data	4(4,5)

Analyzing the health problems of the patients, it was observed that 73% reported no diagnosed health problems, 8% of the patients reported having allergies, 2,2% reported other diseases such as dyslipidemia, asthma, tachycardia, or thyroid problems. It should be noted that in some cases, these pathologies occur together in patients. (Table 3).

Table 3: Student Health Problems

Health problem	n (%)
Allergy	7(8)
Asthma	2(2,2)
Dyslipidemia	2(2,2)
Tachycardia	2(2,2)
Thyroid	2(2,2)
No Health Problems	65(73,0)

Regarding the body mass index data 65% of the students registered a weight within the range considered normal, however almost 26% of the population had different overweight categories (Table 4).

Table 4: Student Body Mass Index

Body Mass Index (n: 87)	n (%)
Low weight (≤ 18.5)	6 (6,7)
Normal weight (18.5 - 24.9)	58 (65,2)
Overweight Grade I (25 - 26.9)	5 (5,6)
Overweight Grade II (27 - 29.9)	8 (9,0)
Obesity Type I (30 - 34.9)	7 (8,0)
Type II Obesity (35 - 39.9)	2 (2,2)
Type III obesity (morbide) (40 - 49.9)	0
Obesity Type IV (extreme) (≥ 50)	1 (1,1)

In Paraguay, according to the aforementioned survey, 58% are overweight or obese, 23% are obese and only 15% consume 5 or more servings of fruits or vegetables per day. WHO recommendations are to consume a healthy diet that contains between three and five daily servings of fruits, vegetables, a reduced amount of sugar, saturated fat and achieve or maintain a healthy body weight[16,17] .

Family history has an important influence on the development of chronic pathologies such as BAHT, and according to the results obtained in this study (Table 5) these data is confirm among the young population, since 72% of students reported having relatives with diagnosed arterial hypertension, 45% grandparents and 20%.

Table 5: Family Background with HT

Family history with BAHT (n = 83)	n (%)
Yes	60(72)
No	23(28)

The progressive aging of the population, unhealthy lifestyles are accompanied by a high prevalence of chronic diseases, which leads to an increase in the need for medication use, with continuous and complex pharmacological therapies, with the aim of controlling them or to improve its symptoms[18-20], that is why is important in maintaining adequate control of Blood Pressure, risk factors and healthy life style.

In relation to habits of life, most students did not consume tobacco or alcohol significantly, according to (Table 6). Regarding the diet, 90% qualified to have an adequate diet consisting of fruits, vegetables and cereals, noteworthy their Body Mass Index did not reflect a normal ratio.

After applying the Chi-square test to determine if there was a significant difference between high blood pressure levels and family history, $p < 0.05$, it was possible to determine that there is a significant relationship between both variables, as well as blood pressure and BMI.

Table 6: Hábitos de Vida de Estudiantes

Tobacco use (n = 82)	n (%)
Does not smoke	77 (87)
Former smoker	3 (3,4)
Smoke Less than 10 / day	2 (2,2)
Wine Consumption (n = 66)	**n (%)**
Does not consume wine	46 (70)
Yes: 1 glass / day	7 (8)
Yes: 2-5 glasses / day	2 (2,2)
Yes: once a week	4 (4,5)
Yes: rarely	7 (8)
Consumption of Other Alcoholic Beverages (n = 68)	**n (%)**
Does not consume	32 (36)
Yes: Beer rarely	16 (18)
Yes: 2-5 glasses / day	1 (1,1)
Yes: Beer only weekend	19 (21,3)
Use of tea / coffee (n = 79)	**n (%)**
Does not consume	22 (25)
Yes: Less than 3 cups / day	53 (60)
Yes: More than 6 cups / day	4 (4,5)
Diet (n = 84)	**n (%)**
Adequate	76 (90)
Not adequate	8 (10)
Physical Activity (n = 78)	**n (%)**
Not done	33 (37,1)
Yes: 1 time / week	23 (26)
Yes: 3 times / week	8 (9)
Yes, every day	14 (16)

Regarding physical activity, 37.1% of the students said that they did not perform any physical activity. In Paraguay there is a high rate of sedentary lifestyle, and according to a national survey of risk factors carried out in 2011, 75% of the population do not perform physical activity in their free time[5].

Regarding the consumption of medicines used by the students, it was reported that 19% of them regularly consume Non Steroid Anti-inflammatory drugs (NSAIDs) mostly to treat sporadically headaches, while 11% of the students regularly used of nasal vasoconstrictors respond to the referred pathologies of allergies.

Table 7: Medicines used

Medicines Used	n (%)
NSAIDs	17 (19)
NASAL VASOCONTRITORS	8 (11)
AMPHETAMINE	1 (1)
CORTICOID	4 (4,4)
OTHERS	15 (17)

To identify the level of knowledge of patients on BAHT, a 10-point test was applied, which included basic and key aspects that the hypertensive patient should know about their disease and the care they should have for good control. If the answers were answered correctly a point was assigned to each of them.

Table 8: Knowledge about Arterial Hypertension
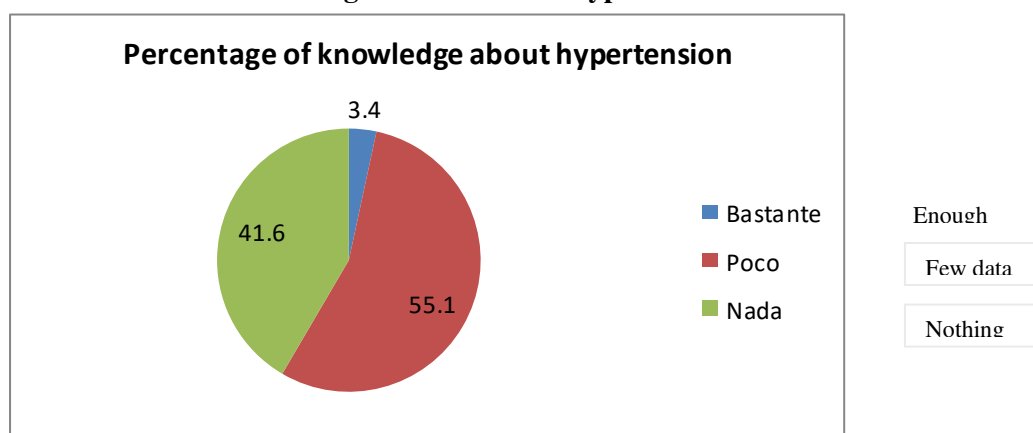
The level of knowledge of the BAHT that we observed in the students was either few data or not data at all (55.1% and 41.6% respectively). The most unknown points were those related to: healthy lifestyle habits (eating plan and physical activity), symptoms of the disease, the medications they should use and the importance of compliance, the causes of BAHT, normal values of Blood pressure, and the complications you may have if you do not have good control.

It has been shown by us that greater knowledge of the patient about the pathologies, favors therapeutic compliance, data that has a concordance with other researches [21,22].

CONCLUSIONS

The main conclusions of this work are:

☐ 20,2% of the students had an abnormal systolic pressure at the time of screening.

☐ 23% of the students were overweight.

☐ 72% of the student had a family history of HTA.

☐ 37% of the young adults do not perform any physical activity during the week.

☐ The level knowledge of BAHT and its consequences among the university students was only 55.1% of the population.

☐ From the results obtained in this study, University authorities and the Paraguay Minister of Health implement a follow-up service to promote knowledge about BAHT and a program of the education to install healthy lifestyle habits among young adults in order to prevent chronic pathologies like blood hypertension.

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It is also interesting to note that this study was carried out with the team of professors and students involved in the professional subjects of the 9th Level Pharmacy career, highlighting the dedication and interdisciplinary teamwork carried out during the execution of this project. On the other hand, this type of work will motivate teachers and students to carry out innovative work and provide scientific information in the field of healthcare pharmacy.

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