

## Study of Clinical Profile of Patients with Hypertensive Urgencies and Emergencies.

Sanjay Gulhane\*, Bhushan Chopade\*\*, Uma Sundar\*\*\*

\*Associate Professor\*\*Senior Resident\*\*\*Professor,

Department of Medicine, Lokmanya Tilak Medical College and Municipal General Hospital,  
Sion, Mumbai India

**Abstract:** Hypertension is a major contributor to morbidity and mortality in India and worldwide. More than half of people of 60–69 years of age and approximately three-fourths of those 70 years of age and older are affected. Hypertension is the most common condition seen in primary care and leads to myocardial infarction, stroke, renal failure, and death if not detected early and treated appropriately. This clinical study of hypertensive emergencies was done in order to recognize this condition as early as possible, so as to reduce burden associated with it in terms of morbidity and mortality in our society.

**Methods and Materials:** This was an observational prospective study. We included 200 patients above the age of 12 years of either sex presenting in EMS (Emergency medical services) or admitted in ward/ICU with BP > 180/120. Patients with head injury and with duration of hospital stay <24 hrs were excluded. Detailed history, biochemical and radiological workup (as needed) were done. Outcome was noted in terms of clinical presentations, end organ damage, duration of stay and mortality.

**Results:** The mean age of patients was  $58.4 \pm 13.26$  years. 149 patients (74.5%) were of age more than 50 years. Males comprised 56.5% (n=113) and had significantly higher mortality as compared to females ( $p=0.0012$ ). Predominant presenting symptoms were giddiness (51.5%), headache (40%), breathlessness (30%) and hemiparesis (34.5%). 10 (5%) patients had GCS <5, 21 patients had GCS 5-8 and 169 patients had GCS >8. Low GCS was significantly associated with high mortality ( $p=0.001$ ). Mean systolic blood pressure was  $207 \pm 27$  and mean diastolic pressure was  $130 \pm 22$  mm of Hg. High diastolic BP was significantly associated with mortality (P value 0.004). The mean time of normalization of BP was  $20.9 \pm 23.76$  Hrs, neurological ( $44.67 \pm 28.65$  Hrs), renal ( $10.1 \pm 5.44$  Hrs), Ophthalmic ( $6.43 \pm 1.18$  Hrs), cardiac ( $6.29 \pm 1.81$  Hrs). Serum creatinine level were above 1.4 mg/dl in 68 (34%) of patients. The mean duration of stay was  $7.09 \pm 4.4$  days; it was longest in renal (12.22 days) and shortest in malignant hypertension (4.71 days). Duration of stay of patients with renal end organ damage was statistically significantly longer (p value 0.01) when compared with others. End organ damage was neurological in 79 patients (40%), cardiac in 71 patients (35%), renal in 36 patients (18%), and ophthalmic 14 patients (7%). The in-hospital mortality was 19.5 percent.

**Conclusions:** Males had higher incidence of developing hypertensive emergencies and higher mortality compared to females. Risk of hypertensive emergency increases as age advances. Commonest presenting symptom was giddiness. Higher diastolic BP on admission points towards more adverse outcome. Patients with low GCS had higher mortality. Neurological involvement is the most common end organ damage in hypertensive emergencies.

### I. Introduction

Hypertension affects individuals of all classes and across all age groups. The prevalence of hypertension increases with advancing age to the point where more than half of people of 60–69 years of age and approximately three-fourths of those 70 years of age and older are affected.<sup>[1]</sup> Hypertension is the most common condition seen in primary care and leads to myocardial infarction, stroke, renal failure, and death if not detected early and treated appropriately.<sup>[2]</sup> The age related rise in SBP is primarily responsible for an increase in both incidence and prevalence of hypertension with increasing age<sup>[1]</sup>. The relationship between blood pressure and risk of cardiovascular disease events is continuous, consistent and independent of other risk factors<sup>[1]</sup>.

Although improved management of chronic hypertension has decreased the lifetime incidence of hypertensive crisis to less than 1%, patients presenting with severe hypertension represent up to 25% of all patients presenting to emergency departments<sup>[3]</sup>. Hypertensive emergency can be an end result of chronic hypertension, noncompliance to drugs, or new presentation of unrecognized essential hypertension. A hypertensive emergency is characterized by rapid deterioration of target-organs and poses an immediate threat to life. These conditions were invariably fatal before the advent of antihypertensive drugs<sup>[4]</sup>.

This clinical study of hypertensive emergencies was done in order to recognize this condition as early as possible, so as to reduce burden associated with it in terms of morbidity and mortality in our society.

The aim of the study was to study clinical presentation, biochemical parameters, radiological parameters (whenever indicated) and target organ dysfunction of patients presenting with hypertensive urgencies and emergencies. Also assess the outcome of these patients with respect to treatment given and correlate it with various clinical, biochemical and radiological parameters.

## II. Methodology

This was an observational study, to analyze different clinical presentations, biochemical and radiological parameters of hypertensive urgencies and emergencies and to correlate its outcome. The study was conducted after obtaining permission from institutional ethics committee. All patients above the age of 12 years of either sex admitted in EMS/ICU or in wards with BP > 180/120 mm of Hg are included in the study. Patients with history of head injury and who had short duration (<24 hrs) of hospital stay were excluded from the study.

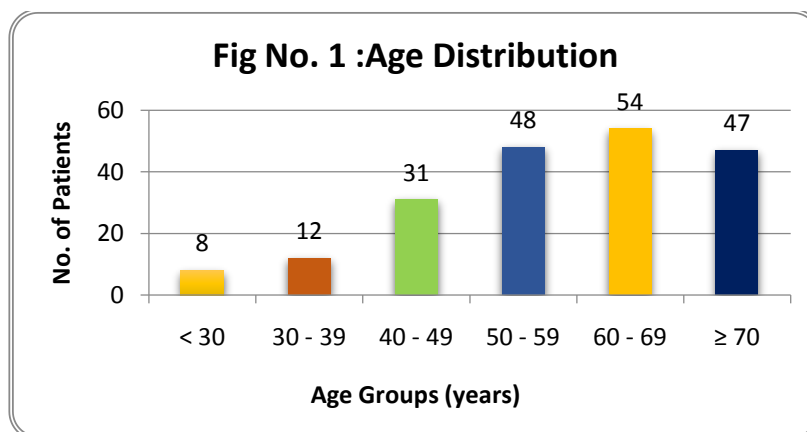
Patients admitted in a major tertiary care institute in Mumbai over a period of 12 months were recruited. Detailed Informed consent was obtained from all of the patients or their legal guardian before recruitment in study. All patients presenting with BP > 180/120 mm of Hg were serially enrolled after informing patients or their legal guardian about the aims, objectives and procedure of study. Detailed history of demographic data, history of symptoms, past history of hypertension, diabetes and detailed clinical evaluation was done. Routine investigation like Hemogram, Renal and Liver function test, Lipid profile, Urine routine, funduscopy, ECG, 2D echo, Ultrasonography and Chest X ray were done. Patients presenting with neurological symptoms underwent brain imaging like CT or MRI on the day of admission. Patients BP were noted on admission and then charted every hourly for first 12 hours then every 4 hourly. Treatment given to the patient was noted. Outcome of the patient was observed in form of morbidity, duration of stay and mortality data was entered in the Case Record Form.

## III. Data Analysis

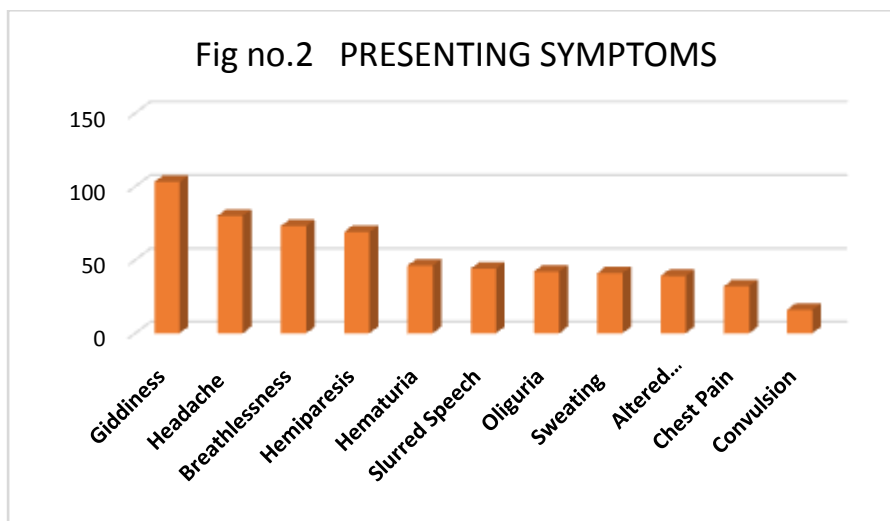
The data processing solution we employed was SPSS (statistical package for social science), version 16, which enabled us to statistically analyze the data and transfer it into graphical representations.

## IV. Results

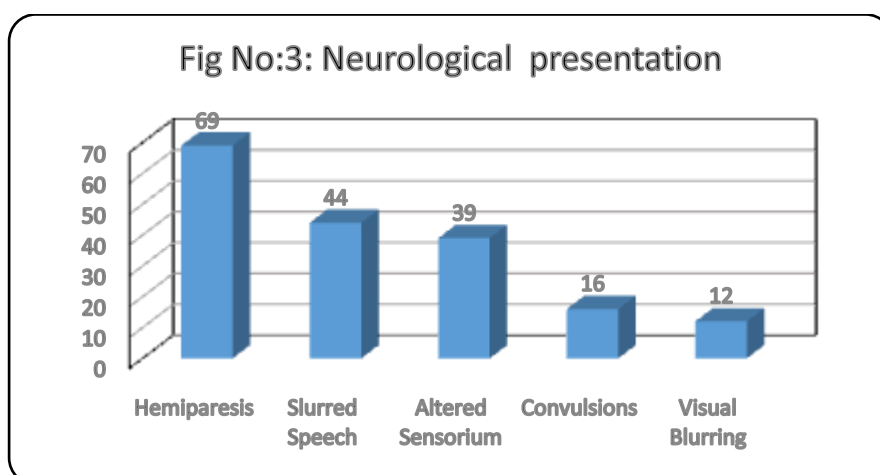
Among 200 patients studied 113(56.5%) were males and 87(43.5%) were females. Male: female ratio is 1.3:1. Mortality was significantly higher in males as compared to females. The mean age was  $58.4 \pm 13.26$  years. The mean age for male and female was 58.64 years and 58.1 years respectively. Out of 200 patients in this study 149 patients (74.5%) were of age > 50 years. Age distribution in intervals of 10 years is shown in Fig No. 1.



Mean age of those expired was significantly higher as compared to patients who were discharged 67.79 Vs 56.13 respectively ( $p < 0.001$ ). Most common presenting symptom was giddiness in 103 patients (51.5%) followed by headache in 80 patients (40%), breathlessness in 73 patients (36.5%) and hemiparesis in 69 patients (34.5%) **Fig No.2**



Among patients with neurological deficit, 69 patients (34.5 %) had hemiparesis, 16 patients (8%) had convulsions 44 patients (22%) had slurred speech, 39 patients (19.5%) had altered sensorium and 12 patients(6%) had visual disturbances,16 patients out of 25 patients who presented with neurological deficits were in altered sensorium(Fig No: 3).



Among the 200 patients studied 130 (65%) were previously known hypertensive. Of the 130 known hypertensive patients, 91 (70%) were on antihypertensive medications while 39(30%) patients had discontinued medications. Of all the patients studied, 10 (5%) patients had GCS<5, 21 patients had GCS 5-8 and 169 patients had GCS >8.Low GCS was significantly associated with high mortality ( $p < 0.001$ ).Mean systolic blood pressure was  $207 \pm 27$  and mean diastolic pressure was  $130 \pm 22$  mm of Hg. Systolic and diastolic BP when compared with outcome, high diastolic BP was significantly associated with mortality ( $P = 0.004$ )

The mean time of normalization of BP was  $20.9 \pm 23.76$  hrs. Mean time of normalization was  $44.67 \pm 28.65$  Hrs in patients with neurological end organ damage,  $10.1 \pm 5.44$  Hrs in renal patients,  $6.43 \pm 1.18$  Hrs in ophthalmic end organ damage and  $6.29 \pm 1.81$  Hrs in cardiac patients. Neurological patients had significantly longer time of normalization ( $p$  value  $< 0.01$ ).Association of time of normalization of BP with outcome (expired or discharged) was not significant. The number of drugs required to control BP was 3 drug combination was used in 123 patients (61.5%), 4 drug combination in 44 patients (22%).

CT brain was done in 93 patients out of whom 50 patients had intracerebral hemorrhage, 23 patients had infarct, and 4 patients had subarachnoid hemorrhage, 16 patients had normal CT Brain. Fundoscopic evaluation was normal in 101 patients (50.5 %) 25 had grade I changes (12.5%), 38 had grade II changes (19 %), 22 patients had grade III changes (11%), 14 patients had evidence of papilloedema (7%). Fundoscopic changes were not significantly associated with outcome. Serum creatinine level were above 1.4 mg/dl in 68 (34%) of patients. The mean duration of stay was  $7.09 \pm 4.4$  days. It was longest in cases of renal hypertensive emergencies with mean duration of 12.22 days and shortest in malignant hypertension with mean duration of

4.71 days. Duration of stay of renal end organ damage patients when compared with others, the difference found was statistically significantly longer (p value 0.01).

End organ damage was neurological in 79 patients (40%), cardiac in 71 patients (35%), renal in 36 patients (18%), and ophthalmic 14 patients (7%).

The outcome of the study showed an in hospital mortality in 39 patients (19.5%). In those who expired, 29 were males (74%) were more than 10 were female (26%), mean age was 67.79 yrs, which was higher than those discharged 56.13 yrs, most of them presented with neurological deficits (91%)Table:1

## V. Discussion

In the present clinical study of hypertensive emergencies, the number of males presenting with hypertensive emergencies were more than the number of females. Martin et al in their study on hypertensive crises observed that 55% of patients were males among patients with hypertensive emergencies<sup>[5]</sup>.The proportion of males in hypertensive emergencies were also higher in the study of Zampaglione et al<sup>[3]</sup> and Giuliano et al (60%)<sup>[6]</sup>.This is probably due to an increased susceptibility of males compared with females to hypertension related target organ damage. This possibility was revealed in the Framingham study, which showed that the incidence of coronary arterial disease in men increased in an almost linear mode as age advances. The proportions of males were higher when studying the group of patients less than 50 years of age. Majority of female patients belonged to the postmenopausal age group which shows susceptibility of postmenopausal age to end organ damage. This is also due to the fact that postmenopausal female hemodynamics is not very much different from the male profile with regard to blood pressure.<sup>[7,8]</sup> Decade wise distribution of age shows largest groups belonging to the fifth and sixth decade at the time of presentation with 24% and 27% respectively.

Analyzing the presenting symptoms, the largest group of patients in the present study, presented with giddiness (51%) followed by headache (40%),neurological deficit (34%), followed by dyspnoea (36.5%) and chest pain(16%).Giuliano et al found cardiac symptoms like chest pain, dyspnea in 28.3% followed by neurological deficit in 16.1% and nonspecific symptoms in 55.4% which included dizziness, headache, palpitation, epistaxis<sup>[6]</sup>.Monteiro Júnior et al reported most common symptoms as headache (54.4%), dizziness (22.4%) and chest pain (28.4%). Other symptoms such as nervousness, nausea, blurred vision, malaise and bodily pain were less frequently reported, totaling 35.5% of the cases<sup>[9]</sup>.The study by Martin et al found presenting symptoms of neurological deficits, dyspnoea and chest pain in 48%, 25 % and 18 % of their patients<sup>[5]</sup>Zampaglione et al in their study had more patients presenting with chest pain(27 %) followed by dyspnoea (22 %) and neurological deficits (21%)<sup>[3]</sup>.

Majority of patients in the present study were previously known hypertensive (65%). Percentage of known hypertensive study by Giuliano et al<sup>[6]</sup> was 79%. In study by Martin et al<sup>[5]</sup> it was 83%, Zampaglione et al<sup>[3]</sup> it was 92%. Al-Bannay & Hussain<sup>[10]</sup> it was 87%. This evidence confirms that hypertensive emergencies were higher in patients with previously known hypertensives. In the present study 30% among the known hypertensive's ignored their hypertensive status and discontinued antihypertensive medications which would have put them at a higher risk for acute target organ damage and hypertensive emergency. Giuliano et al<sup>[6]</sup> found 28 % of patients were non compliant to medication.

Diabetes mellitus and dyslipidemia were the other risk factors present in this study. Patients with diabetes mellitus and dyslipidemia were 30% and 56% respectively in the present study. The number of patients with diabetes mellitus were 26% in the study done by Martin et al<sup>[5]</sup> and 45.5 % in study done by Al-Bannay & Hussain<sup>[10]</sup>.These risk factors would have added to premature atherosclerosis and coronary artery disease in these patients predisposing them to acute target organ damage.

Highest recorded systolic blood pressure was 290 mm Hg with mean systolic blood pressure of 207 mm Hg. The highest diastolic blood pressure recorded was 220 mm Hg with a mean of 130 mm Hg. Martin et al in their study reported a mean systolic blood pressure and diastolic blood pressure  $193 \pm 26$  mm Hg and  $129 \pm 12$  mm Hg respectively<sup>[5]</sup>. Study by Giuliano et al had mean systolic and diastolic BP of  $203 \pm 29.1$ mm Hg and  $114.4 \pm 17.5$ mm Hg respectively<sup>[6]</sup>.Mean diastolic BP was significantly higher in patients who expired (140.4mm Hg) than those who were discharged (129.mm Hg) with p value 0.004. This indicates worse prognosis with a higher levels of blood pressure at presentation.

Framingham study reported that there was a continuum of risk of stroke and coronary heart disease with increasing diastolic BP and the levels where risks were not present were unknown. Stamler et al analysed US studies of correlation of BP levels with cardiovascular risks and showed that both systolic and diastolic BP have a continuous, graded, strong, independent and an etiologically significant relationship to the outcome variables such as cardiovascular mortality and all-cause mortality<sup>[11]</sup>. Renal dysfunction in the form of raised creatinine were seen in 68 (34%) of patients

Time of normalization was significantly longer in patients with neurological damage. This may be due to the fact that there is potential risk of worsening cerebral ischemia from altered autoregulation/perfusion. Of all the patients studied, 10 patients had GCS<5, 21 patients had GCS 5-8 and 169 patients had GCS >8, when compared with mortality low GCS has been significantly associated with high mortality.

Evaluation of fundus revealed changes ranging from hypertensive retinopathy to papilloedema in 49.5 % of patients. Papilloedema was seen in 7% of patients which is an evidence of ongoing target organ damage in these patients. Correlation of fundoscopic findings with outcome was not significant.

Computed tomography of the brain showed intracerebral hemorrhage (50 patients) as the commonest cause for the neurological target organ damage followed by cerebral infarct (23 patients) and subarachnoid hemorrhage (4 patients). Study by Martin et al<sup>[5]</sup> reported that most cases of hypertensive emergencies corresponded to cerebrovascular lesions (58%) among which 67% were cases of ischemic stroke. Study by Zampaglione et al<sup>[3]</sup> found a lesser number of patients with ischemic stroke (24.5%).

The most frequently reported target organ damage in hypertensive emergency included Neurologic 79(39.5%), cardiac 71(35.5%), renal 36(18%), ophthalmic 14(7%). In this context, there is great disparity among various other studies. Lanthier et al<sup>[12]</sup> ranked target organ damage in hypertensive emergency by the frequency of occurrence as heart failure (32%), stroke (23%), and myocardial ischemia (23%). Zampaglione et al<sup>[3]</sup>, however, observed that target organ damage was dominated by stroke (29%), heart failure (23%), and hypertensive encephalopathy (16%). In the Martin et al<sup>[5]</sup> study, 58% of the hypertensive emergencies were cerebrovascular complications here as cardiovascular lesions accounted for 38%. Giuliano et al<sup>[6]</sup> acute pulmonary edema (30.9%), stroke (22%), myocardial infarction (17.9%), acute aortic dissection (7.9%), acute renal failure (5.9%) and hypertensive encephalopathy (4.9%). The mean duration of stay was 7.09 ± 4.4 days. It was longest in cases of renal hypertensive emergencies with mean duration of 12.22 days and shortest in malignant hypertension with mean duration of 4.71 days. Longer duration of stay in cases of renal hypertensive emergencies found in this study may be because these patients responded to the treatment.

The outcome of the study showed an in hospital mortality in 39 patients (19.5%). In those who expired, 29 were males (74%) were more than 10 were female (26%), mean age was 67.79 yrs, which was higher than those discharged 56.13 yrs. Most of them presented with neurological deficits (91% of those who expired). Table 1.

**Table 1**

		<b>Expired (n=39)</b>	<b>Discharged (n=161)</b>
<b>Age(in Years)</b>		<b>67.79 ± 8.23</b>	<b>56.13 ± 13.23</b>
<b>sex</b>	<b>male</b>	29	84
	<b>female</b>	10	77
<b>Time of Normalisation (Hrs)</b>		27.35± 19.85	19.42±24.47
<b>SBP(on adm) (mm Hg)</b>		208.41±39.59	206.98±22.55
<b>DBP (on adm) (mm Hg)</b>		140.41±18.5	129.28±22.25
<b>H/O HTN</b>		23	42
<b>H/O DM</b>		19	107
<b>DYSLIPIDEMIA</b>		18	95
<b>FUNDOSCOPIC CHANGES</b>		18	81
<b>ECCG</b>	<b>LVH</b>	10	73
	<b>ST CHANGES</b>	20	82
	<b>LAD</b>	10	73
<b>2D ECHO</b>	<b>LVH</b>	20	101
	<b>RWMA</b>	6	24
<b>GCS</b>	<b>&lt;8</b>	25	6
	<b>&gt;8</b>	14	155
<b>END ORGAN DAMAGE</b>	<b>CARDIAC</b>	6	25
	<b>NEUROLOGICAL</b>	33	46
	<b>RENAL</b>	0	36
	<b>OPHTHALMIC</b>	0	14

## VI. Conclusions

Males have higher incidence of developing hypertensive emergencies and higher mortality compared to females. Risk of hypertensive emergency increases as age increases as majority of patients in present study with hypertensive emergencies were of age >50 years. Commonest presenting symptom is Giddiness followed by headache, breathlessness and hemiparesis. Commonest mode of presentation in neurological deficit is hemiparesis. Higher levels of BP on admission especially diastolic BP points towards more adverse outcome. Blood pressure needs to be lowered rapidly in patients with cardiac involvement and relatively slowly in those with neurological involvement. Patients with renal involvement have longer duration of stay. Neurological

involvement is the most common end organ damage in hypertensive emergencies. Acute intracerebral hemorrhage was the commonest form of neurological target organ damage in present study. Most of the patients presenting in hypertensive emergencies required multiple drugs to control blood pressure. Patients with low GCS had higher mortality. The in-hospital mortality among patients with hypertensive emergency in present study was 19.5 percent.

### **Acknowledgement**

We wish to thank the Dean L T M Medical College and General Hospital, Sion Mumbai and Dr N D Moulik Head Department of Medicine for permitting to publish this manuscript.

### **Bibliography**

- [1]. Joint national committee on prevention detection and treatment of high blood pressure .The seventh report of Joint national committee on prevention detection and treatment of high blood pressure. JAMA 2003; 289: 2560-2572.
- [2]. World health report 2002: reducing risks, promoting healthy life. Geneva, Switzerland, world health organization 2002
- [3]. Zampaglione et al. Hypertensive urgencies and emergencies. Hypertension1996;27: 144-147
- [4]. Ventura et al. Desperate disease, desperate measures: Tackling malignant hypertension in *the 1950s*. *Am Heart J* 2001; 142: 197-203.
- [5]. Martin J et al: ArquivosBrasileiros de Cardiologia - Volume 83, No 2, August2004.
- [6]. Giuliano Pinna et al, Hospital Admissions for Hypertensive Crisis in the Emergency Departments: A Large Multicenter Italian Study, PLOS ONE April 2014 | Volume 9 | Issue 4 | e93542
- [7]. Messerli FH et al. Disparate cardiovascular findings in men and women with essential hypertension. *Ann Intern Med* 1987; 107: 158-61.
- [8]. Owens JF et al. Menopausal status influences ambulatory blood pressure levels and blood pressure changes during mental stress. *Circulation* 1993; 88: 2794-802.
- [9]. Monteiro Júnior et al, Prevalence of True Hypertensive Crises and Appropriateness of the Medical Management in Patients with High Blood Pressure Seen in a General Emergency Room *Arq Bras Cardiol* 2008; 90(4): 247-251
- [10]. Al-Bannay & Husain Hypertensive crisis Clinical presentation, co-morbidities, and target organ involvement *Saudi Med J* 2010; Vol. 31 (8): 916-920.
- [11]. Stamler J1, Stamler R, Neaton JD, Blood pressure, systolic and diastolic, and cardiovascular risks. US population data, *Arch Intern Med.* 1993 Mar 8;153(5):598-615.
- [12]. Lanthier L, Malenfant L, Lacelle MJ.S Characteristics of hypertensive emergencies and urgencies at Sherbrooke between1998 and 2006. *Can J Gen Intern Med* 2008; 3: 38-40.