Orthostatic Hypotension in the Elderly:
Insights from the Geriatric Unit at Dr. Carlos Fragachan Hospital and San Vicente de Paul Asylum in Bolivar City

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SUMMARY

Orthostatic hypotension is considered as a sustained drop in systolic blood pressure (SBP) greater than or equal to 20 mm/Hg or a decrease in diastolic blood pressure (DBP) of 10 mm/Hg, after 3 minutes of changing from the supine to the upright position. Based on this, this study was proposed, the general objective of which was to determine the incidence of orthostatic hypotension in patients over 65 years of age, institutionalized in the Dr. Carlos Fragachan Geriatric Center and the San Vicente de Paúl Asylum in Ciudad Bolívar, during the period October 2023 - October 2024. The research design of this study is of a non-experimental descriptive type; The population subject of this research consisted of 116 elderly people from the Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 to October 2024. To select the sample, the stratified sampling technique was used, because all the elements of the sample are proportional to their presence in the population, it was made up of 67 elderly people over 65 years of age from the Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum. A work form was used as instruments for this research. After analyzing and evaluating the data obtained, we can conclude that in the sample of elderly people studied, the presence of orthostatic hypotension was determined. In most of the elderly, an increase in the arterial pulse of more or less 10 beats per minute was observed when changing from a supine to a standing position. Considering that in the population studied more than 50% of the elderly showed a significant decrease in both systolic and diastolic blood pressure when assuming a standing position; and that this constitutes an important risk factor for causing falls and syncope, which can have serious consequences in these elderly people such as

(disability, fractures, wounds, head trauma, etc.) Preventive measures are recommended to avoid such complications.

INTRODUCTION.

Orthostatic hypotension is a frequent cause of falls and syncope in people over 65 years of age, occurring in 4 to 33% of these patients. (Masaka, K., Shatz, I., 1998)

Elderly people are more susceptible to developing orthostatic hypotension because they have an inadequate homeostatic mechanism to maintain blood pressure with changes in position, due to the aging process per se.

This is a reason for frequent consultations (falls and syncope) in these patients and sometimes has serious consequences. Hence the importance of carrying out this study, which will be structured in chapters that will be formulated as follows:

Chapter I: The Problem: Problem statement, research objectives and justification. Chapter II: The Theoretical Framework: Background of the research, theoretical bases, definition of basic terms, the system of variables and the operationalization of the variables. Chapter III: The Methodological Framework: Research design, population and sample, data collection technique, data analysis technique. Chapter IV: Data processing and analysis, presentation of results, analysis of results, analysis and discussion of data. Chapter V: Conclusions and Recommendations. Bibliography and Annexes.

This research, which is being carried out in the field of geriatrics, aims to understand the important problem of orthostatic hypotension as the main cause of falls in the elderly, and also to understand the regional frequency of this event.

CHAPTER I

THE

PROBLEM

1.1 Statement and Formulation of the Problem.

Orthostatic hypotension is a common and important cause of falls and syncope in elderly patients, which is a frequent reason for consultation in these patients.

Osteostatic Hypotension is defined as “a sustained fall in systolic blood pressure of greater than or equal to 20 mm/Hg, or a decrease in diastolic blood pressure of 10 mm/Hg, when changing from the supine to the upright position.” (Henry, R., Rowe, J., 1999).

Clinically, orthostatic hypotension can manifest with different symptoms such as: blurred vision or amaurosis fugax, dizziness, sweating, hearing loss, paleness and asthenia.

On the other hand, the elderly have an inadequate homeostatic mechanism to maintain blood pressure with changes in position and are more sensitive to the effects of medications.

It is also stated that approximately 30% of the elderly community over 65 years of age has orthostatic hypotension. Various studies have shown that a decrease in systolic blood pressure of more than 20 mm/Hg three minutes after changing from a supine to an upright position is an important risk factor for falls and syncope in the elderly. (Engestrom, J. Harrison 2002)

Similarly, epidemiological data indicate that orthostatic hypotension has a prevalence of 4 to 33% in the elderly and increases with increasing age; however, it is unknown how many of the elderly at the Dr. Carlos Fragachan Geriatric Center and San Vicente de Paúl Asylum have this pathology.

Based on all of the above, the following question arises:

What is the incidence of orthostatic hypotension in institutionalized patients at the Dr. Carlos Fragachan Nursing Home and San Vicente de Paúl Asylum in Ciudad Bolívar?

Research Objectives.

General Objective.

- To determine the incidence of orthostatic hypotension in patients over 65 years of age, institutionalized in the Dr. Carlos Fragachan Geriatric Center and San Vicente de Paúl Asylum in Ciudad Bolívar, during the period October 2023 - October 2024.

Specific Objectives.

- Record arterial pulse in position decubitus and 3 minutes later inbipedalism.
- Record the pressure arterial in position decubitus and 3 minutes later inbipedalism.
- Distribute the frequency of orthostatic hypotension according to sex.
- To determine the frequency of orthostatic hypotension according to age group.
- To determine which are the predominant symptoms in the elderly studied.

- Determine the presence of associated diseases.

- To correlate daily medication consumption and its relationship with orthostatic hypotension.

- To compare the frequency of orthostatic hypotension in the Geriatric Dr. Carlos Fragachan and the Saint Vincent de Paul Asylum.

Research Justification.

Knowing that the elderly are more likely to present orthostatic hypotension in relation to young people, and that this is a frequent cause of falls and syncope that have serious consequences in these patients such as cranial-encephalic trauma, complicated fractures, prostration, etc. then the need arises to know the incidence of orthostatic hypotension in these institutions, its distribution by sex and age group, association with drugs and most frequent complications, in order to establish preventive measures that allow the elderly to remain healthier for a long time. Measures that in many cases will be related to the architectural changes of the facilities for the elderly and their orientation in relation to not changing position abruptly.

CHAPTER II

THEORETICAL FRAMEWORK.

2.1 Background of the Research

One of the truly defining moments in the long process of human evolution was the adoption of bipedalism. Although mobility is enhanced, bipedalism occupied a new place in the blood pressure control system that was primarily developed for satisfy the needs of animals in a dorsal position. Thus humans demonstrated a great susceptibility to the effects of gravity on circulation. Thus the most important organ that defines our human condition, the brain, in its most precarious location on the zoological scale, depends on vascular perfusion. (Blair P, Grub 1998).

One of the major changes imposed on the body by standing is the diversion of blood to lower levels away from the heart. The efferent sympathetic pathway and the autonomic nervous system are the main sources of both short and medium term responses to these position changes. Although other mechanisms such as the renin-angiotensin-aldosterone system also contribute, these responses are seen over longer periods. Thus, disturbances in autonomic function resulting in sympathetic failure can cause orthostatic hypotension, which may decrease sufficiently to cause cerebral hypoperfusion and eventually syncope (Blair P, Grub 1998).

Over the course of the 20th century, the elderly population has shown substantial growth, and is projected to increase even further in the next century. U.S. demographics report that by 1994, 12.6% or 33 million Americans were over 65 years of age, compared with about 6.5%

worldwide. By 2030, individuals over 65 years of age are expected to reach 20% of the population. The majority of the population over 65 years of age are female. (North American Clinic. Lo Obs E. 1998).

According to the 1990 census, the state of Bolívar had 24,642 senior citizens over 65 years of age. In 1996, Venezuela had a population of 1,000.
387,237 people over 60 years of age, with a projection for 2000 of 1,593,585 elderly people. In Venezuela, according to the last census, the elderly represent 7% of the population and by 2015 it is estimated that they could reach 9 to 10%. (OCEI, 1994)

The aging process is associated with multiple changes that predispose to falls, these can be classified into two categories: those responsible for postural stability and those that affect blood pressure homeostasis and produce dizziness and syncope. The elderly probably have an inadequate homeostatic mechanism to maintain blood pressure with changes in position. (Engstrom, J., Martin, J., 2002)

The autonomic nervous system makes rapid adjustments to vital physiological mechanisms essential for survival. The importance of this regulation is demonstrated by the intensity and severity of the disability that results when the function of the autonomic nervous system is altered. The most frequent and clinically significant autonomic disorders manifest as symptoms of orthostatic hypotension. (Engstrom, J., Harrinson 2002).

2.2 Theoretical Bases.

Orthostatic Hypotension.

Definition

Orthostatic hypotension is defined as a sustained drop in systolic blood pressure (SBP) greater than or equal to 20 mm/Hg or a decrease in diastolic blood pressure (DBP) of 10 mm/Hg, after 3 minutes of changing from the supine to the upright position (Henry, R., Rowe, J., 1999).

It is reasonable to base the definition of orthostatic hypotension on the presence of symptoms of cerebral hypoperfusion (dizziness, blurred vision) when standing or sitting, even in the absence of a supporting record of a drop in BP. These patients should be treated in the same way as if they had changes in BP. (Hornillos, MI, 1998)

Orthostatic hypotension is a common and important independent risk factor for falls in the elderly. Epidemiological data indicate that 20 to 30% (for other authors 4 to 33%) of the elderly have orthostatic hypotension, and that this increases with age. (Masaki, K., Shatz, I. 1998).

Clinically, orthostatic hypotension can manifest with different symptoms such as blurred vision, dizziness, diaphoresis, hearing loss, pallor and asthenia. Syncope occurs when the drop in blood pressure alters cerebral perfusion.

Loss of consciousness is usually brief and there are no concomitant symptoms of hyperactivity of the nervous system. These symptoms are usually

exacerbated when the subject gets up in the morning and particularly noticeable 2 hours after food ingestion, (postprandial orthostatic hypotension).

Functional Classification.

Orthostatic Hypotension is classified into:

Class I: Asymptomatic orthostatic hypotension.

Class II: Symptoms: Dizziness, vertigo, lightheadedness, blurred vision, muscle weakness, fatigue, cognitive disorders, tremor, nausea, headache or neck pain associated with postural hypotension but without history of syncope.

Class III: History of syncope accompanied by postural hypotension.

Class IV: Disability secondary to severe symptoms or frequent syncope secondary to proven postural hypotension. (Makender, K., 2000)

Causes of Orthostatic Hypotension.

Blood pressure is regulated by the autonomic nervous system, which controls glandular action, breathing, and other important functions. This system can suffer from a number of disorders, fortunately rare, that can cause failures in blood pressure regulation. Orthostatic or postural hypotension, for example, causes syncope when a person who has been lying down suddenly sits up due to an excessive drop in blood pressure. Another disorder caused by the autonomic nervous system, postprandial hypotension, causes failures in blood pressure regulation in older people, who experience a substantial drop in blood pressure 2 hours after bedtime.

after breakfast or lunch. Both orthostatic and postprandial hypotension require careful examination to determine the nature of the autonomic nervous system defect.

Among the most frequent causes of orthostatic hypotension we have:

Primary:

- Pure ANS failure (Idiopathic orthostatic hypotension). ANS failure with atrophy of multiple systems or organs (Shy-Drager syndrome).

- Autonomic failure in Parkinson's disease.

Secondary:

- Diabetes, alcoholism.
- SLE, rheumatoid arthritis, mixed connective tissue disease.
- Neoplasms of the Autonomic Nervous System.
- Metabolism: Vitamin B12 deficiency, Fabry disease.
- Spinal Cord Injuries, Hypothalamus Tumor, Multiple Sclerosis.
- Kidney Failure.
- Aging.

Drugs:

- Selective neurotoxins, alcoholism.
- Tranquilizers: Phenothiazines, Barbiturates.
- Tricyclic antidepressants, MAO inhibitors.

- Vasodilators: Hydralazine, Calcium channel blockers.
- Hypotensives with action on the CNS: Methyldopa, Clonidine.
- ACE inhibitors: Captopril, Enalapril, Lisinopril.

Pathophysiological Mechanism of Orthostatic Hypotension.

As a person assumes an upright position, 500 to 700 ml of blood accumulates in the lower extremities and in the visceral (splanchnic) circulation. The subsequent decrease in venous return to the heart causes a decrease in cardiac output and stimulation of the aortic, carotid, and cardiopulmonary baroreceptors; this stimulation reflexively increases sympathetic outflow and inhibits parasympathetic activity. These adjustments increase heart rate and vascular resistance to maintain systemic pressure in the upright position.

Orthostatic hypotension occurs when there is a defect in the regulation of blood pressure in any element of this system, ranging from circulating volume to nerve stimuli reaching the vascular tree.

The most common causes of symptomatic orthostatic hypotension include decreased intravascular volume (diarrhea, vomiting, hemorrhage, burns) and adverse drug effects. Medications cause syncope by altering vascular volume or tone (e.g., antihypertensives, nitrates) or by producing an allergic or anaphylactic reaction. Drugs cause 2% to 9% of symptoms in individuals whose presenting symptoms are syncope. The elderly are even more vulnerable to drug effects and volume depletion because of decreased baroreceptor sensitivity, decreased cerebral blood flow, excessive sodium elimination by the kidneys, and impaired thirst mechanism that characterizes aging.

Postprandial syncope is a rare problem affecting the elderly, caused by hypotension after meals. Possible mechanisms include failure to maintain compensatory noradrenaline levels and cardioaccelerative responses. In up to 36% of nursing home residents, a decrease in systolic blood pressure of approximately 20 mm/Hg was observed between 45 and 60 minutes after a meal in almost all of the affected patients. The decrease mentioned was asymptomatic but in rare cases it could cause syncope and presyncope (Wishwa, N. 1936., Brounwald, N. 2000).

Numerous studies over the past decade have identified postprandial hypotension as an important cause of syncope in the elderly in those with autonomic failure. Postprandial hypotension also appears as a common cause of orthostatic hypotension in the elderly although both can coexist in the same individual. Previous studies in nursing home residents showed that between 24 and 30% of residents had a decrease in systolic blood pressure greater than 20 mmHg, 75 minutes after meals. In many cases postprandial hypotension is asymptomatic. However, in institutionalized patients with syncope, 8% were found to have postprandial hypotension as a probable cause of syncope.

Evaluation of Patients with Orthostatic Hypotension.

The first step in studying symptomatic orthostatism is the exclusion of treatable causes of postural hypotension. The history should include a complete review of the patient's medications (e.g., diuretics, antihypertensives, antidepressants, phenothiazines, ethanol, narcotics, insulin, barbiturates, beta-blockers, and calcium antagonists) that may cause postural hypotension. An exaggerated response to medication may be the first indication.

symptom of an underlying autonomic disorder. The history may reveal a possible underlying cause of the symptoms (e.g. diabetes or Parkinson's disease), or the specific mechanism responsible (e.g. heart failure, decreased intravascular volume). Inadequate or excessive increase in venous reserve may contribute to the development of orthostatic hypotension. An inquiry should be made as to whether there is a relationship between the onset of symptoms and meals (pooling of blood in the splanchnic territory) or the time of arising after awakening in the morning (relative decrease in intravascular volume).

Physical examination should include measurement of pulse and blood pressure in both the supine and standing positions, with a time interval of at least 3 minutes between the two positions. If, after standing for at least 3 minutes, there is a sustained fall in systolic blood pressure of more than 20 mm/Hg or diastolic blood pressure of more than 10 mm/Hg, without a corresponding increase in pulse rate of at least 15 beats per minute, this finding suggests an autonomic deficit. In non-neurogenic causes of orthostatic hypotension, the fall in blood pressure is accompanied by a compensatory increase in heart rate of more than 15 beats per minute. The fact that hypotension persists allows differentiation of autonomic failure from the slow baroreceptor responses that are common in older people (EngsFrom, J., Harrison 2002).

Treatment.

These patients should do regular, but never excessive, physical exercise; they should avoid prolonged periods of standing. They should raise their head about 20° above the horizontal when in bed. When getting out of bed, they should do so slowly, pausing in the different positions before standing up and starting to walk. Abdominal binders and elastic stockings may be used if necessary.

The treatment of idiopathic orthostatic hypotension, as its cause is unknown, can only be carried out symptomatically and its main objective is to prevent hypotensive crises. When the circulating blood volume is reduced, salt intake is recommended for these patients, which can expand plasma volume and, in addition, sodium has a direct effect on noradrenergic tone. However, most patients with orthostatic hypotension have a normal or even increased circulating blood volume; on the other hand, in the elderly, if there is an increase in the pressure of the circulatory system, heart failure can occur. (Salgado, A., 1988)

Another symptomatic measure to increase plasma volume is the administration of mineralocorticoids, for example 0.1 mg/day of 9-α-fluorohydrocortisone. In the elderly, as with salt, there is a risk of heart failure and high blood pressure when lying down.

Various oral sympathomimetics have also been used in elderly patients with a dysfunction of the adrenergic postganglionic neuron, such as ephedrine, which has both α and β adrenergic action, and phenylephrine, which has little activity on β receptors, with uncertain results and sometimes with side effects. In this type of patient whose postganglionic neuron is intact, treatment with tyramine (Chelddar cheese) can be tried, administered in conjunction with monoamine oxidase inhibitors. In this way, the metabolism of the administered tyramine is inhibited, which will release the stored intraneural noradrenaline and the peripheral sympathetic effects of catecholamine will appear. The simultaneous administration of these two drugs can cause arterial hypertension in the supine position, increase the resistance of the cerebral vessels, which can cause symptoms of cerebrovascular insufficiency, and even they can determine severe hypertensive crises and death.

More recently, other drugs have been introduced, such as indomethacin, which inhibits prostaglandins PGE and PGI, and which are better tolerated although they may cause headaches that limit their long-term value. Flubiprofen is more potent and better tolerated than indomethacin.

β-blocking agents such as propranolol act at two levels: they improve cardiac output and the action of catecholamines on α-receptors, thereby improving postural vasoconstriction; their action is unsatisfactory in the elderly.

In conclusion, the application of general measures and some of the appropriately selected drugs can improve and stabilize these patients for years. (Alloza, J. L, 1983)

Theories on Aging.

Although research on biological aging is not based on any universally accepted theory, genetic, cellular, and physiological studies have given rise to several hypotheses. One of the most important genetic concepts, the so-called error theory, assumes that age-related changes are due to the accumulation of random genetic errors, or small errors in the transmission of genetic information. These damages or errors reduce or prevent the proper functioning of cells.

In cellular studies, the best-known theory of aging is based on the so-called Hayflick effect, named after the American microbiologist Leonard Hayflick. He observed in a cell culture that certain human cells underwent only a limited number of cell divisions before dying. This finding suggests that aging is programmed within the cells, and

This could explain the differences in life span between different animal species, as well as the unequal longevity of the different sexes within the same species. For example, in the human species, women typically live an average of eight years longer than men.

Physiological theories of aging focus on organic systems and their interrelations. For example, one of the most researched areas today is the immune system that protects our body from foreign cells. A characteristic of mammals is that their immune system gradually loses its ability to deal with infections and other situations such as aging. As a result, the antibodies produced by the body are unable to distinguish between “friendly” or “self” cells, and “enemy” or “non-self” cells. Currently, most experts consider that aging is not the result of an isolated mechanism but rather comprises a set of phenomena that act in concert. (Salgado, F., 1988)

Social and Behavioral Aspects.

The process of human aging must also be considered.
in the context of complex societies subject to great variations. The way in which the population ages is not entirely determined by biology, but is also influenced by social circumstances and the individual environment. As a result, ageing is increasingly seen as a process that includes cultural and psychosocial aspects. Moreover, rather than being limited exclusively to the stage of old age, its study is being extended to the entire life span.

Knowledge gained through sociological and behavioral studies is helping to dispel some of the established myths.

about the inevitability of the aging process. One example is the belief that intelligence peaks in adolescence and declines thereafter; another is the belief that sexual activity begins to decline irreversibly in midlife, yet we now know that it continues even into later years. (Kelley, F., 1998)

Since the aging process is not unalterable, behavioral scientists are looking for ways to modify it. For example, certain techniques have been found to help prevent the short-term memory loss experienced by some elderly people. A home-based assistance system has been established as a measure to promote independent living for patients, achieving higher levels of activity in them, even in some cases that were considered unrecoverable. It has also been found that nutritional problems resulting from the diminished senses of taste and smell are easily resolved with simple changes in the seasoning of foods; in addition, technical means are being perfected to alleviate the visual and auditory problems of old age.

Current Research

A comprehensive understanding of the aging process requires the combined efforts of psychosocial and biomedical scientists. New research methods include clinical trials in biomedical studies and statistical data analysis in long-term studies. Particular attention is paid to nutritional needs of age, age-related changes in drug responses, and senile dementia.

Some researchers also ask a large number of questions about how social changes, changes in

smoking habits, exercise, dietary habits, economic fluctuations, political reforms and new technologies. ((Kelley, F. 1998)

Definition of Basic Terms.

- **ORTHOSTATIC HYPOTENSION:**Sustained drop in systolic blood pressure greater than or equal to 20 mm Hg. Or a decrease in diastolic blood pressure of 10 mm Hg. After three minutes of changing from supine to upright position.

- **OLD MAN:**Person over 65 years of age.

- **GERIATRIC PATIENT:**It is a person, generally over 65 years of age, who suffers from one or more diseases that tend to incapacity or disability and whose evolution is conditioned by psychological and/or social factors.

- **SUPINE POSITION:**Lying in a horizontal position (decubitus).

- **BIPEDESTATION:**Adopt a standing (upright) position.

System of variables.

- **Independent variable**

  Orthostatic
  Hypotension

- **Dependent variable**

  Patients over 65 years of age (elderly)

Operationalization of variables.

Variable	Dimension	Indicators
Orthostatic Hypotension	Variation in blood pressure in relation to changes in position from supine to standing	Systolic blood pressure Diastolic blood pressure Arterial pulse
Patient of the Dr. Carlos Fragachan nursing home and the San Vicente de Paúl Asylum	Over 65 years of age	Age Sex Symptoms Medications Concomitant diseases

Source: Zacarias, M (2002)

CHAPTER III

METHODOLOGICAL

FRAMEWORK

Methodology is one of the stages of research that involves the development and formulation of an operational model where a research design is proposed. This constitutes a general strategy that allows the researcher to take the steps to obtain the data and information required, in order to verify the assumptions that guide the research work.

Research Type and Design.

The type of research selected for any study will depend largely on the objectives set by the researcher. In this particular case, the purpose of the work was to find out the incidence of orthostatic hypotension in the elderly in a population, to determine the age most frequently affected, the relationship with the drug and the accompanying symptoms. To this end, a non-experimental research design was used, since it will be carried out without deliberately manipulating the variables. That is, we do not intentionally vary the independent variable. What we do is observe the phenomenon as it occurs in its natural context, and then analyze it. (Hernández, R. and others 1991:189).

The selected design modality was descriptive cross-sectional, which aims to investigate the incidence and values in which one or more variables are manifested.

The use of this type of design is due to the fact that the results will serve to determine the incidence and the values in which it manifests itself in one or more variables.

Population and Sample.

- Population:

It was made up of 116 elderly people from the Dr. Carlos Fragachan Geriatric Unit and the San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 to October 2024.

- Sample:

The stratified sampling technique was used to select the sample, since all elements of the sample are proportional to their presence in the population. This sample, once the exclusion criteria are applied, is given by:

- Patients with disabilities in standing
- Under 65 years old.
- Bedridden patients.
- Those not willing to collaborate.

It was made up of 67 elderly people over 65 years old of the Dr. Carlos Fragachan Geriatric Unit and the San Vicente de Paúl Asylum.

Data Collection Technique.

Data collection object of study will be done through a protocol designed by the researcher. This protocol will allow obtaining the necessary data to determine the prevalence of the phenomenon in the geriatric population of these institutions.

For this purpose, blood pressure will be taken in the supine position and three minutes after assuming the standing position; the arterial pulse, drug intake and the consequences that orthostatic hypotension can cause in this population will also be measured.

Information Collection Instrument.

The instrument was developed by the researcher and will allow the collection of adequate information for the development of the research; allowing the grouping and collection of data, as well as the tabulation of the same. (annex 1).

To measure blood pressure, a digital ALPK2 model 21 blood pressure monitor was used.

Validity and Reliability.

According to Busot (1991:107), "an instrument is valid if it measures what it is intended to measure", in the case of the validity of the instrument that was applied in the research, it was subjected to content validity, using the expert judgment criterion as a technique.

It is important to highlight that the instrument will be analyzed by the research methodology specialist and the specialists in the area (Internist and Cardiologist and geriatrician).

Through expert judgment, the consistency, organization, clarity, relevance and wording of the document will be determined.

Regarding the reliability of the research instrument, Busot (1991) points out that "reliability expresses the degree of accuracy, consistency, and precision that a measuring instrument has."

Data Analysis Technique.

Data analysis will require three basic processes: coding, tabulation and construction of tables and graphs, otherwise the mass of data accumulated alone would not allow for any synthesis of value (Sabino, 1986). Furthermore, statistical results require an interpretation that implies their meaning.

The technique used for statistical verification of the results will be transferred to a database (EPI INFO 6.4 statistical analyzer in Windows environment).

The summary measures will be the percentage and the average. The technique used for the statistical verification of the results will be based on the measures of central tendency (Mean, Mode, Standard Deviation, etc.), and the presentation of these results will be done in tables and graphs.

CHAPTER IV DATA

PROCESSING AND ANALYSIS.

Presentation of the Results.

The data obtained was processed by creating tables and graphs containing the results obtained: Tables of numerical series and frequencies, which are the result of emptying the data of each of the variables; then the percentages were calculated, to create bar graphs that allowed the behavior of each of the variables studied contained in the research questions to be visualized; this allowed first of all to statistically describe the data and then analyze and interpret them according to the observation made through the development of the research.

Analysis of the Results.

The analysis of the data obtained was carried out by creating tables and graphs using different techniques of Inferential Descriptive Statistics; this with the purpose of responding to the descriptive phase of the study, through which the behavior of each variable is inferred and said variables are manipulated so that the expected results can be obtained.

Table No. 1

Frequency distribution of elderly people according to arterial pulse. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024..

Arterial Pulse Recumbent Position beats/min	Arterial Pulse in Standing Position beats/min													
	49 - 59		60 – 69		70 - 79		80 – 89		90 - 99		> 100		Total	
	n	%	n	%	N	%	n	%	n	%	n	%	n	%
49 – 59	4	5.97	6	8.95	2	2.98	0	0	0	0	0	0	2	17.91
60 – 69	0	0	8	11.94	15	22.38	1	1.49	0	0	0	0	24	35.82
70 – 79	0	0	1	1.49	8	11.94	3	4.47	0	0	0	0	12	17.91
80 – 89	0	0	0	0	1	1.49	3	4.47	7	10.44	2	2.98	13	19.40
90 – 99	0	0	0	0	0	0	0	0	5	7.46	1	1.49	6	8.95
> 100	0	0	0	0	0	0	0	0	0	0	1	1.49	1	1.49
Total	**4**	**5.97**	**15**	**22.38**	**26**	**38.80**	**7**	**10.44**	**12**	**17.91**	**4**	**5.97**	**67**	**100**

Source: Protocol Data Sheet.

Chart No. 1

Frequency distribution of elderly people according to arterial pulse. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October

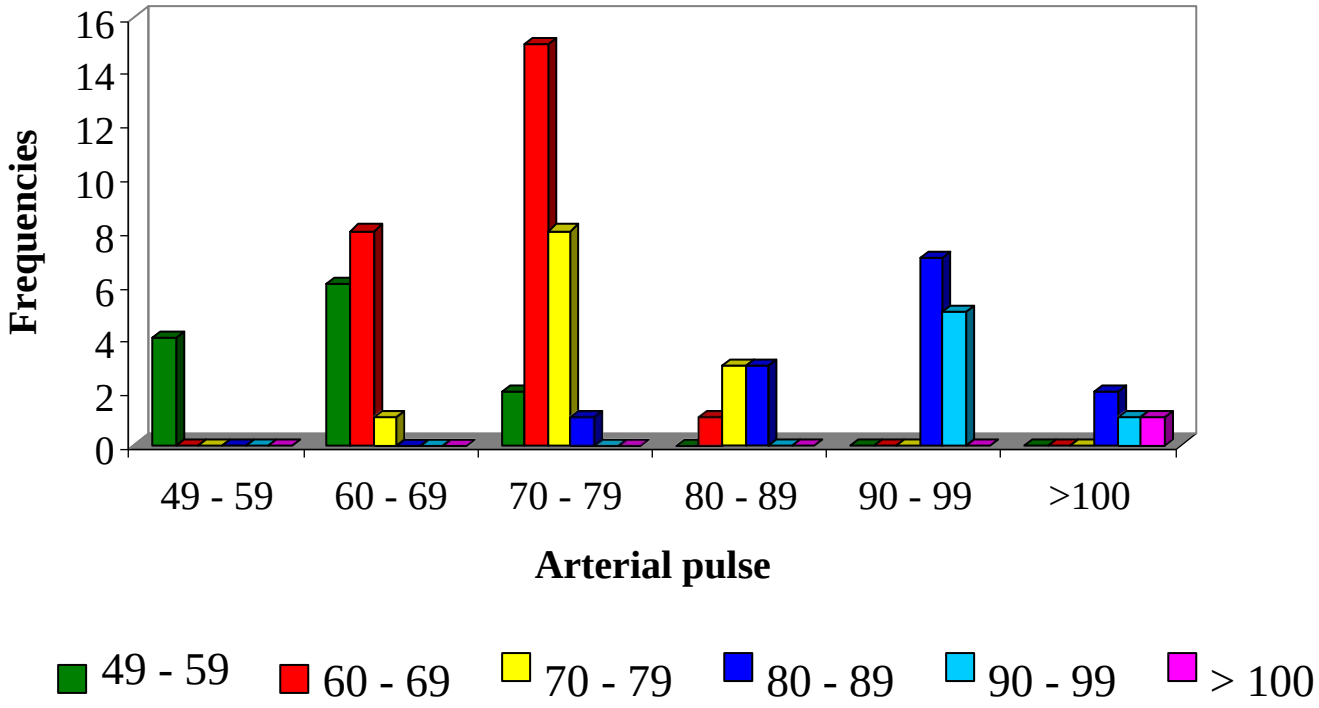


Table No. 2

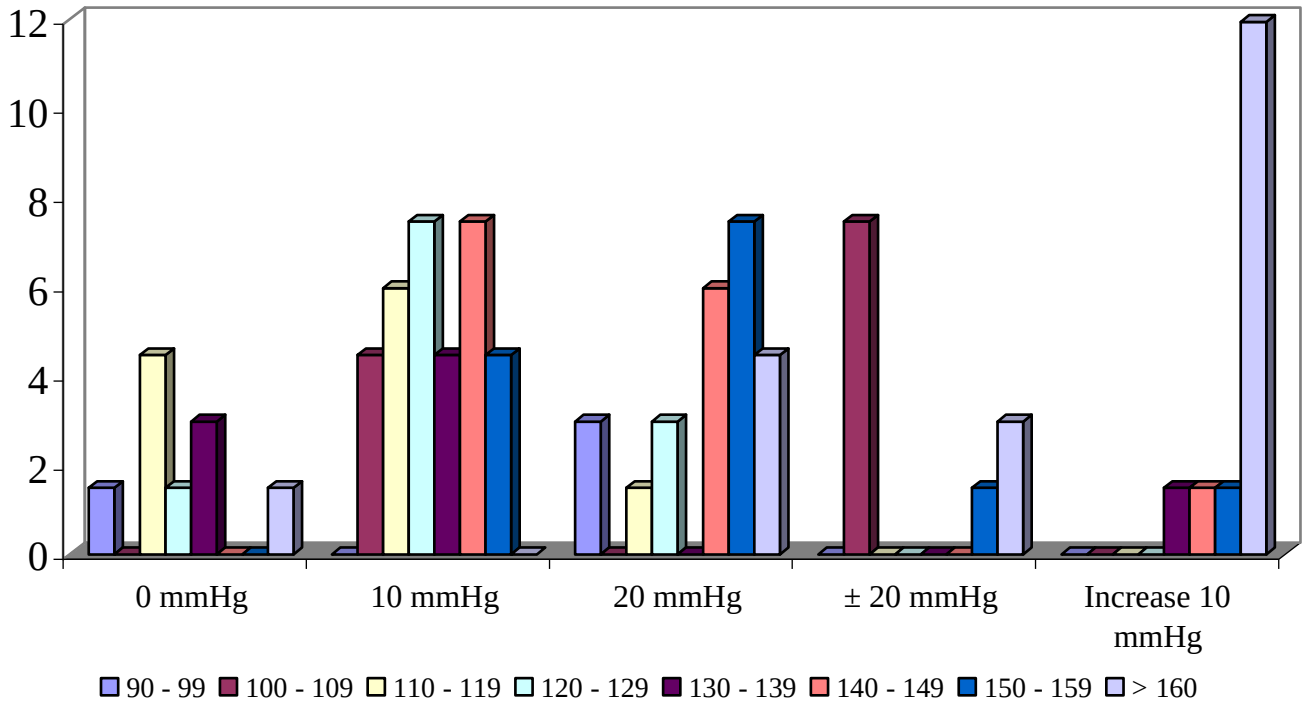
Frequency distribution of elderly according to systolic blood pressure. Dr. Carlos Fragachan geriatric unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Blood Pressure Lying Position MmHg	Standing Diastolic Blood Pressure Change (mmHg).											
	0 mmHg		Decrease 10 mmHg		Decrease 20 mmHg		Decrease. +20 mmHg		Increase. + 10 mmHg		Total	
	n	%	n	%		%		%	n	%		%
90 – 99	1	1.49	0	0	2	2.98	0	0	0	0	3	4.47
100 – 109	0	0	3	4.47	0	0	5	7.46	0	0	8	11.94
110 – 119	3	4.47	4	5.97	1	1.49	0	0	0	0	9	13.43
120 – 129	1	1.49	5	7.46	2	2.98	0	0	1	1.49	9	13.43
130 – 139	2	2.98	3	4.47	0	0	0	0	0	0	5	7.46
140 – 149	0	0	5	7.46	4	,97	0	0	1	1.49	10	14.92
150 – 159	0	0	3	4.47	5	7,44,4	1	1.49	1	1.49	10	14.92
>160	1	1.49	0	0	3	7	2	2.98	8	11.94	14	20.09
Total	**8**	**11.94**	**23**	**34,32**	**17**	**25.37**	**8**	**11.94**	**11**	**16.41**	**67**	**100**

Source: Protocol Data Sheet.

Chart No. 2

Frequency distribution of elderly according to systolic blood pressure. Dr. Carlos Fragachan geriatric unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 2

Table No. 3

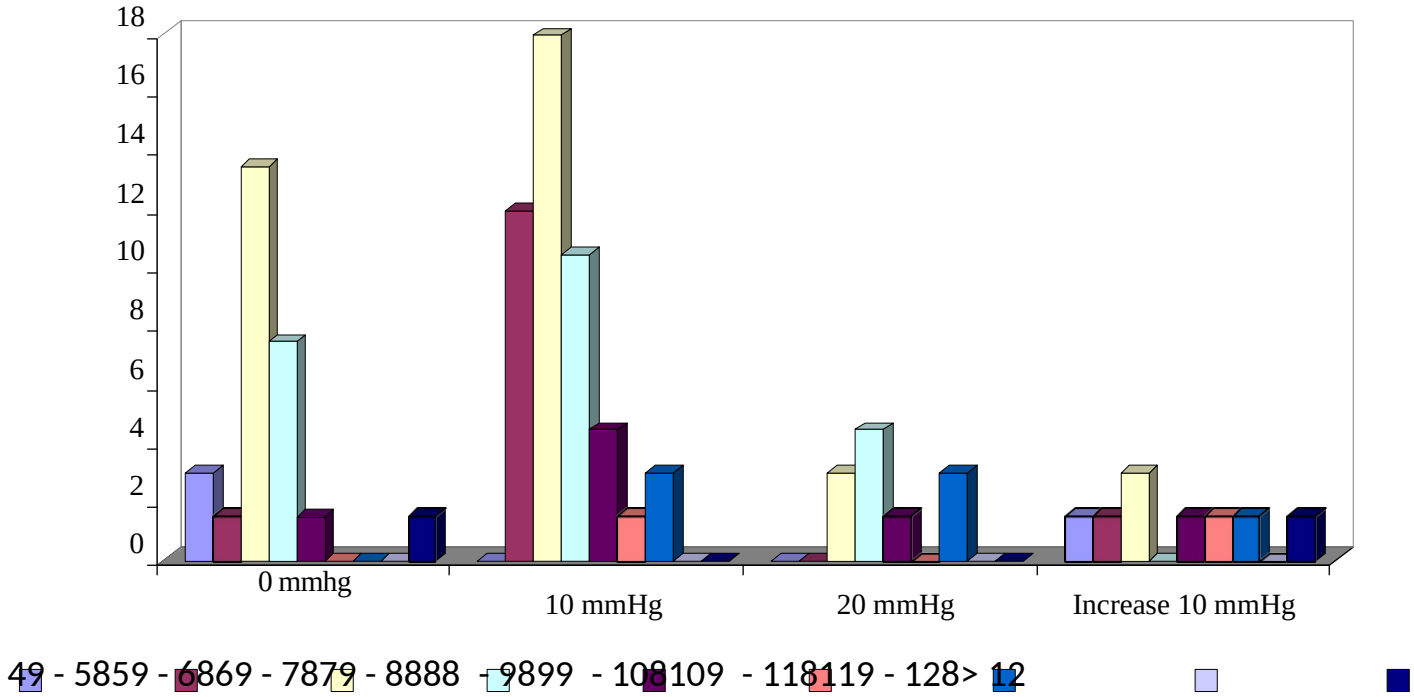
Frequency distribution of elderly according to diastolic blood pressure. Dr. Carlos Fragachan geriatric unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Blood Pressure Recumbent Position mmHg	Change in Blood Pressure in Standing Position mmHg									
	0 mmHg		Decrease 10mmHg		Decrease 20mmHg		Increase 10 mmHg		Total	
	n	%	N	%	n	%	n	%	n	%
49 – 58	2	2.98	0	0	0	0	1	1.49	3	4.47
59 – 68	1	1.49	8	11.94	0	0	1	1.49	10	14.92
69 – 78	9	13.43	12	17.91	2	2.98	2	2.98	25	37.31
79 – 88	5	7.46	7	10.44	3	4.47	0	0	15	22.38
89 – 98	1	1.49	3	4.47	1	1.49	1	1.49	6	8.95
99 – 108	0	0	1	1.49	0	0	1	1.49	2	2.98
109 – 118	0	0	2	2.98	2	2.98	1	1.49	5	7.46
> 129	1	1.49	0	0	0	0	1	1.49	2	2.98
Total	**19**	**28.35**	**33**	**49.25**	**17**	**25.37**	**8**	**11.94**	**67**	**100**

Source: Protocol Data Sheet

Chart No. 3

Frequency distribution of elderly according to diastolic blood pressure. Dr. Carlos Fragachan geriatric unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 3

Table No. 4

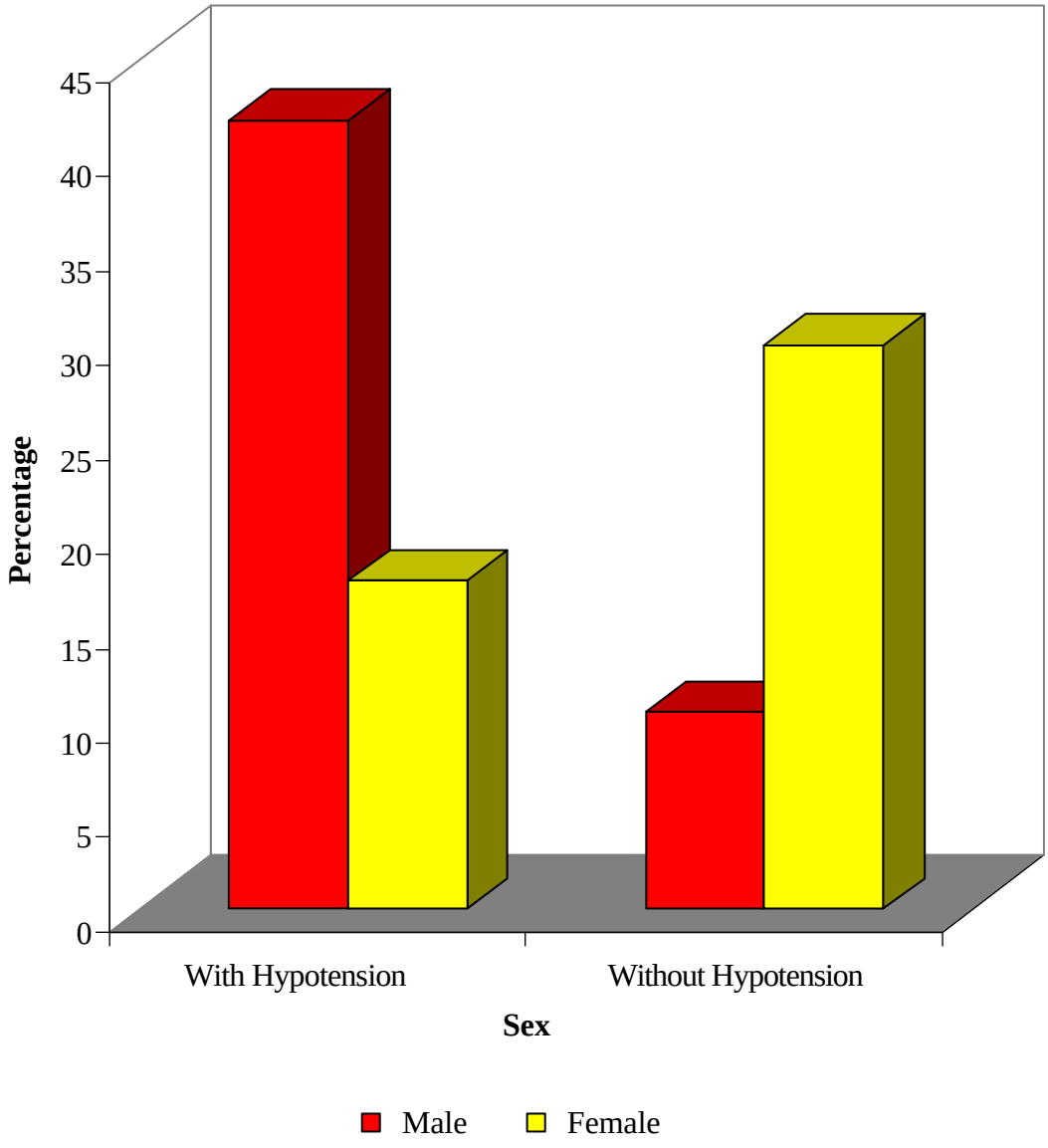
Frequency Distribution of Elderly with and without Orthostatic Hypotension According to Sex. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Seniors	Sex					
	Male		Female		Total	
	n	%	n	%	n	%
With Hypotension	28	41.79	12	17.91	40	59.70
Without Hypotension	7	10.44	20	29.85	27	40.30
Total	35	34,32	32	47.76	67	100

Source: Protocol Data Sheet

Chart No. 4

Frequency Distribution of Elderly with and without Orthostatic Hypotension by Sex. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 4

Table No. 5

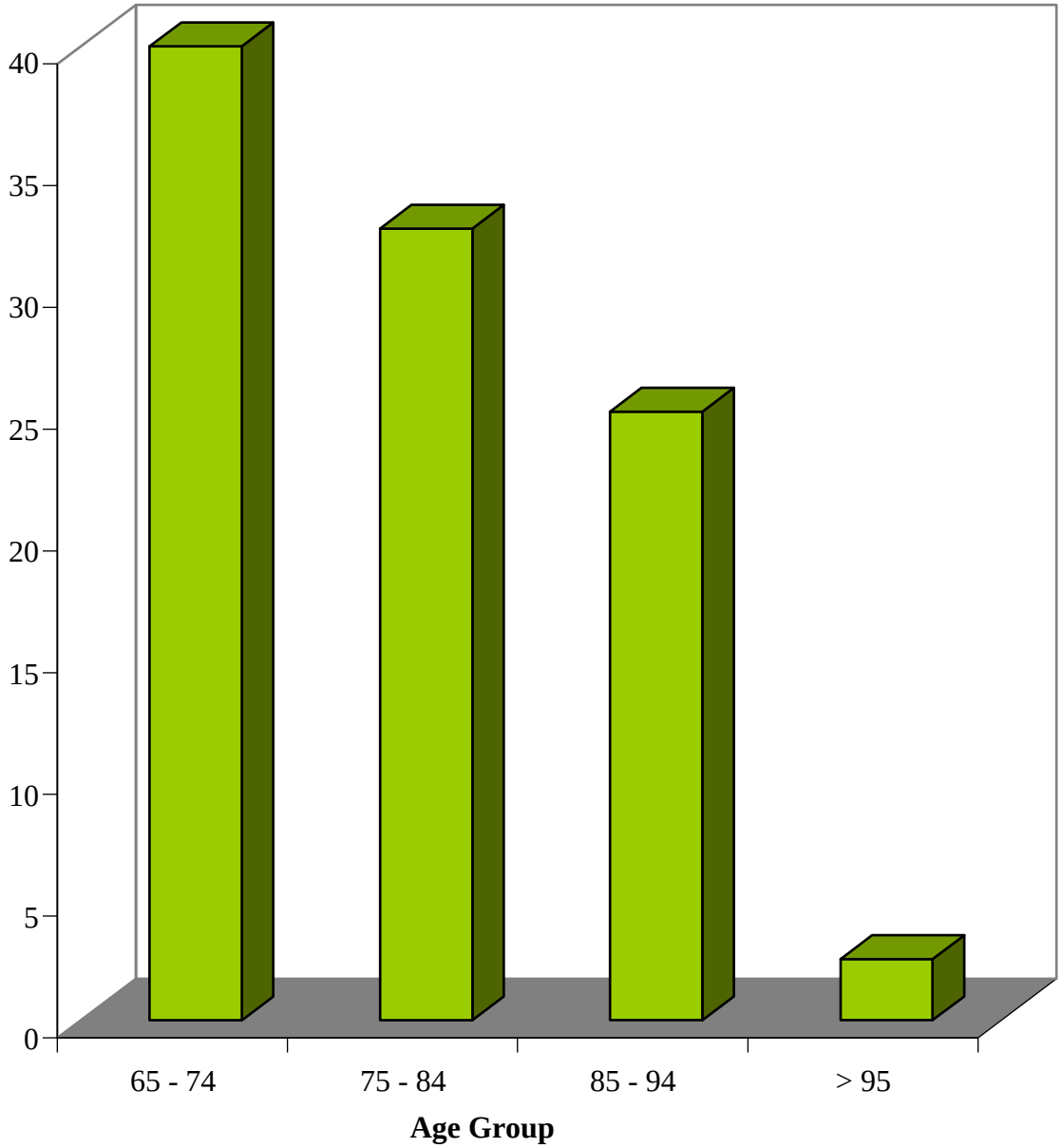
Frequency Distribution of Elderly with Orthostatic Hypotension by Age Group. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Age Group (age)	Frequency (n)	Percentages (%)
65 – 74	16	40,00
75 – 84	13	32.5
85 – 94	10	25,00
> 95	1	2.5
Total	**40**	**100**

Source: Protocol Data Sheet

Chart No. 5

Frequency Distribution of Elderly with Orthostatic Hypotension According to Age Group. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 5

Table No. 6

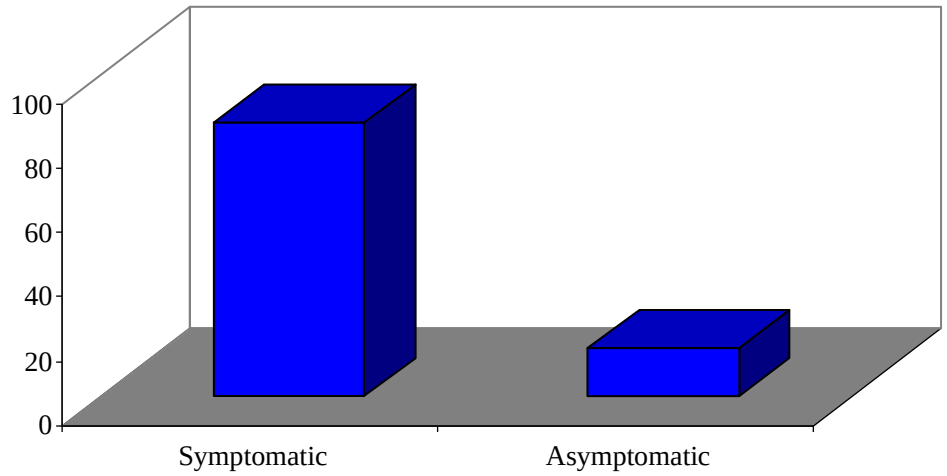
Frequency Distribution of Elderly with Orthostatic Hypotension According to the Presence of Symptoms. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 to October 2024.

Symptoms	Frequency (n)	Percentages (%)
Symptomatic	34	85,00
Asymptomatic	6	15,00
Total	**40**	**100**

Source: Protocol Data Sheet

Chart No. 6

Frequency Distribution of Elderly with Orthostatic Hypotension According to the Presence of Symptoms. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 6

Table No. 7

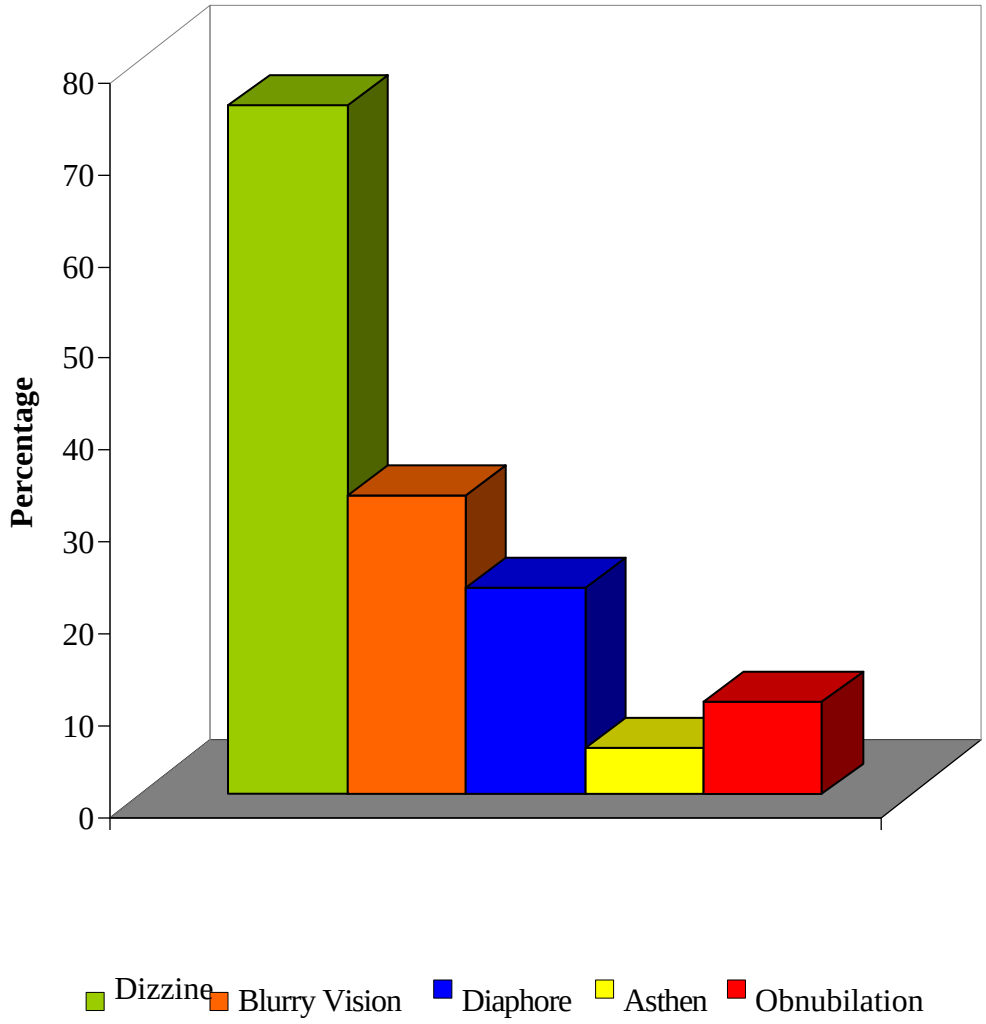
Frequency Distribution of Elderly with Orthostatic Hypotension According to Type of Symptoms. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Symptoms	Frequency (n)	Percentages (%)
Dizziness	30	75,00
Blurry Vision	13	32.5
Diaphoresis	9	22.5
Asthenia	2	5.00
Obnubilation	4	10,00

Source: Protocol Data Sheet

Chart No. 7

Frequency Distribution of Elderly with Orthostatic Hypotension According to Types of Symptoms. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 7

Table No. 8

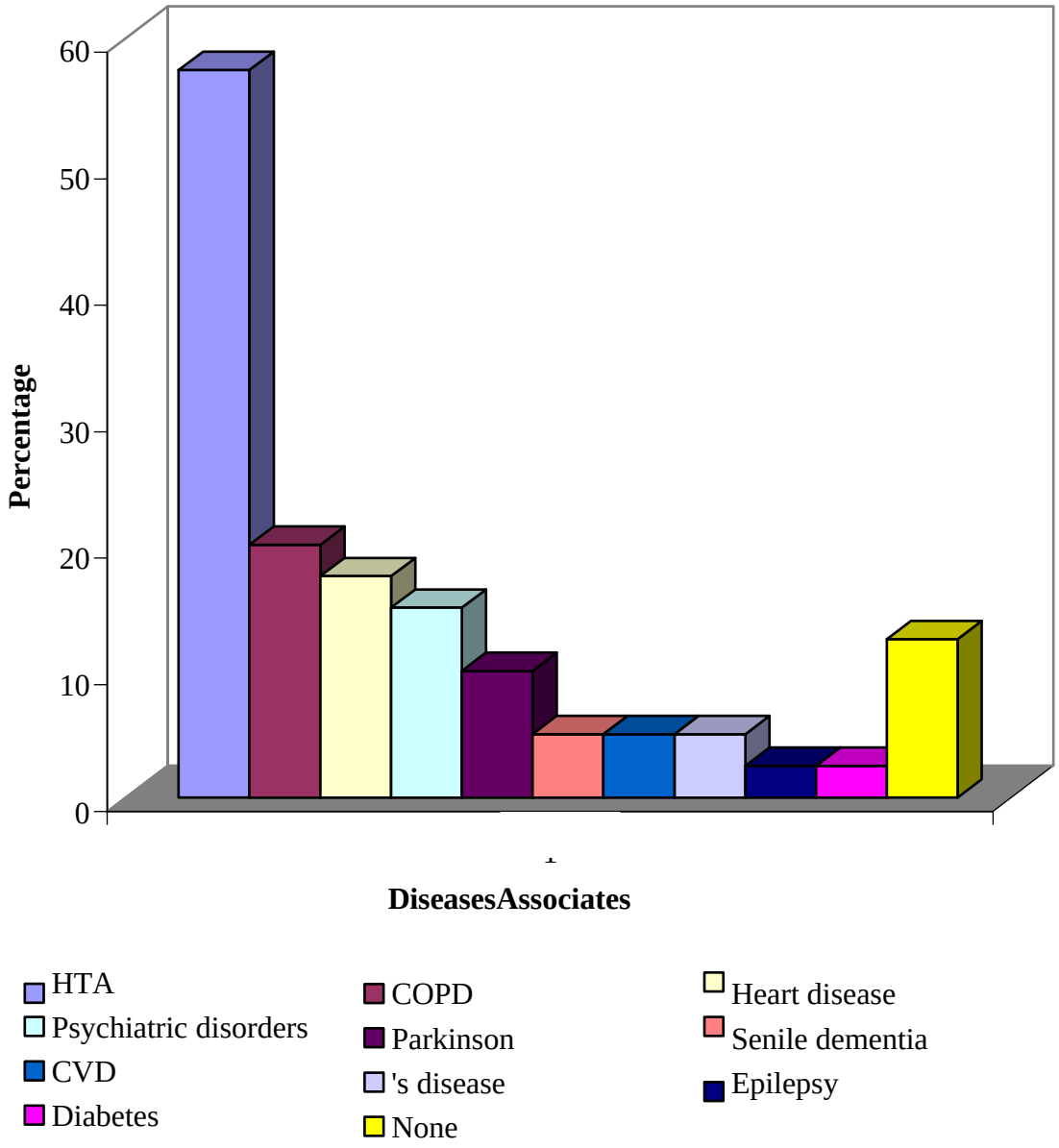
Frequency Distribution of Elderly with Orthostatic Hypotension According to Associated Diseases. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Associated Diseases	Frequency (n)	Percentages (%)
Hypertension	23	57.5
COPD	8	20,00
Heart disease (Ischemia + Arrhythmia)	7	17.5
Psychiatric Disorders	6	15,00
Parkinson's disease	4	10,00
Senile Dementia	2	5.00
CVD	2	5.00
IRC	2	5.00
Epilepsy	1	2.5
Diabetes	1	2.5
None	5	12.5

Source: Protocol Data Sheet

Chart No. 8

Frequency Distribution of Elderly with Orthostatic Hypotension According to Associated Diseases. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source Table No. 8

Table No. 9

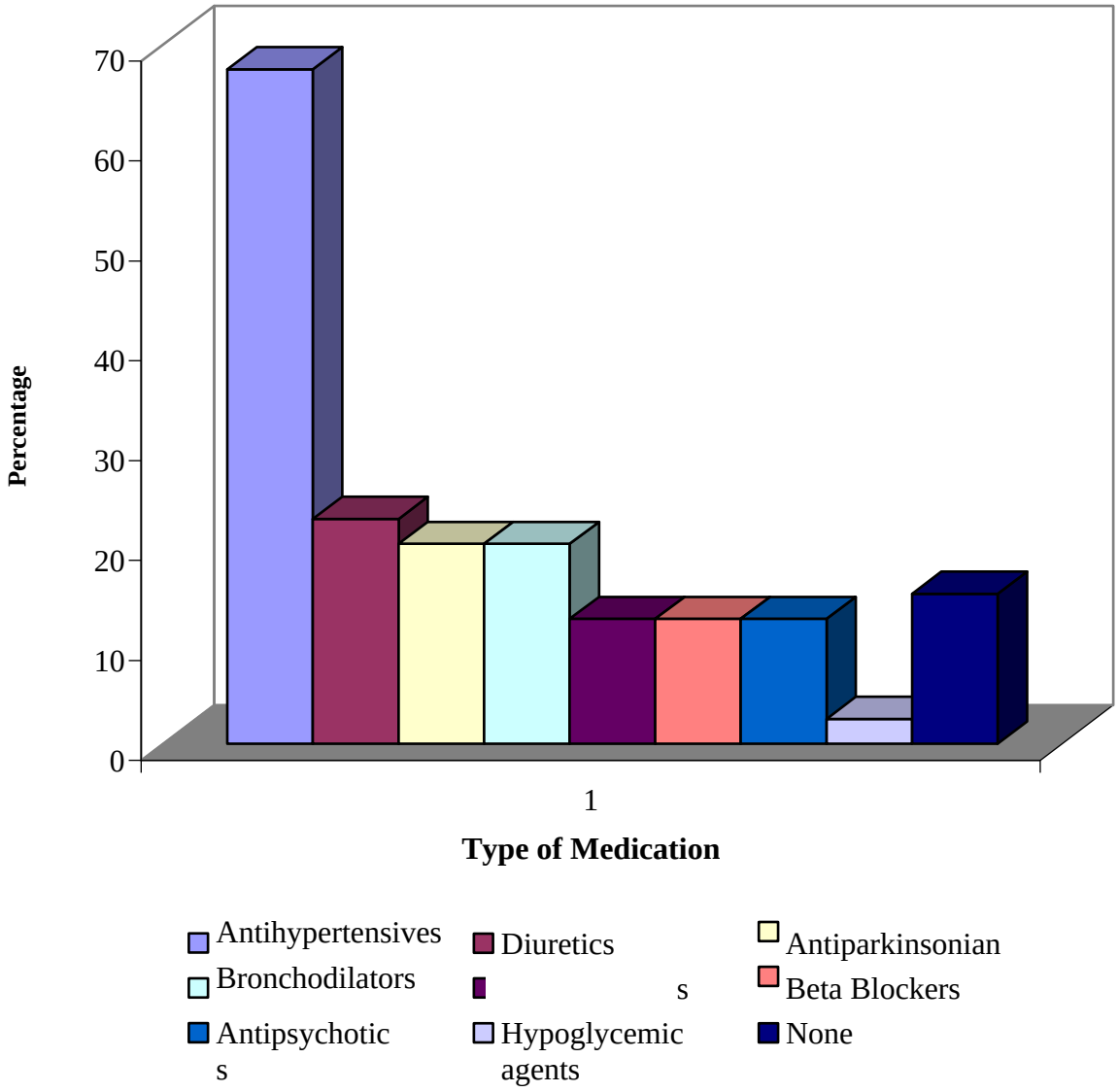
Frequency Distribution of Elderly with Symptomatic Orthostatic Hypotension According to the Type of Medication They Take. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Type of Medication	Frequency (n)	Percentages (%)
Antihypertensives	27	67.5
Diuretics	9	22.5
Beta blockers	8	20,00
Bronchodilators	8	20,00
Antidepressants and Tranquilizers	5	12.5
Antiparkinsonian	5	12.5
Antipsychotics	5	12.5
Hypoglycemic agents	1	2.5
None	6	15,00

Source: Protocol Data Sheet

Chart No. 9

Frequency Distribution of Elderly with Symptomatic Orthostatic Hypotension by Type of Medication they are Taking. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 9

Table No. 10

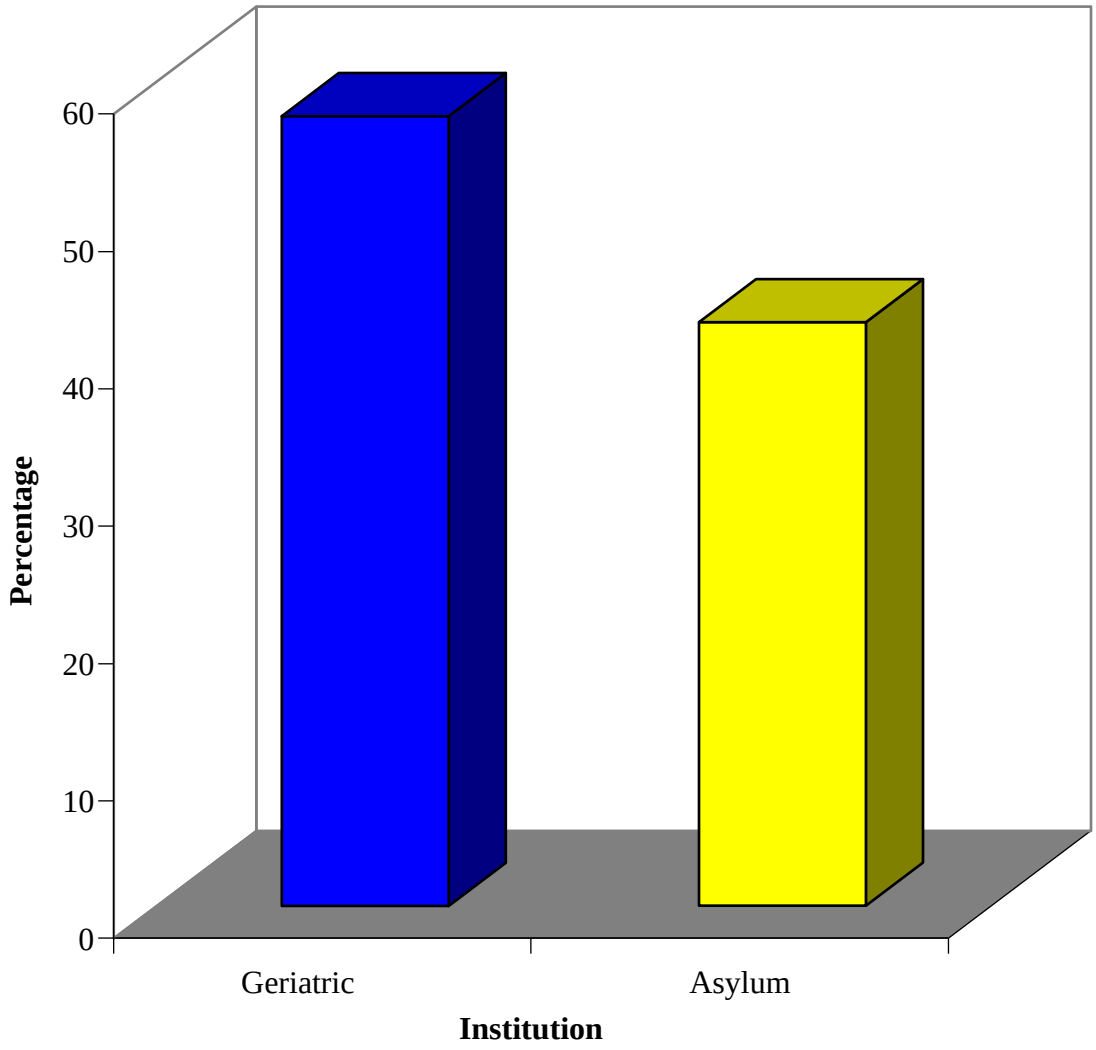
Frequency Distribution of Elderly with Orthostatic Hypotension According to the Institution of Origin. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.

Symptoms	Frequency (n)	Percentages (%)
Geriatric	23	57.5
Asylum	17	42.5
Total	**40**	**100**

Source: Protocol Data Sheet

Chart No. 10

Frequency Distribution of Elderly with Orthostatic Hypotension According to the Institution of Origin. Dr. Carlos Fragachan Geriatric Unit and San Vicente de Paúl Asylum in Ciudad Bolívar in the period from October 2023 – October 2024.



Source: Table No. 10

4.3. Analysis of the Results.

A total of 67 institutionalized elderly people were studied at the Dr. Carlos Fragachan Geriatric Unit (INAGER) and the San Vicente de Paúl Asylum in Ciudad Bolívar, in the period between October 2023 - October 2024; having a sample of 40 (59.7%) who were diagnosed with orthostatic hypotension.

Arterial pulse was determined (Table No. 1) in the supine position and 3 minutes later in the standing position. It was observed that the largest number of elderly people, 24 (35.82%), had a supine BP of 60 to 69 beats/min, of which 8 elderly people (11.94%) did not show a variation in BP when changing position; 15 elderly people (22.38%) showed an increase in BP of 10 beats/min or more; of 12 elderly people (17.91%) who had a supine BP of 70 to 79 beats/min, 8 elderly people (11.94%) showed no variation in BP when changing position; 3 elderly people (4.47%) showed an increase in BP of 10 beats/min or more when changing position. In conclusion, of 67 elderly people studied, 34 (50.7%) presented a variation in BP of 10 beats/min or more when changing from a supine to a standing position.

Regarding systolic blood pressure (Table No. 2) in order of frequency, it was observed that 3 (4.47%) elderly people had a SBP in the supine position of 90 to 99 mmHg, of which 1 (1.49) maintained the pressure when assuming the standing position and 2 (2.98%) had a decrease of 20 mmHg, 8 (11.94) were between 100 - 109, 3 (4.47%) of them had a decrease in SBP of 10mmHg and 5 (7.46%) elderly people ±20mmHg; 9 (13.43%) elderly people had a SBP in supine position between 110 - 119 mmHg of which 3 (4.47%) maintained the same SBP when assuming the standing position, 4 (5.97%) presented a decrease of 10mmHg and 1 (1.49%) of 20mmHg, in 9 (13.43%) elderly people a SBP in supine position was observed that ranged between 120 - 129 mmHg of which 1 maintained the same SBP when standing, 5 (7.46%) presented a decrease of 10 mmHg, 2

(2.98%) a decrease of 20 mmHg and 1 (1.49%) an increase of 10 mmHg; 5 (7.46%) elderly had a supine SBP between 130 - 139 of which 2 (2.98%) elderly remained with the same SBP, 3 (4.47%) decreased by 10 mmHg; of 10 (14.92%) who had a supine SBP between 140 - 149, 5 (7.46%)
decreased by 10 mmHG, 4(5.97%) by 20 mmHg and 1(1.49%) increased by 10 mmHg; 10 (14.92%) had a supine SBP between 150 – 159 of which 3
(4.47%) decreased by 10 mmHg, 5 (7.46%) by 20 mmHg and 1 (|,49%) increased by more than 10 mmHg and 14 (20.09%) elderly had a supine SBP greater than
160 mmHg and when assuming standing position, 1 (1.49%) remained the same, 3 (4.47) had a decrease of 20 mmHg, 2 (2.98%) had a decrease of more than 20 mmHg and 8 (11.94) had an increase of more than 10 mmHg.

Regarding diastolic blood pressure (DBP), it was observed that 3 (4.47%) elderly people had a supine DBP between 49 - 58 mmHg, of which 2 (2.98%) elderly people maintained the same DBP when assuming a standing position and 1 (1.49%) increased it to more than 10 mmHg; 10 (14, 92%) had a supine DBP between 59 - 68 mmHg where 1 (1.49%) maintained the same pressure when standing, 8 (11.94%) elderly had a decrease of 10 mmHg and 1 (1.49%) had an increase of more than 10 mmHg, 25 (37.31%) of the elderly had a supine DBP between 69 - 78 mmHg of which 9 (13.43%) maintained the same pressure, 12 (17.91%) elderly had a decrease of more than 10 mmHg, 2 (2.98%) by 20 mmHg and
2 (2.98%) increased by more than 10 mmHg; 15 (22.38%) had a supine DBP between 79 - 88 mmHg, with 5 (7.46%) having the same DBP in standing position, 7 (10.44%) had a decrease of more than 10 mmHg and 3 (4.47%) a decrease of 20 mmHg; 6 (8.95%) of the elderly had a supine DBP between 89 - 98, where 1 (1.49%) maintained the same DBP when assuming bipedalism, 3 (4.47%) had a decrease of more than 10 mmHg, 1 (1.49%) of 20 mmHg and 1 (1.49%) had an increase in their DBP of more than 10 mmHg; 2 (2.98%) elderly people in recumbency had a DBP between 99 – 108 mmHg,

presented a decrease of more than 10 mmHg 1 (1.49%) elderly and an increase of more than 10 mmHg 1 (1.49%); 5 (7.46%) had a lying DBP between 109 – 118 mmHg where 2 (2.98%) had a decrease of more than 10 mmHg, 2 (2.98%) of more than 20 mmHg and 1 (1.49%) an increase of more than 10 mmHg in DBP and 2 (2.98%) elderly people had a DBP greater than 129 in supine position of which 1 (1.49%) remained at the same pressure and in 1 (1.49%) elderly person it increased by more than 10 mmHg.

Regarding the frequency of orthostatic hypotension according to sex, it was observed that in a total of 67 elderly people, 40 (59.70%) presented orthostatic hypotension, of which the highest incidence was in the male sex with 28 (41.79%) elderly people and 12 (17.91%) in the female sex; 27 (40.30%) elderly people did not manifest orthostatic hypotension when changing from a supine to a standing position, of which 7 (10.44%) were male and 20 (29.85%) female. According to these results, a significant difference is noted in terms of sex between the population with orthostatic hypotension and the population without hypotension.

According to the distribution of the elderly with orthostatic hypotension according to the age group in order of frequency, it was observed that the highest incidence was in the age group between 65 - 74 years of age with 16 (40%) of the elderly, followed by the age group 75 - 84 years of age with 13 (32.5%) of the elderly, the age group between 85 - 94 years of age with 10 (25%) of the elderly and only 1 (1.5%) elderly person over 95 years of age. Regarding the presence of orthostatic hypotension in the elderly according to the age group, it was possible to see that there was no significant difference in terms of age.

According to the presence of symptoms in the elderly with orthostatic hypotension, it was observed that 34 (85%) of them were symptomatic and 6 (15%) asymptomatic. Regarding the types of symptoms, it was observed that the most common is dizziness since

It occurred in 30 (75%) elderly, followed by blurred vision in 13 (32.5%) elderly, sweating in 9 (22.5%), obtundation in 4 (10%), weakness in 2 (5%) elderly.

According to the diseases associated with orthostatic hypotension in the elderly, it was found that the most frequent is arterial hypertension with 23 (57.5%) followed by chronic obstructive pulmonary disease in 8 (20%), heart disease with 7 (17.5%),
Psychiatric disorder in 6 (15%), Parkinson's disease in 4 (10%) dementia
senile in 2 (5%), cerebrovascular disease in 2 (5%) chronic renal failure in 2 (5%) epilepsy and diabetes in 1 (2.5%) elderly respectively; however, it is important to highlight that 5 (12.5%) elderly did not present any associated disease.

On the other hand, the types of medications related to the presence of orthostatic hypotension in the elderly were observed that a significant number of the study population 27 (67.5%) consume antihypertensives, followed by diuretics in 9 (22.5%), beta-blockers and bronchodilators in 8 (20%) elderly respectively; antidepressants, antiparkinsonian, antipsychotics in 5 (12.5%) elderly respectively; however, it is important to highlight that 6 (15%) of the elderly do not consume any type of medication.

Regarding the incidence of orthostatic hypotension in the elderly according to the institution of origin, the majority of them (23) (57.5%) elderly people belong to the Dr. Carlos Fragachan Geriatric Unit and 17 (42.5%) to the San Vicente de Paúl Asylum, it is important to highlight that despite the fact that the San Vicente de Paúl institution has a greater elderly population, they presented a lower incidence of orthostatic hypotension.

4.4 Discussion of Results.

When analyzing the results of this study carried out in elderly residents of the Dr. Carlos Fragachan Geriatric Unit and the San Vicente de Paúl Asylum, it was found that out of 67 elderly people, 40 (59.7%) of them presented a decrease in systolic blood pressure of 20 mmHg and of 10 mmHg in diastolic blood pressure when adopting the standing position 3 min. later. When evaluating the arterial pulse, we found that in the recumbent position the highest pulse rate was between 60 to 69 beats/min (35.82%), of which 22.38% presented an increase of 10 beats/min when adopting the standing position 3 minutes later. According to the consulted bibliography, the variation in the PA when changing position from supine to standing allows us to differentiate the etiology of orthostatic hypotension, whether it is of autonomic cause or secondary to other pathologies. (Kapoor, W.2000. Engstrom, J.2002).

It was found that in this study the incidence of orthostatic hypotension was higher than in previous studies where a prevalence of 48% and 43% was observed in a population of 126 and 53 elderly people respectively (Puisienx, F. 1999; Belmin, J. 2000).

When studying the symptoms presented by these elderly people, it was found that most of them had dizziness and blurred vision when changing from a supine to a recumbent position; no elderly person presented syncope, so they were classified in functional class II; 6 elderly people did not present symptoms, which classifies them in functional class I. Regarding asymptomatic orthostatic hypotension, there are studies showing that a significant number of healthy elderly people have a decrease in blood pressure in the range of orthostatic hypotension and without any clinical significance (as was found in 17% of hypertensive elderly people included in the American SHEP study). (Hornillos, M., 1998)

Most of the elderly studied who presented changes in blood pressure when changing position were hypertensive with treatment, which favors the development of orthostatic hypotension in this population. (Saez, T.2000).

Regarding the age group, the majority of them were between 65 and 74 years old. It is described that the risk of orthostatic hypotension increases with age, hence it occurs more frequently in people over 65 years old. (Lipsit, L. 1989).

The most affected sex was male. There are no reports on the prevalence according to sex. However, it must be taken into account that in the institutions studied, the male population is greater than the female population by approximately 70%, which explains this incidence.

These results show that orthostatic hypotension is a frequent entity in the elderly population, and although the study group did not present syncope as a consequence of it, the majority presented symptoms that classify them in functional class II of the classification of orthostatic hypotension, which should be taken into account to take preventive measures and thus avoid serious consequences in these elderly people.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS.

Conclusions.

After analyzing and evaluating the data obtained, we can conclude that the following conclusions could be obtained from the sample of elderly people studied where the presence of orthostatic hypotension was determined:

1. In most elderly patients, an increase in arterial pulse of approximately 10 beats per minute was observed when changing from a supine to a standing position.

2. When studying systolic blood pressure in the elderly, changes in blood pressure when adopting the standing position were up to 20 mmHg, which was positive for the diagnosis of Orthostatic Hypotension in the elderly.

3. Regarding the study of changes in diastolic blood pressure in the elderly when adopting the standing position, a significant number of them presented a variation of 10 mmHg, which demonstrated the presence of orthostatic hypotension in the population.

4. Regarding the distribution of elderly people with orthostatic hypotension, the highest incidence was in the male sex.

5. The most frequent age group of elderly people with orthostatic hypotension was between 65 and 74 years of age.

6. Regarding the presence of symptoms, the majority of the population was symptomatic.

7. Regarding the most frequent symptoms in elderly people with orthostatic hypotension, the majority of them presented dizziness, followed by blurred vision, sweating, weakness, and clouding of consciousness.

8. According to associated diseases, high blood pressure was the most frequent, followed by heart disease, psychiatric disorders, Parkinson's disease, senile dementia, cerebrovascular disease, chronic renal failure, epilepsy, diabetes, and a small group did not present any type of associated disease.

9. The types of medication related to the frequency of orthostatic hypotension in the elderly, the largest number of them consumed antihypertensives; followed diuretics, beta blockers, bronchodilators, antidepressants andtranquilizers, antiparkinsonian, antipsychotics, hypoglycemics and a small group did not consume any type of medication

10. Most of the elderly with orthostatic hypotension belonged to the Dr. Carlos Fragachan Geriatric Unit; however, it is important to note that despite the fact that the San Vicente de Paúl Asylum has a larger population, the incidence of hypotension is lower.

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