

HYPERTENSION AMONG UNDERGRADUATE STUDENTS FROM LUBANGO, ANGOLA

Manuel Simão¹

Miyeko Hayashida²

Cláudia Benedita dos Santos³

Evandro José Cesarino⁴

Maria Suely Nogueira⁵

Simão M, Hayashida M, Santos CB, Cesarino EJ, Nogueira MS. Hypertension among undergraduate students from Lubango, Angola. Rev Latino-am Enfermagem 2008 julho-agosto; 16(4):672-8.

This descriptive study aimed to investigate the prevalence of hypertension and its risk factors among undergraduate students in Lubango-Angola. The results obtained according to the health field model were: a) human biology: 61.3% were between 18 and 29 years old; prevalence of hypertension from 20.3 to 26.7%; 17.1% were overweight; 3.2% were obese; b) environment: 36.1% were exclusively students; 33.1% gained a family income of up to 250 dollars; c) life style: 86.2% practiced physical activity; 60.6% preferred salty food; 4.0% were smokers; 40.6% drank alcohol; d) health care: 82.8% already had their arterial pressure verified sometime in their life, and 65.4% did not remember the obtained value.

DESCRIPTORS: hypertension; risk factors; cardiovascular diseases

LA HIPERTENSIÓN ARTERIAL ENTRE UNIVERSITARIOS DE LA CIUDAD DE LUBANGO, ANGOLA

Se trata de un estudio descriptivo que tuvo como objetivo estudiar la presencia de la hipertensión arterial y los factores de riesgo entre universitarios de la ciudad de Lubango-Angola. Los resultados obtenidos según el Modelo de Campo de Salud fueron: a) biología humana: 61,3% en el intervalo de edad de 18 a 29 años; se estimó la presencia de la hipertensión entre 20,3 a 26,7%; 17,1% presentaban sobrepeso; 3,2%, obesidad; b) medio ambiente: 36,1% tenían dedicación exclusiva al estudio; 33,1% indicaron una renta familiar de hasta 250 dólares; c) estilo de vida: 86,2% realizaban actividad física; 60,6% indicaron preferencia por la ingestión de alimentos salados; 4,0% eran fumadores; 40,6% hacían uso de bebidas alcohólicas; d) atención de la salud: 82,8% ya habían verificado la presión arterial en alguna ocasión y el 65,4% de ellos no recordaba el valor encontrado.

DESCRIPTORES: hipertensión; factores de riesgo; enfermedades cardiovasculares

HI PERTENSÃO ARTERIAL ENTRE UNIVERSITÁRIOS DA CIDADE DE LUBANGO, ANGOLA

Trata-se de estudo descritivo que teve como objetivo estudar a prevalência de hipertensão arterial e fatores de risco entre universitários da cidade de Lubango, Angola. Os resultados obtidos, segundo o Modelo de Campo de Saúde foram: a) biologia humana - 61,3% na faixa dos 18 a 29 anos, estimou-se prevalência de hipertensão de 20,3 a 26,7%, 17,1% apresentavam sobrepeso, 3,2%, obesidade; b) meio ambiente - 36,1% tinham dedicação exclusiva aos estudos, 33,1% indicaram renda familiar de até 250 dólares; c) estilo de vida - 86,2% realizavam atividade física, 60,6% indicaram preferência para a ingestão de alimentos salgados, 4% eram fumantes, 40,6% faziam uso de bebida alcoólica; d) atendimento à saúde - 82,8% já haviam verificado a pressão arterial em alguma ocasião e 65,4% deles não se lembravam do valor encontrado.

DESCRITORES: hipertensão; fatores de risco; doenças cardiovasculares

¹ Ph.D in Nursing, Agostinho Neto University, Angola, e-mail: msimao40@hotmail.com; ² RN, Ph.D. in Nursing, e-mail: miyeko@eerp.usp.br; ³ Faculty, e-mail: cbsantos@eerp.usp.br. University of Sao Paulo at Ribeirão Preto College of Nursing, WHO Collaborating Center for Nursing Research Development, Brazil; ⁴ Faculty, University of São Paulo at Ribeirão Preto School of Pharmaceutical Sciences, Brazil, e-mail: cesarino@fcrp.usp.br; ⁵ Associate Professor, University of Sao Paulo at Ribeirão Preto College of Nursing, WHO Collaborating Center for Nursing Research Development, Brazil, e-mail: msnog@eerp.usp.br.

INTRODUCTION

Hypertension has been appointed as the greatest risk factor for early morbidity and mortality caused by Cardiovascular Diseases (CD). Framingham's studies show that increased blood pressure (BP) is associated to higher incidence of CD, which are an important problem for public health and are the main cause of death in most countries' adult population⁽¹⁾. Data from the World Health Organization (WHO, 1997) indicate that they were the cause of about 30% of all deaths in the world, which corresponds to almost 15 million deaths each year, the majority (9 million) in developing countries. These data rank CD as a pandemic, whose treatment requires the adoption of effective primary and secondary preventive measures⁽²⁾.

Data from the VII Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure indicate that hypertension affects approximately 50 million people in the United States of America, and about 1 billion worldwide⁽³⁾.

Despite acknowledging that this group of diseases is of high severity, many African countries dedicate little attention to its prevention, since studies related to the prevalence of hypertension were not found in bibliographic research in some countries of the region, especially in Angola.

The primary prevention of hypertension is essential for the reduction of morbidity and mortality due to CD. Primary prevention aims to reduce or modify hypertension risk factors through the implementation of appropriate policies and educative programs in order to avoid or delay the development of the disease. Changes in the population's behavior (low consumption of salt or increased physical activity) can benefit individuals and contribute to BP control in the population⁽⁴⁾.

The IV Brazilian Guidelines on Hypertension emphasize both the work of a multi-professional team in orientations to hypertensive patients and the importance of implementing strategies for the primary prevention of hypertension. Prevention is the most efficient means to fight hypertension. The reason is that it basically comprehends guidance aiming to introduce changes in life habits, to avoid elevated social costs, and to prevent difficulties related to treatment and control of complication in target organs, such as heart, brain and kidneys⁽⁵⁾.

Regarding risk factors for the hypertensive disease, these can be classified in constitutional, age,

gender, genetic (race and family history) and environmental factors, including excessive consumption of salt, alcohol and fat in addition to smoking, and also those environmental factors linked to work and social class⁽⁶⁾.

The hypertension diagnosis is basically established by permanently high tensional levels, that is, above normal limits, when BP is determined through appropriate methods and conditions. Thus, BP is a key element in the establishment of the hypertension diagnosis. In Brazil, its measurement is a mandatory procedure that should be performed by physicians of all specialties and other properly trained health professionals, in every clinical evaluation of patients of both genders⁽⁵⁾.

THEORETICAL REFERENCE: THE HEALTH FIELD MODEL

The epidemiological model called "Health Field", determinant of diseases and death and proposed by Lalonde⁽⁷⁾, was the theoretical reference adopted in this study. The author supports the thesis that health is determined by a variety of factors grouped in four main components: human biology, environment, life style and the organization of health services.

Human Biology – includes all those aspects related to physical and mental health, which are part of the human body and the individual's organic constitution, such as genetic heritage, growth and aging process, and the different internal systems of the organism.

Environment – includes all elements related to health but external to the human body, comprehending physical and social environments that involve individuals and on which they exert little or no control.

Life style – consists in a set of decisions made by the individual that affects one's own health and on which one has a higher or lower level of control. It comprehends decisions and personal habits.

Organization of Health Services – consists in the quality, quantity, administration, nature and personal relations, as well as resources in the delivery of health care. It includes different resources such as physicians, nurses, hospitals, pharmacies, public and private health services, outpatient clinics, dentistry services, among others.

This model was used in another Brazilian study involving women with acute myocardial infarction⁽⁸⁾.

OBJECTIVES

- Identify the prevalence of systemic hypertension among students from a University Center at a Public University in Angola;
- Characterize the population, according to the variables: human biology, environment, life style and organization of the health services.

METHODOLOGY

This is a descriptive, cross-sectional study, developed in a representative sample of the population of college students at a University Center in a city in the interior of Angola. This study was developed at the University Center of Lubango, located in Lubango, province (State) of Huíla. Lubango is the capital of the province of Huíla, situated in the South region and the interior of Angola.

The University Center of Lubango is the second in the country after that of Luanda, in the Capital of Angola. The Center is reference for the provinces of Namibe, Huíla, Cunene, Cuando-Cubango and includes with the Higher Institute of Education Sciences (ISCED), directly subordinated to the Rectorate of the University Agostinho Neto (UAN) and two Centers, one of Law and the other of Economics, hierarchically subordinated to the Law and Economy Schools of UAN, Luanda.

The population in this study was composed of college students, both genders, 18 years old or over, who were regularly registered at the Center. In total, 667 students participated in this study: 391 were from the Higher Institute of Education Sciences; 62 from the Law School Center, and 214 from the Economics School Center. The data collection instrument was based on the four elements of Lalonde's Health Field model (human biology, environment, lifestyle and organization of the health services).

First, the research project was sent to the Research Ethics Committee of the University of Sao Paulo at Ribeirão Preto College of Nursing (EERP-USP), because there are no Ethics Committees in Angola. The data collection was carried out after the committee's approval. Data were obtained through

individual interviews, after signature of the free and informed consent term, based on Resolution 196/96 of the Brazilian Health Council (CNS).

Height was inferred with an inelastic metric tape of 150 cm of length, fixed upside down with adhesive tapes on a flat wall with no baseboard, positioned 50 cm above the floor. Body weight was obtained through a portable anthropometrical scale with a 150-kilogram capacity, arranged on a leveled floor and previously calibrated.

Body Mass Index (BMI) was computed by the formula: $\text{weight (kg)/height}^2 \text{ (m}^2\text{)}$. The BMI classification criteria used were those provided by the World Health Organization⁽⁹⁾, which are: low-weight under 18.5kg/m^2 , normal weight 18.5 to 24.9kg/m^2 , overweight 25 to 29.9kg/m^2 , and obesity equal to or higher than 30kg/m^2 (level I – 30 to 34.9kg/m^2 ; level II – 35 to 39.9kg/m^2 , and level III $\geq 40\text{kg/m}^2$). Waist and hip circumferences were measured with an inelastic metric tape, with the student in the upright position, arms along the body and feet together. The waist-hip ratio (WHR) was obtained by dividing the waist circumference by the hip circumference.

To calculate the WHR, the cut-off points most used in studies of this kind were adopted, that is, equal or inferior to 0.80 for females and 0.90 for males⁽¹⁰⁾, which define adequate values of WHR.

The cut-off points used for waist circumference were those recommended by WHO⁽⁹⁾, which classifies it as high when the value in centimeters is equal to or higher than 80cm for females, and equal to or higher than 94cm for males. A value equal to or higher than 88cm for females and 102cm for males is considered very high.

Considering that pregnancy is a state where some anthropometrical measures are increased, such as body weight and waist, the waist circumferences and WHR of eight pregnant participants were excluded from the analysis of BMI variables in order to avoid false associations.

BP was measured by the auscultation method, using tested and appropriately calibrated aneroid sphygmomanometers, rubber cuffs with width compatible to the circumference of the individuals' arms. BP values were measured after the interview, allowing the subject to rest for at least five minutes, in the seated position with the arm resting on the table. Three consecutive measures were taken, with intervals of 60 seconds between one and the other, and systolic and diastolic blood pressure levels were registered for the three measurements.

After the collection, data were pre-codified, stored in an Excel database and then transferred to EPI-INFO 6 and SPSS – Statistical Program for Social Sciences, version 10.1, which allowed for the application of correlation tests in the case of two quantitative variables.

RESULTS

In total, 667 subjects participated in the study, 419 (62.8%) males and 248 (37.2%) females. The participants' age range varied between 18 and 55 years, with the predominant range between 18 and 29 years (61.3%), followed by ages between 30 and 39 years (25.3%). Regarding ethnic origin, 590 (88.5%) were black, 57 (8.5%) mixed and 20 (3.0%) white.

Data on students' human biology

Diagnosis criteria and classification recommended by the IV Brazilian Guidelines on Hypertension were used to define hypertension in the study population. These guidelines establish BP for adults according to their tensional levels as excellent: (systolic blood pressure <120mmHg and diastolic blood pressure < 80mmHg); normal: (systolic blood pressure <130 and diastolic blood pressure <85mmHg); borderline: (systolic blood pressure 130–139mmHg or diastolic blood pressure 85–89mmHg); hypertension stage I (mild): (systolic blood pressure 140–159mmHg or diastolic blood pressure 90–99mmHg) and hypertension stage II (moderate): (systolic blood pressure 160-169mmHg or diastolic blood pressure 100-109mmHg); hypertension stage 3 (severe): (systolic blood pressure \geq 180 or diastolic blood pressure \geq 110mmHg) and isolated systolic hypertension: (systolic blood pressure \geq 140 and diastolic blood pressure <90mmHg).

Therefore, to identify the prevalence of hypertension in the population under study, the following subjects were considered: 87 subjects who presented systolic blood pressure \geq 140mmHg and diastolic \geq 90mmHg, 13 subjects with systolic blood pressure \geq 140mmHg, and 57 participants with only diastolic blood pressure \geq 90mmHg, totaling 157 subjects. Thus, a prevalence of hypertension in 23.5% of the study population was obtained.

Results show that 18.9% of the 419 (62.8%) male students presented systolic blood pressure \geq 140mmHg, and that 8.4% of the 248 (37.2%) females presented systolic blood pressure \geq 140mmHg. Values of diastolic blood pressure \geq 90mmHg were observed in 27.7% of males and 11.3% of females.

The participants' BMI varied between 18.5kg/m² to 39.9kg/m², with the highest frequency between 18.5kg/m² and 24.9kg/m², indicating that 455 (69.1%) individuals were in the range considered normal. Another fact observed was that 10.6% of the participants were in the low-weight range and 17.1% were overweight. Obesity was found only in 3.2% of them, with 2.6% of level I and 0.6% of level II.

The Waist/Hip ratio (WHR) analysis showed that the majority of students (79.7%) presented adequate WHR and 20.3% inadequate. The highest concentration of inadequate WHR was observed among female individuals (38.3%), versus 10.0% of males.

Regarding the waist circumference, the majority of students, 518 (78.6%) did not present increased risk for CD when the only element considered was waist circumference. However, 141 (21.4%) of them were classified as high risk, mostly females. Moreover, 7.6% of them were classified as very high risk for metabolic complications and CD, again mostly females (n = 39).

In the participants' family antecedents, it was found that 232 (34.8%) were orphans of father and 14.1% of them did not know the cause of death; 29 (4.3%) reported that it was due to the war, followed by homicides, sudden death and CVA, each of these causes reported by 3.4% of the participants. The other 133 (19.9%) informed they were orphans of mother and 6.9% were unable to inform the mother's cause of death; 1.8% reported hypertension and sudden death, respectively, and 1.5% reported CVA.

Regarding family history of hypertension, 269 (40.3%) reported that at least one of the parents had the disease, and 147 (22.0%) students had at least one first-degree relative (siblings, grandparents, uncles and aunts) with hypertension.

Data on the students' environment

Regarding the origin of the 667 participants, 363 (54.4%) were from other States; 187 (28.0%) were from Lubango (place where data were collected); 100 (15.0%) were from the interior of the State; 12

(1.8%) were from neighboring cities – cities from the same State located within a distance of up to 100km, and 5 (0.7%) were from other countries, Portugal and Canada.

In relation to the school year, 48.6% were attending the first year and 27.9% the second.

Regarding the students' occupation, more than a third, 241 (36.1%), were exclusively students; 179 (26.8%) were also teachers in private and public basic and secondary schools; 128 (19.2%) worked in administrative activities in public or private institutions; 42 (6.3%) were either police officers or from the armed forces, and the remainder (11.6%) worked in trade, industry, journalism and/or self-employed.

Regarding the participants' marital status, it was observed that 361 (54.1%) were single; 290 (43.5%) were married or lived with partners in consensual union; 8 (1.2%) were widowed and 8 (1.2%) separated. Approximately half of them (48.7%), had no children. Of the 51.3% with alive children, 253 (37.9%) had one to four children.

Another element related to the environment, the object of investigation, was the individual and family income. The majority of students, 342 (51.3%), reported individual income from 20 to 250 dollars; approximately a third, 193 (28.9%), had no income; 107 (16.0%) received an income that varied from 251 to 500 dollars and only 25 (3.7%) reported individual income of more than 500 dollars. Regarding family income, 180 (27.0%) students could not inform; 221 (33.1%) reported income of less than 251; 163 (24.4%) between 251 and 500 dollars; 81 (12.1%) between 501 and 980 dollars and only 22 (3.3%) reported family income of more than 980 dollars.

Analyzing the number of people who lived in the same household, 60.4% reported four to eight individuals; 17.2% nine or more people; 14.8% two to three, and 8.1% of the students informed that they lived alone. It was also verified that 357 (53.5%) of the students lived in their own houses, against 203 (30.4%) in rented ones.

In terms of the predominant means of transportation to school, work and vice-versa, 334 (50.1%) reported no transportation means because they usually walk in their daily routine; 178 (26.7%) used their own means of transportation and 155 (23.2%) used collective transportation.

Data on students' life style

The large majority, 575 (86.2%), reported some kind of physical activity and only 92 (13.8%) denied this practice. Walking is the predominant physical activity (60.9%), followed by gymnastics, practiced by 10.2% of students. Regarding the frequency and duration at which they performed the predominant physical activity, 408 (61.2%) reported three or more times per week; 101 (15.1%) less than three times per week, and 66 (9.9%) daily; 539 (80.8%) students perform physical activity during thirty or more minutes/day and 34 (5.1%) mentioned less than thirty minutes/day.

The majority of participants, 386 (57.9%), reported three meals/day; 183 (27.4%) two daily meals; 90 (13.5%) four meals/day, and 8 (1.2%) reported only one daily meal. Regarding the meals the majority mentioned as most consumed, 351 (52.6%) were composed by breakfast, lunch and dinner; 160 (24.0%) lunch and dinner. Carbohydrates and proteins were the most consumed groups of food.

Of all participants, 404 (60.6%) indicated preference for salty food, or food prepared with much salt, mentioning salted fish, sausages and corned beef as the most consumed items.

Of the 667 subject studied, 27 (4.0%) were smokers; 271 (40.6%) students consumed alcohol, and 399 (59.8%) reported they were stressed or nervous. Of the 248 women participating in the study, 38 (15.3%) reported the use of oral contraception, among whom 17 (44.7%) had used it for one year or less; a similar percentage reported the use of pills for more than two years.

Data related to health care

Initially, all participants were inquired about whether their BP had ever been measured before and which value had been found. Of the 667 interviewees, 552 (82.8%) reported it had been measured once, with 428 (77.5%) in the same year of the study; 56 (10.1%) had it measured two years before; 49 (8.9%) more than two years ago; 19 (3.4%) did not remember when it had been measured, and the majority, 361 (65.4%), were not able to inform the BP value found at the time.

All students were asked whether they suffered from hypertension and answers were: 60 (9.0%) knew they had hypertension; 329 (49.3%) denied they had the disease, and 278 (41.7%) did not know whether or not they had the disease, despite the fact that many

of them had their BP measured sometime before. Only 16 (26.7%), of the 60 students who acknowledged their hypertension, followed some kind of treatment to control the disease.

DISCUSSION

The prevalence of hypertension found in the study (23.5%) is high when considering that the large majority of the population studied (86.6%) is young (18 to 39 years old). The results found in this study regarding gender are in agreement with data found in scientific literature, since different studies indicate higher prevalence of the disease among men than among women, considering a certain age range. Findings of several studies indicate a lower prevalence of hypertension in women if compared to men of up to 55 years old. After this age, a significant increase in the prevalence of the disease is observed among women⁽¹¹⁾.

Damage caused by obesity is clearly known and described by several authors. Obese people have a higher prevalence of hypertension than non-obese, and reducing body weight leads to reduced levels of BP⁽¹²⁾.

The association of BMI and hypertension is also stressed in the studies of Framingham, who observed that an excess of 20% in the ideal weight increases the incidence of hypertension eight times⁽¹³⁾. Reducing body weight is the most effective non-pharmacological way to control hypertension, because even moderate reduction of body weight significantly reduces BP⁽¹⁴⁾.

Family history of the hypertensive disease should be taken into account in studies on the prevalence of the disease because hypertension is a disease in which the genetic heritage element is of great importance.

Regarding the family structure of the population studied, it was observed that the majority (54.1%) was single, explained by the fact that the predominant age range was of young individuals, between 18 and 29 years old, though the majority (51.3%) had children.

Socioeconomic conditions have been appointed by some authors as risk factors for the development of some diseases, which influences mortality.

Regarding the students' life style, the physical activity reported by the great majority (86.2%) deserves to be highlighted. It is a positive fact, since

regular physical activity provides multiple benefits to health, even reducing the incidence of CD, such as those due to coronary arteriosclerosis⁽¹⁵⁾.

Data showed that the study population had some healthy habits, such as physical activities, which contribute to prevent some diseases caused by physical inactivity. However, despite the majority reporting the practice of physical activities, there is still a share of this population who does not, and others who do not follow requirements, that is, 30 to 60 minutes of activity at least three times per week⁽⁵⁾. This indicates the need to program and implement educative actions, aiming to inform individuals about the need to practice regular physical activity.

Regarding eating patterns, the findings show that the most consumed foods were carbohydrates and proteins, and the least consumed foods were fruits, greens and vegetables. The consumption of fruits and greens is advised because there is evidence of their protective effect against CD and CVA. The favorable effects of consuming fruits and greens for BP have been reported in innumerous studies⁽¹⁶⁾. It is known that a balanced diet is essential for the maintenance of health and that it should include the main nutritional sources: carbohydrates, proteins, fat, vitamins and fibers.

In relation to the consumption of salt, information obtained indicates that the participants did not have a clear understanding of the harmful effects of excessive ingestion of this ion. Several authors stress that saline restriction should be part of anti-hypertension therapy and is one of the first recommendations given to hypertensive patients and their families, aiming to prevent it.

Therefore, the dissemination of information aiming to prevent BP is crucial because, as several studies have shown, reducing the consumption of salt is one of the most effective measures to prevent the disease. It promotes lower elevation of BP and pressure decrease proportional to the decreased level of sodium. In this perspective, the consumption of salt up to 6 grams/day is recommended, as well as to avoid the use of a salt container on the table, and the non-ingestion of industrialized food because it presents high levels of salt⁽⁵⁾.

Despite the small number of smokers (4.0%), this habit deserves attention because smoking is a risk factor for cardiovascular and cancer diseases and is one of the main evitable causes of death in the world. In relation to the consumption of alcohol,

several studies report the association between its excessive consumption and hypertension and/or CD.

CONCLUSION

In the analysis of risk factors for hypertensive disease grouped in the four elements of the Health Field model, in the human biology element, modifiable (high prevalence of hypertension and a considerable percentage of overweight students) and non-modifiable factors (age, race, gender, family history of hypertension) were highlighted. In terms of environment, the socio-economic level (low income and family structure) was verified, whereas self-raised habits (excessive consumption of salt and alcohol, expressive in this population) are found in relation to life style. And finally, a fact related to health services deserves attention. Although many participants indicated blood pressure measurement sometime in their life, they were not able to inform the value found at that time.

REFERENCES

1. Vasan RS, Larson MG, Leip EP, Evans JC, O'Donnell CJ, Kannel WB, et al. Impact of high-normal blood pressure on the risk of cardiovascular disease. *N Engl J Med* 2001;345(18):1291-7.
2. Brandão AP. Tratando a hipertensão arterial, reduzindo o risco de doenças cardiovasculares-Adalat INSIGHT Study. *Rev Bras Cardiol* 2000;2(5):180-3.
3. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The JNC 7 Report. *J Am Med Assoc* 2003;289:2560-72.
4. Lemogoum D, Seedat YK, Mabadeje AF, Mendis S, Bovet P, Onwubere B, Blackett KN, et al. Recommendations for prevention, diagnosis and management of hypertension and cardiovascular risk factors in sub-Saharan Africa. *J Hypertension* 2003;21(11):1993-2000.
5. Sociedade Brasileira de Hipertensão. Sociedade Brasileira de Cardiologia. Sociedade Brasileira de Nefrologia. IV Diretrizes Brasileiras de Hipertensão Arterial. Campos do Jordão (SP): SBH/SBC/SBN; 2002.
6. Ministério da Saúde (BR). Secretaria de Assistência à Saúde. Departamento de Programas de Saúde. Coordenação de Doenças Cardiovasculares. Controle de hipertensão arterial: uma proposta de integração ensino-serviço. Rio de Janeiro (RJ): Ministério da Saúde; 1993.
7. Lalonde M. A new perspective on the health of Canadians: a working document. Ottawa: National Health and Welfare; 1974.
8. Dantas RAS, Colombo RCR, Aguillar OM. Perfil de mulheres com infarto agudo do miocárdio, segundo o modelo de "campo de saúde". *Rev Latino-am Enfermagem* julho 1999;7(3):63-8.
9. World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: WHO; 2000 (WHO technical report series, 894).
10. Rosa RF, Franken RA. Tratamento não farmacológico da hipertensão arterial. In: Timerman A, César LAM. Manual de cardiologia: SOCESP. São Paulo (SP): Atheneu; 2000.
11. Ribeiro AB, Zanella MT, Kohlmann O Junior. Tratamento da hipertensão arterial. In: Ribeiro AB. Atualização em hipertensão arterial: clínica, diagnóstico, e terapêutica. São Paulo (SP): Atheneu; 1996.
12. Ferreira SR, Zanella MT. Epidemiologia da hipertensão arterial associada à obesidade. *Rev Bras Hipertensão* 2000;7(2):128-35.
13. Kannel WB, Gordon T, Offutt D. Left ventricular hypertrophy by electrocardiogram: prevalence, incidence and mortality in the Framingham study. *Annals Intern Med* 1969;71(1): 89-106.
14. Suplicy HL. Obesidade visceral, resistência à insulina e hipertensão arterial. *Rev Bras Hipertensão* 2000;7(2):136-41.
15. Berlin JA, Colditz GA. A meta-analysis of physical activity in the prevention of coronary heart disease. *Am J Epidemiol* 1990;132(4):612-28.
16. Organización Mundial De La Salud. Dieta, nutrición y prevención de enfermedades crónicas. Ginebra: OMS; 2003 (Serie de Informes Técnicos, 916).

FINAL CONSIDERATIONS

Results from this study indicate the need for orientation programs to inform the population on chronic degenerative diseases in general and especially hypertension.

The struggle against hypertension and other chronic diseases is a great challenge to the State as well as to professionals, because it depends on the establishment of public policies and investment in human resources, which would allow health professionals and teachers to attend education and training programs. Communication means and society as a whole should link up with these professionals, aiming to disseminate information, with a view to changes in citizens' educative process.

The most viable alternatives include continuing education courses, training, informative booklets, lectures, seminars, among many other means of enriching and/or consolidating knowledge.