

**UNIVERSITI SAINS MALAYSIA  
GERAN PENYELIDIKAN UNIVERSITI  
PENYELIDIKAN  
LAPORAN AKHIR**

**A STUDY ON 24 HOURS AMBULATORY BLOOD PRESSURE  
MONITORING AMONG HYPERTENSIVE PATIENT  
ATTENDING FAMILY MEDICINE CLINIC HUSM**

**PENYELIDIK**

**DR. JUWITA SHAABAN**

**PENYELIDIK BERSAMA  
DR. HARMY MOHD YUSOFF  
DR. TENGKU ALINA TENGKU ISMAIL**

**2012**

1. Nama Ketua Penyelidik: DR JUWITA SHAABAN  
Name of Research Leader

Profesor Madya/  
Assoc. Prof.

Dr./  
Dr.

Encik/Puan/Cik  
Mr/Mrs/Ms

2. Pusat Tanggungjawab (PTJ):  
School/Department

PUSAT PENGAJIAN SAINS PERUBATAN

3. Nama Penyelidik Bersama: DR HARMY MOHD YUSOFF, DR TENGKU ALINA TENGKU ISMAIL  
Name of Co-Researcher

4. Tajuk Projek: A STUDY ON 24 HOURS AMBULATORY BLOOD PRESSURE MONITORING  
Title of Project AMONG HYPERTENSIVE PATIENT ATTENDING FAMILY MEDICINE  
CLINIC HUSM

5. Ringkasan Penilaian/Summary of Assessment:	Tidak Mencukupi Inadequate		Boleh Diterima Acceptable	Sangat Baik Very Good	
	1	2		3	4
i) Pencapaian objektif projek: Achievement of project objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Kualiti output: Quality of outputs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Kualiti impak: Quality of impacts	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Pemindahan teknologi/potensi pengkomersialan: Technology transfer/commercialization potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v) Kualiti dan usahasama : Quality and intensity of collaboration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
vi) Penilaian kepentingan secara keseluruhan: Overall assessment of benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

6. **Abstrak Penyelidikan**  
(Perlu disediakan di antara 100 - 200 perkataan di dalam Bahasa Malaysia dan juga Bahasa Inggeris. Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek (tan/puan) kepada pihak Universiti & masyarakat luar)

*Abstract of Research*

*(An abstract of between 100 and 200 words must be prepared in Bahasa Malaysia and in English)  
This abstract will be included in the Annual Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large)*

LAMPIRAN 1

7. Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini.  
[Sila gunakan kertas berasingan]  
*Applicant are required to prepare a Comprehensive Technical Report explaining the project.  
(This report must be appended separately)*

LAMPIRAN 2 ; ABSTRAK YANG TELAH DIHANTAR KE PERSIDANGAN  
MANUSKRIP YANG DIHANTAR

Senaraikan kata kunci yang mencerminkan penyelidikan anda:  
*List the key words that reflects your research:*

Bahasa Malaysia

AMBULASI TEKANAN DARAH  
HYPERTENSI/TEKANAN DARAH TINGGI

Bahasa Inggeris

AMBULATORY BLOODPRESSURE  
HYPERTENSION

8. **Output dan Faedah Projek**  
*Output and Benefits of Project*

(a) \* **Penerbitan Jurnal**  
*Publication of Journals*

A Study On 24 hrs Ambulatory Blood Pressure Monitoring Among Hypertensive Patient Attending Family Medicine Clinic HUSM (preliminary result). Cardiology Update 2008 Reinainssance Hotel Kota Bharu. (poster presentation)

A Study On 24 hrs Ambulatory Blood Pressure Monitoring Among Hypertensive Patient Attending Family Medicine Clinic HUSM. 7<sup>th</sup> Asian Pacific congress of Hypertension (APCH), Kuala Lumpur 2009. (poster presentation)

Diurnal Blood Pressure Variation Between Hypertensive Male and Female Patients Attending Family Medicine Clinic HUSM. 14<sup>th</sup> National Conference Medical and Health Science, HUSM Kubang Kerian 2009. (poster presentation)

(b) Faedah-faedah lain seperti perkembangan produk, pengkomersialan produk/pendaftaran paten atau impak kepada dasar dan masyarakat.  
*State other benefits such as product development, product commercialisation/patent registration or impact on source and society.*

Sila berikan salinan/ *Kindly provide copies*

(c) Latihan Sumber Manusia  
*Training in Human Resources*

l) Pelajar Sarjana:  
*Graduates/Students*  
(Perincikan nama, ijazah dan status)  
*(Provide names, degrees and status)*


DR. SITI SUHAILA MOHD YUSOFF

M. MED (FAMILY MEDICINE)

m) Lain-lain:  
*Others*

9. Peralatan yang Telah Dibeli:  
*Equipment that has been purchased*

1 UNIT SCHILLER AMBULATORY BLOOD PRESSURE

  
Tandatangan Penyelidik  
*Signature of Researcher*

4/3/2012

Tarikh  
*Date*

**Komen Jawatankuasa Penyelidikan Pusat Pengajian/Pusat**  
*Comments by the Research Committees of Schools/Centres*

This project has been completed successfully and all objectives achieved. The output include one manuscript submission and three poster presentations.

This report has been assessed by an independent assessor and approved by pro committee

**PROFESOR AHMAD SUKARI HALIM**  
Timbalan Dekan (Siri B) (Kek) /  
Pusat Pengajian Sains Perubatan  
Kampus Kesihatan  
Universiti Sains Malaysia  
16150 Kubang Kerian, Kelantan.  
**TANDATANGAN PENERUSI**  
**JAWATANKUASA PENYELIDIKAN**  
**PUSAT PENGAJIAN/PUSAT**  
*Signature of Chairman*  
*[Research Committee of School/Centre]*

19/1/12  
Tarikh  
Date

**BORANG LAPORAN HASIL PENYELIDIKAN**

**PPSP**

Tajuk geran: **A STUDY ON 24 HOURS AMBULATORY BLOOD PRESSURE MONITORING AMONG HYPERTENSIVE PATIENT ATTENDING FAMILY MEDICINE CLINIC HUSM.**

Penyelidik: Dr Juwita Shaaban, Dr Harny Mohd Yusoff, Dr Siti Suhaila Yusoff

Jenis geran: Short term

Tempoh geran:

Jenis laporan: Laporan Kemajuan  Alatan di beli  Ya:nyatakan.  
SCHILLER ABPM

Laporan Akhir\*:   Tidak

<b>OBJEKTIF SPESIFIK KAJIAN (sama spt dalam proposal asal)</b>	<b>SECARA RINGKAS TERANGKAN PENCAPAIAN/HASIL</b>	<b>OBJEKTIF TERCAPAI ATAU TIDAK</b>
1. To describe the circadian pattern of blood pressure among hypertensive patients based on ambulatory blood pressure monitoring	1 <sup>st</sup> January 2008 to 30 <sup>th</sup> June 2008, 114 hypertensive patients were found to be eligible and 9 patients were excluded because the ABPM readings were less than 80 %.  Mean 24 hours SBP and DBP were 128.4 (SD 12.7) mmHg and 79.7 (SD 8.74) mmHg respectively. Mean daytime SBP and DBP were 132.1 (SD 11.72) mmHg and 82.4 (SD 9.41) mmHg while for the mean night time SBP and DBP were 123.3 (SD12.78) mmHg and 76.2 (SD9.01) mmHg. Percentage of non dippers were 68.6% for systolic and 61.9% for diastolic.	✓
2. To determine and compare the proportion of controlled and uncontrolled hypertension between 24 hours ambulatory blood pressure monitoring (ABPM) and office blood pressure.	Percentage of uncontrolled systolic and diastolic 24 hours ABPM were 26.7% and 23.8%, respectively and percentage of uncontrolled diastolic night time blood pressure was 56.2%. Percentage of uncontrolled office blood pressure was high 57.1% systolic and 61.0% diastolic and the difference between office and 24 hours were statistically significant	✓
3. To identify the associated cardiovascular risk factors among non dippers	Simple logistic regression analysis done to look for the association of cardiovascular risk factor and non dippers were not significant	✓


- *Laporan Akhir perlu disertakan salinan manuskrip dan surat yang dihantar kepada mana-mana jurnal untuk penerbitan.*

Nama Penyelidik Utama (PI): Dr Juwita Shaaban  
Tarikh: 21/03/12

t.t.: 

## **Lampiran 1**

### **ABSTRAK**

**Kajian mengenai ambulasi tekanan darah 24 jam dikalangan pesakit Hipertensi di Klinik Rawatan Keluarga Hospital Universiti Sains Malaysia.**

#### **PENGENALAN**

Penyakit Hipertensi merupakan salah satu faktor risiko yang tinggi untuk mendapat penyakit kardiovaskular, penyakit angin ahmar dan masalah buah pinggang. Walaupun peratusan pesakit hipertensi yang mengambil ubatan meningkat tetapi peratusan pesakit yang mempunyai tekanan darah yang terkawal masih lagi rendah. Objektif kajian ini adalah untuk mengkaji kadar perubahan tekanan darah selama 24 jam di kalangan pesakit darah tinggi di Klinik Rawatan Keluarga, HUSM.

#### **KAEDAH KAJIAN**

Kajian ini merupakan kajian irisan lintang bermula dari bulan 1 Januari 2008 hingga 30 Jun 2008 yang melibatkan 105 pesakit darah tinggi di klinik rawatan keluarga HUSM. Pesakit di pilih mengikut kaedah pensampelan sistematik akan mamakai alat Schiller BR-102 selama 24 jam untuk mendapat bacaan tekanan darah tinggi 24 jam. Kadar Purata tekanan darah klinik juga di ambil.

#### **HASIL KAJIAN**

Hasil analisa kajian, di dapati 59 (56.2%) pesakit lelaki dan 46 (43.8%) adalah perempuan dengan purata umur 51.8 (SD 9.34). Purata tekanan darah tinggi 24 jam ialah 128.4 (SD 12.7)mmHg sistolik dan 79.7 (SD 8.74)mmHg diastolik. Purata tekanan darah sistolik dan



diastolik siang hari ialah 132.1 (SD 11.72) / 82.4 (SD 9.41) mmHg manakala purata tekanan darah malam hari ialah 123.3 (SD 12.78) / 76.2 (SD 9.01) mmHg. Peratusan 'non dippers' adalah 68.6% untuk sistolik dan 61.9% untuk diastolik. Peratusan tekanan darah sistolik dan diastolik 24 jam ABPM yang tak terkawal adalah 26.7% dan 23.8% manakala peratusan tekanan darah malam yang tak terkawal ialah 56.2%. Peratusan tekanan darah klinik yang tak terkawal ialah 57.1% sistolik dan 61.0% diastolik. Perbezaan tekanan darah antara 24 jam ABPM dan tekanan darah klinik adalah signifikan secara statistik menunjukkan secara keseluruhan tekanan darah pesakit adalah terkawal berbanding semasa di klinik.. Walaubagaimanapun faktor faktor risiko kardiovaskular di dalam kajian ini tidak menunjukkan signifikan secara statistik.

## **KESIMPULAN**

Kesimpulannya, purata tekanan darah 24 jam dan tekanan darah siang hari ABPM adalah normal manakala purata tekanan darah diastolik ABPM malam menunjukkan lebih dari kadar normal. Lebih dari 50% pesakit di kategorikan sebagai 'non dippers'. Peratusan tekanan darah klinik adalah tinggi berbanding dengan peratusan tekanan darah 24 jam ABPM. Oleh sebab itu penggunaan alat ABPM adalah penting untuk mendapatkan tekanan darah yang lebih tepat dan ianya adalah praktikal berbanding tekanan darah di klinik.

## **ABSTRACT**

### **A STUDY ON 24 HOURS AMBULATORY BLOOD PRESSURE MONITORING AMONG HYPERTENSIVE PATIENT ATTENDING FAMILY MEDICINE CLINIC HUSM.**

#### **INTRODUCTION**

Hypertension is a common and an important modifiable risk factor for cardiovascular disease, cerebrovascular and renal disease. Although the percentage of patients who are treated for hypertension has increased, the percentage of those who demonstrate control of blood pressure has declined. The objectives of this study were to describe the circadian blood pressure profile of hypertensive patients attending Family Medicine Clinic HUSM.

#### **METHOD**

This is a cross sectional study conducted from 1<sup>st</sup> January 2008 to 30<sup>th</sup> June 2008 among hypertensive patients attending Family Medicine Clinic HUSM. All patients who fulfilled inclusion criteria were selected via systematic random sampling. Schiller BR-102 plus was put on patients to get 24 hours BP reading. Mean of two office blood pressure were also taken. Non dippers are defined as systolic or diastolic nocturnal drop of less than 10%. Analysis was done using SPSS Version 12.

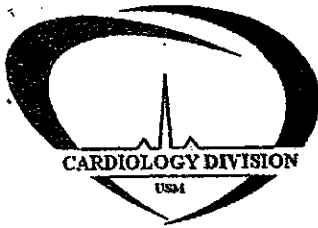
#### **RESULTS**

A result of 105 patients were able to be recruited with 59 (56.2%) males and 46 (43.8%) were female with mean age of 51.8 (SD 9.34) years old. The patients' mean 24 hours SBP and DBP were 128.4 (SD 12.7) mmHg and 79.7 (SD 8.74) mmHg respectively. Mean daytime SBP and DBP were 132.1 (SD 11.72) mmHg and 82.4 (SD 9.41) mmHg while for the mean night time

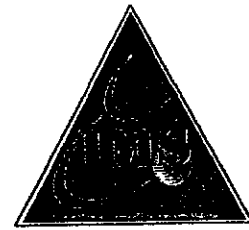
SBP and DBP were 123.3 (SD12.78) mmHg and 76.2 (SD9.01) mmHg. Percentage of non dippers were 68.6% for systolic and 61.9% for diastolic. Percentage of uncontrolled systolic and diastolic 24 hours ABPM were 26.7% and 23.8%, respectively and percentage of uncontrolled diastolic night time blood pressure was 56.2%. Percentage of uncontrolled office blood pressure was high 57.1% systolic and 61.0% diastolic and the difference between office and 24 hours were statistically significant. However the simple logistic regression analysis done to look for the association of cardiovascular risk factor and non dippers were not significant.

## **CONCLUSION**

In conclusions the mean 24 hours and daytime ambulatory blood pressure were normal but the mean diastolic night time was above normal value. Majority of the patients were categorized as non dippers. The percentage of uncontrolled office blood pressure was high compared to 24 hours ABPM. Therefore using ambulatory blood pressure was clinically and practically important to get a better understanding of blood pressure fluctuations over 24 hour periods compared to simple clinical measurements



UNIVERSITI SAINS MALAYSIA



Secretariat, Cardiology Update 2008

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Dr. Siti Suhaila Mohd Yusoff  
Medical Officer,  
Department of Family Medicine,  
Health Campus.  
USM

12 October 2008

Dear Dr.,

**RE: CARDIOLOGY UPDATE 2008 POSTER PRESENTATION**

On behalf of the scientific committee I am proud to announce that your abstract entitled 'A Study On 24 Hours Ambulatory Blood Pressure Monitoring Among Hypertensive Patient Attending Family Medicine Clinic Husm (Preliminary Result)' has been accepted for the upcoming Cardiology Update 2008 Poster Presentation.

Further information regarding the poster presentation are as follows:

- Poster set up time : 8.00am, 25<sup>th</sup> October 2008
- Poster removal time : 2.00pm, 26<sup>th</sup> October 2008
- Poster size : 2 feet (W) x 3 feet (H)

Please take note of the above details. Thank you.

**DR. SUHAIRI IBRAHIM**  
Scientific chairperson,  
Cardiology Update 2008

## Poster 6

### A STUDY ON 24 HOURS AMBULATORY BLOOD PRESSURE MONITORING AMONG HYPERTENSIVE PATIENT ATTENDING FAMILY MEDICINE CLINIC HUSM (preliminary result)

Siti Suhaila Mohd Yusoff, Juwita Shaaban, Harmy Mohamad Yusoff, Tengku Alina Tengku Ismail  
Department of Family Medicine; Department of Community Medicine  
Universiti Sains Malaysia

**Introduction:** Hypertension is a common and an important modifiable risk factor for cardiovascular disease, cerebrovascular and renal disease. Although the percentage of patients who are treated for hypertension has increased, the percentage of those who demonstrate control of blood pressure has declined. As a result of this trend, clinicians may increasingly rely on ambulatory blood pressure monitoring (ABPM) to improve the diagnosis and treatment of hypertension as it is now a firm evidence of its prognostic value in predicting cardiovascular outcome. The objective is to study on the circadian blood pressure profile of hypertensive patients attending Family Medicine clinic HUSM.

**Methods:** A cross sectional study conducted from December 2007 to Mei 2008 among 76 hypertensive patients attending Family Medicine Clinic who fulfill the inclusion criteria. Schiller BR-102 plus was put on patients to get 24 hours BP reading. Other parameters taken were body mass index, waist circumference, smoking habits, past medical history, and cholesterol level.

**Results:** Seventy six patient were able to be recruited with 47 (61.8%) males and 29 (38.2%) were female with mean age of  $52 \pm 9.9$  years old. The patients' average 24 hours SBP and DBP were  $129.9 \pm 12.7$  mmHg and  $80.5 \pm 9.3$  mmHg respectively. For the mean daytime SBP and DBP were  $133.3 \pm 13.1$  mmHg and  $82.9 \pm 10.0$  mmHg while for the mean night time SBP and DBP were  $125.0 \pm 13.5$  mmHg and  $77.05 \pm 9.5$  mmHg. For the Diastolic blood pressure (DBP) nocturnal drop was 27 (35.5%) of the total of 76 patients were dippers and 49 (64.5 %) were non dippers. For the nocturnal fall in SBP, the percentage for dippers and non dippers were 19 (25%) and 57 (75%).

**Conclusion:** The prevalence of non dippers among mild to moderate hypertensive patients attending family medicine clinic HUSM are higher in Diastolic blood pressure and also systolic blood pressure. The mean of 24 hours blood pressure of those patients are within normal limit which is less than 130/80.



Malaysian Society of  
HYPERTENSION

## 7<sup>th</sup> Asian-Pacific Congress of Hypertension 2009

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Dr Siti Suhaila Bt Mohd Yusoff  
Family Medicine Department  
Hospital Universiti Sains Malaysia  
Kubang Kerian  
16150 Kelantan

19<sup>th</sup> December 2008

**Re: 7<sup>th</sup> Asian-Pacific Congress of Hypertension (APCH), Kuala Lumpur  
Convention Centre, 19<sup>th</sup> - 22<sup>nd</sup> February 2009 - Acceptance Letter**

We are pleased to inform you that the scientific committee has accepted your abstract to be the **Poster Presentation** at the **7<sup>th</sup> Asian-Pacific Congress of Hypertension 2009**, which will be held in **Kuala Lumpur Convention Centre** on **19<sup>th</sup> - 22<sup>nd</sup> February 2009**.

The details of your presentation(s) are as follows:

**Abstract ID** : P.P 18  
**Abstract Title** : **A Study On 24 Hours Ambulatory Blood Pressure Monitoring Among Hypertensive Patient Attending Family Medicine Clinic HUSM**

**Abstract Author** : **Dr Siti Suhaila Bt Mohd Yusoff**  
**Date of Presentation** : **20<sup>th</sup> February 2009**  
**Time of Presentation** : **Between 0930-1030 hr**  
**Posting Date** : **19<sup>th</sup> February 2009**  
**Posting Time** : **1000-1100 hr**  
**Venue** : **Ballroom 1, Level 3, East Wing, Kuala Lumpur Convention Centre**

Finally we would like to remind you to register as a delegate of the congress as this is the pre-requisite to present your abstract at this congress latest by **7<sup>th</sup> January 2009**. Please feel free to contact us at [apchkl@msh.org.my](mailto:apchkl@msh.org.my) should you require any further information or clarification regarding your presentation.

We look forward to welcoming you to **7<sup>th</sup> APCH 2009** in Kuala Lumpur.

Thank you,

**Prof Dato' Dr Khalid Yusoff**  
Chairman of the Scientific Committee  
7<sup>th</sup> Asian-Pacific Congress of Hypertension 2009

**Congress Secretariat: sanofi-aventis (Malaysia) Sdn Bhd**  
**Event Organiser: Event Solution Management Sdn Bhd**

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## **A STUDY ON 24 HOURS AMBULATORY BLOOD PRESSURE MONITORING AMONG HYPERTENSIVE PATIENT ATTENDING FAMILY MEDICINE CLINIC HUSM.**

Siti Suhaila Mohd Yusoff<sup>1</sup>, Juwita Shaaban<sup>1</sup>, Harmy Mohamad Yusoff<sup>1</sup>, Tengku Alina Tengku Ismail<sup>2</sup>

<sup>1</sup>Department of Family Medicine, <sup>2</sup>Department of Community Medicine, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

**Background:** Hypertension is a common and an important modifiable risk factor for cardiovascular disease, cerebrovascular and renal disease. Although the percentage of patients who are treated for hypertension has increased, the percentage of those who demonstrate control of blood pressure has declined. Clinicians may increasingly rely on ambulatory blood pressure monitoring (ABPM) to improve the diagnosis and treatment of hypertension as it is now a firm evidence of its prognostic value in predicting cardiovascular outcome.

**Objective:** To study on the circadian blood pressure profile of hypertensive patients attending Family Medicine Clinic HUSM and to describe the prevalence of uncontrolled hypertension based on 24 hours ambulatory blood pressure monitoring (ABPM).

**Materials and Methods:** A cross sectional study was conducted from December 2007 to September 2008 among hypertensive patients attending Family Medicine Clinic HUSM. All patients who fulfilled inclusion criteria were selected via systematic random sampling. Schiller BR-102 plus was put on patients to get 24 hours BP reading. Mean of two office blood pressure were also taken. Non dippers are defined as systolic or diastolic nocturnal drop of less than 10%. Analysis was done using SPSS Version 12

**Results:** 105 patients were able to be recruited with 59 (56.2%) males and 46 (43.8%) were female with mean age of 51.8 (SD 9.34) years old. The patients' mean 24 hours SBP and DBP were 128.4 (SD 12.7) mmHg and 79.7 (SD 8.74) mmHg respectively. Mean daytime SBP and DBP were 132.1 (SD 11.72) mmHg and 82.4 (SD 9.41) mmHg while for the mean night time SBP and DBP were 123.3 (SD12.78) mmHg and 76.2 (SD9.01) mmHg. Prevalence of non dippers were 68.6% for systolic and 61.9% for diastolic. Prevalence of uncontrolled systolic and diastolic 24 hours ABPM were 26.7% and 23.8%, respectively and prevalence of uncontrolled diastolic night time blood pressure was 56.2%.

**Conclusions:** The mean 24 hours and daytime ambulatory blood pressure were normal but the mean night time was high. The prevalence of systolic and diastolic non dippers were high. The prevalence of uncontrolled hypertension based on 24 hours ABPM was low but the prevalence of uncontrolled diastolic night time blood pressure was high.

NO.	PRESENTER	TITLE
PM01	<i>R Roslina</i>	Optimization of PCR amplification of the exons of MSX1 gene in cleft lip with or without cleft palate patients
PM02	<i>Saiful Azmi Johari</i>	Resistance-modifying potential of synthetically produced apigenin derivatives against methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)
PM03	<i>C M Siti Kamariah</i>	Traumatic adrenal haemorrhage: a case report
PM04	<i>S N F Muhsain</i>	Inadequate glycaemic control among diabetic patients in Medical Ward, Hospital Selayang
PM05	<i>R Saini</i>	Vertical transmission of human papilloma virus from cervical cancer patients to their children
PM06	<i>Salwa Selim Ibrahim</i>	Targeted glycemic control among type 2 diabetic patients attending Hospital Universiti Sains Malaysia
PM07	<i>Shahid Hassan</i>	Introducing a new model for postgraduate competent and self-directed clinical skills authentic learning (CSAL)
PM08	<i>S Siti Nurul Ashikin</i>	Lymphocyte subsets in epileptic patients
PM09	<i>Nurul 'Atifaa Mohd Azmi</i>	Autologous stem cell transplant in Hospital Universiti Sains Malaysia
PM10	<i>M M Norhasimah</i>	Translocation Down syndrome - report of 4 cases
PM11	<i>Nani Draman</i>	A study on the prevalence of metabolic syndrome among patients undergoing coronary angiogram in Hospital Universiti Sains Malaysia
PM12	<i>I Siti Mariam</i>	Karyotype abnormalities at diagnosis in adult acute lymphoblastic leukaemia patients in HUSM
PM13	<i>Siti Hawa Hamzah</i>	Clinical presentation and laboratory profiles of secondary dengue infection in Hospital USM
PM14	<i>Siti Hawa Hamzah</i>	Non O1/O139 <i>Vibrio cholerae</i> bacteraemia in splenectomised patient
PM15	<i>Hazlina Ishak</i>	A study on drug compliance among epilepsy patients attending neurology clinic, Hospital Universiti Sains Malaysia
PM16	<i>H Suryati</i>	Low plasma factor XIII and postoperative haematoma in neurosurgical patients
PM17	<i>H Radbiana</i>	Dysphagia lusoria caused by an aberrant right subclavian artery
PM18	<i>H Radbiana</i>	Pulmonary arteriovenous malformations: a case diagnosed using multislice computed tomography (MSCT)
PM19	<i>Norasiah Abu Bakar</i>	Remission and relapse of proliferative lupus nephritis patients treated with intravenous cyclophosphamide in Hospital Universiti Sains Malaysia
PM20	<i>H Mohd Zaki</i>	Ring chromosome 15 in a child with dysmorphic features
PM21	<i>R Norhidayah</i>	Chromosome translocation associated with anencephaly
PM22	<i>M Rosmilah</i>	Characterization of IgE-binding proteins of giant tiger prawn ( <i>Penaeus monodon</i> )
PM23	<i>M R Nor Subaila</i>	Secondary plasma cell leukemia: a rare conditio
PM24	<i>M R Nor Subaila</i>	Acquired Hemophilia A: a case report
PM25	<i>Julia Omar</i>	A case of Hunter Syndrome
PM26	<i>M N Nurul Alia</i>	An unusual rare translocation in a patient with Down syndrome features
PM27	<i>Siti Subaila Mohd Yusoff</i>	Diurnal blood pressure variation between hypertensive male and female patients attending Family Medicine Clinic, HUSM
PM28	<i>Norazila Abdullah</i>	Prevalence and factors contributing to anemia among pregnancy women in Hospital Universiti Sains Malaysia (HUSM)



## **DIURNAL BLOOD PRESSURE VARIATION BETWEEN HYPERTENSIVE MALE AND FEMALE PATIENTS ATTENDING FAMILY MEDICINE CLINIC HUSM**

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**Introduction:** Ambulatory blood pressure monitoring (ABPM) devices are increasingly being used in the assessment of hypertension.

**Objective:** To study on the circadian blood pressure profile of hypertensive patients attending Family Medicine Clinic HUSM and to further determine the differences of BP readings between male and female.

**Materials and Methods:** A cross sectional study was conducted from January 2008 to June 2008 among hypertensive patients attending Family Medicine Clinic HUSM. All patients who fulfilled inclusion criteria were selected via systematic random sampling. Schiller BR-102 plus was put on patients to get 24 hours BP reading. Mean of two office blood pressure were also taken. Non dippers are defined as systolic or diastolic nocturnal drop <10%. Analysis was done using SPSS Version 12.

**Results:** 105 patients were able to be recruited with 59 (56.2%) males and 46 (43.8%) were female with mean age of 51.85 (SD 9.34) years old. The corresponding records for the average 24 hours, daytime, night time and office SBP/DBP for males were 131.6 (SD 12.13)/82.5 (SD 8.93) mmHg, 135.9(SD 12.1)/85.4(SD 9.70)mmHg, 125.9(SD 13.46)/78.4(SD9.03)mmHg and 145.3(SD 14.71)/90.9(SD 9.66) mmHg. For females the blood pressure were 124.4(SD 9.31)/76.4(SD 7.26)mmHg for 24 hours, 127.4(SD 9.39)/78.6(SD 7.52)mmHg for daytime, 120.2(SD 11.19)/73.4(SD 8.25)mmHg for night time and 142.7(SD 15.77)/89.1(SD 9.80) mmHg for office BP. Analysis using independent t-test to look for significant difference in all the parameters measured by ABPM and office BP between male and female was found to be not significant. Percentage of systolic and diastolic non dippers among males were 66.1% and 61.0% while for females were 71.7% and 63.0%.

**Conclusion:** Male patients had higher result in all the BP measurements compared to female, however the difference was not significant. Thus regardless of gender difference, the patients in the study seemed to have comparable ABPM parameters. The percentages of non dippers among both genders are higher in diastolic and systolic blood pressure.

**Juwita**

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**CIRCADIAN BLOOD PRESSURE PROFILE AMONG HYPERTENSIVE AND  
ASSOCIATED CARDIOVASCULAR RISK FACTORS WITH NON DIPPERS.**

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## **ABSTRACT**

**Objective:** To describe the circadian blood pressure profile of hypertensive patients and to identify the associated cardiovascular risk factors among non dippers.

**Methodology:** This is a cross sectional study conducted from 1<sup>st</sup> January 2008 to 30<sup>th</sup> June 2008 among hypertensive patients attending Family Medicine Clinic HUSM. Schiller BR-102 plus was used to get 24 hours blood pressure (BP) reading. Mean of two offices BP were also taken. Non dippers are defined as systolic or diastolic nocturnal drop of less than 10%. Analysis was done using SPSS Version 12.

**Results:** Total of 105 patients were recruited with mean (SD) age of 51.8 (9.34) year old. The mean (SD) 24 hours systolic and diastolic BP were 128.4 (12.7) mmHg and 79.7 (8.74) mmHg respectively. Mean (SD) daytime systolic and diastolic BP were 132.1 (11.72) mmHg and 82.4 (9.41) mmHg while for the night time were 123.3 (12.78) mmHg and 76.2 (9.01) mmHg. Mean (SD) systolic and diastolic office BP was 144.2(15.16) mmHg and 90.2(9.71) mmHg. Percentage of non dippers were 68.6% for systolic and 61.9% for diastolic.

**Conclusion:** Mean 24 hours and daytime ambulatory BP were normal but the mean night time diastolic and office BP were above normal value. Majority of the patients were categorized as non dippers. Therefore using ambulatory BP is clinically important to get a better understanding of blood pressure fluctuations over 24 hour periods compared to simple clinical measurements

## INTRODUCTION

Hypertension is a common and an important modifiable risk factor for cardiovascular disease, cerebrovascular and renal disease. Many clinical trials have confirmed that the risk of cardiovascular disease has decreased by treatment(Charles and Gregory 1999).<sup>1</sup> In Malaysia, third National Health and Morbidity Survey (2006) showed that the prevalence of hypertension among adults above 30 years old was 43%, a relative increase of 30% from 10 years earlier. Although the percentage of patients who are treated for hypertension has increased, the percentage of those who demonstrate control of blood pressure is declining.<sup>2</sup>

Studies confirmed that ambulatory blood pressure monitoring devices have accurately reflected a patient's actual blood pressure than casual or office BP and have correlated closely with end-organ complications.<sup>3,4</sup> ABPM may improve the physician's ability to predict cardiovascular risk and may be particularly helpful in clinical situations such as borderline hypertension, white-coat hypertension, apparent drug resistance, hypotensive symptoms from medications or autonomic dysfunction, episodic hypertension, and the best possible use of ABPM data is to further evaluate and fine tune treatment in conjunction with in office pressure assessment.<sup>5</sup>

The presence of dip in nocturnal pressure may have prognostic implications. The absence of this decline which called non dippers may place patients at an increasing risk of cardiovascular disease, particularly elderly patients. It also has been associated with increased risk of kidney and vascular target-organ injury compared with patients whose

decline in blood pressure at night is normal and can be independent from the clinic and 24-hour mean blood pressure values.<sup>6,7</sup>

This study will look at the circadian pattern of ambulatory blood pressure variation in hypertensive patients attended in Family Medicine Clinic, Hospital University of Science Malaysia (HUSM). The main aim is to explore the diurnal blood pressure and to identify the associated cardiovascular risk factors among non dippers

## **MATERIALS AND METHODS**

A cross sectional study was conducted from 1st January 2008 to 30<sup>th</sup> June 2008 at Family Medicine Clinic, Hospital University of Science Malaysia (HUSM). Subjects were identified according to the eligibility, hypertensive patient age 18 years and above, with stage I and II without target organ damage and were not pregnant. They were selected by random systematic sampling. Patients were required to be on 24hrs blood pressure monitoring.

A total of 114 hypertensive patients were found to be eligible and consented for this study. However, only 105 patients have adequate reading giving the response rate of 92%. Nine patients were excluded because the ABPM readings were less than 80 %.

### **Research tool and ABPM measurement**

ABPM model of Schiller BR-102 was performed to 105 patients over 6 months. The device was evaluated using the protocols of the British Hypertension Society and the US Association for the Advancement of Medical Instrumentation. A twenty-four hour ABPM

measurements were taken automatically at the non-dominant arm by an oscillometric portable monitor (Schiller BR-102 model).

Day and night have been defined as the waking and sleeping periods from the patient's diary but in this study a wide fixed of time intervals was used as day and night blood pressure (25), in this study daytime was defined from 0601 to 2200 and night time was defined between 2201 to 0600 hr. All the patients were advised to maintain their daily activities and avoid vigorous exercise during the ABPM. The tools were programmed for reading of every 60 minutes from 0600 to 2200 and every 120 minutes from 2201 to 2359 because of sleeping time then every 30 minutes from 0200 to 0600 hr. The recordings from the monitor were downloaded to a PC-compatible by using the MT-300 program and it displayed all the readings values for systolic and diastolic BP.

#### ***Day and night blood pressure variation***

From the mean daytime and night-time blood pressure, the percentage of nocturnal decline of systolic blood pressure (SBP) and diastolic blood pressure (DBP) was calculated as:  $[(\text{mean daytime BP} - \text{mean night time BP}) / \text{mean daytime BP}] \times 100$  (normal  $\geq 10\%$ ). The hypertensive patients can be defined as 'dippers' when the average nocturnal BP decreases by  $>10\%$  of average daytime BP and as 'non dippers' when the decrease is  $<10\%$  of daytime BP (O'Brien E *et al.*, 1988). In this study both systolic and diastolic dippers and non dippers were calculated using the above formula.

#### **Statistical Analysis**

Data entry and analysis were conducted using SPSS for Windows, version 12.0. Data exploration was done including descriptive statistics and appropriate graphs for each variable. The parameters were presented either in mean and standard deviation (SD) to describe continuous variables or frequency and percentage (%) for categorical variables.

From this analysis, the daytime systolic blood pressure (day SBP), daytime diastolic blood pressure (day DBP), night systolic blood pressure (night SBP), night diastolic blood pressure (night DBP), average 24hours systolic blood pressure (24 SBP), average of all blood pressure profile as well as percentage of dippers and non dippers were obtained.

The analysis continued with simple logistic regressions to determine the associated cardiovascular risk factor for systolic and diastolic non dippers as the outcome. Simple logistic regression was used as a screening in selection of variables for further step of analysis. It was then followed by multiple logistic regression analysis for the factors that with  $p$  value of less than 0.3 and factors that has clinical significant. This  $p$  value was set larger than the level of significance to allow for more important variables to be included in the model. The method used for variable selection was backward and forward stepwise procedure. Then the inclusion of variables in the model was based on the  $p$  value, which was less than 0.05.

## **RESULTS**

### *Demographic data*

They were 56.2% male and 43.8% were female respondents. Their age ranged from 22 to 76 year old, with the mean (SD) age of 51.8 (9.3) year old. Majority of them were not



smoking. The hypertension duration ranges from one month to 8 years and they were on one to four anti-hypertensive medication. Table 1 shows the details of demographic and clinical characteristic of respondents.

(Table 1 is here)

The mean (SD) of 24 hours systolic blood pressure (SBP) and diastolic blood pressure (DBP) was 128.5 (11.52) mmHg and 79.8 (SD 8.74) mmHg respectively. (Table 2) The percentage for Nocturnal fall (dippers) in SBP was 31.4% while for dippers in DBP was 38.1%. (Figure 1)

(Table 2 is here)

(Figure 1 is here)

Analysis using simple logistic regression and multiple logistic regression to look for associated cardiovascular risk with non dippers did not show any significant ( $p > 0.05$ ).

(Table 3 is here)

(Table 4 is here)

## DISCUSSION

ABPM devices allow a better understanding of circadian or fluctuation of blood pressure measurements. It will help to detect and distinguish status of dippers and non dippers.

There are many studies with different value of normal ambulatory blood pressure monitoring (ABPM). The American Heart Association recommended standards value or references for abnormal pressures during ambulatory measurement was more than 140/90 mmHg for daytime, more than 125/75mmHg for night time and more than 135/85 mmHg for 24 hours blood pressure.<sup>8,9</sup> These figure are only a guide, and lower pressures may be abnormal in patient whose total risk factor profile is high and in whom there is concomitant disease.<sup>24</sup>

In this study, we found the blood pressure pattern of daytime and 24 hours were in normal range. Even though our patients were at middle age, their mean 24 hours systolic blood pressure (SBP) and diastolic blood pressure (DBP) were in a good range (128.45 / 79.79 mmHg), implying these patients had a reasonably well controlled BP. These results may also be used to indicate optimum control of patients under follow up in the clinic set up, which can be used as an audit tool.

However the mean night time BP was 123.15 / 76.22 mmHg, in which mean diastolic BP was slightly higher compared to the normal value of night-time ABPM reading which is  $DBP \leq 75$  mmHg.<sup>8</sup> There are several reasons of having high mean night time blood pressure in this study that would also contribute to the high percentage of non dippers in

this population. One of them was due to the use of wide fixed time interval (6-22h for daytime and 22-6h for night time) in this study in which we could not get the actual sleeping time of each patient. According to Fagard *et al* (1997), short fixed time period to define night time was preferred to get proper night time blood pressure, for instance from midnight to 6am, thereby excluding to a large extent overlapping periods that patients may be either awake or have gone to bed.

Frequent cuff inflations also could disturb sleep with consequent possible for overestimation of nighttime BP in this study. Therefore it is important to know the quality of sleep during the blood pressure monitoring. Some literature also stated that BP variations may be associated with sleep quality, emotions as well as physical activity. Kario K *et al* (2001) did a study on the associations among depression, anxiety, awake physical activity, sleep quality and diurnal blood pressure variation in non psychiatric sample. They found that depression is associated with abnormal diurnal pattern independent of physical activity in working men and anxiety is associated with awake SBP in women.(26)

Other study found all the BP measurements using ambulatory blood pressure were normal<sup>11</sup> which involved younger patient with mean age was 38.19 (SD 11.7) compared to our study with mean age of 51.8 (SD 9.3) which indicate the uncontrolled hypertension increased with increasing age.<sup>12</sup>

Mean night time diastolic BP was high which indicate a high risk patients as few studies showed that night-time blood pressure was an independent predictor of total cardiac and cerebrovascular events.<sup>13,14</sup> The nighttime blood pressure has better prognostic value than

daytime blood pressure.<sup>15</sup> Therefore, the follow up and modification of their medication to achieve a better controlled blood pressure is important.

In people with normal BP and in most hypertensive patients, the BP dips by 10% to 20% at night. "Non dippers" i.e., people whose blood pressure does not dip or dips very little during the sleep or characterized by the loss or even reversal of the expected 10% to 20% sleep time BP decline, is associated with elevated risk of end-organ injury, particularly to the heart (left ventricular hypertrophy and myocardial infarct), brain (stroke), and kidney (albuminuria and progression to end-stage renal failure).<sup>7,13,16,17</sup> Non-dipper BP is more frequent in secondary hypertension than in uncomplicated primary hypertension.<sup>18</sup>

## Stop.

Majority of our respondents were categorized as non dippers with 68.6% of systolic and 61.9% of diastolic. The prevalence of non dippers in our study was quite similar with a study done by Qiu YG et al.<sup>19</sup>

From the literature, there are several factors that contribute to the abnormal night-time blood pressure and non dippers. Non dippers BP patterning is more frequent in hypertension that is secondary to specific medical conditions, such as chronic renal failure, diabetes, and autonomic nervous system dysfunction than in uncomplicated primary hypertension. (27)

The timing and amplitude of the natural rhythm of BP is influenced by neurohormonal regulation, but the effects of extrinsic factors, such as physical activity and dietary sodium, may be of greater significance. Additionally, behavioral influences, such as

mental activity and emotional state, and lifestyle factors, such as smoking cigarettes and drinking alcohol, can also affect the natural rhythm of BP.<sup>20</sup> In this study we did not evaluate detail information all the above activity so we unable to get the reason of having high percentage of abnormal night time blood pressure and non dippers. Other causes of non-dippers include autonomic dysfunction syndromes, diabetes (with neuropathy and/or nephropathy), renal insufficiency, pheochromocytoma, Cushing's syndrome, primary-aldosteronism, some drugs, as well as severe systolic hypertension in the elderly.<sup>21</sup>

Other studies conclude higher prevalence of non dipper was contributed by the time when the antihypertensive treatment was taken. There was a marked reduction in ambulatory blood pressure, mainly during the hours of nocturnal rest, when patients with resistant hypertension were treated with one drug at bedtime.<sup>22,23</sup> However, we also have no data to evaluate the time of antihypertensive taken, furthermore ambulatory blood pressure monitoring was done only for 24 hours compared to their study which used ABPM for 48 hours to confirm the accurate prevalence of non dippers in their population.

Results of this study to look for associated cardiovascular risk factors with non dippers shows insignificant. There were no studies done previously to look for the association. The reason of the result could be due to the study design of cross sectional study which is unsuitable to look for the associated factors. It is more appropriate to do cohort study to look for relevant markers of end organ damage and cardiovascular mortality, namely plasma glucose, total cholesterol, LDL cholesterol, and urinary albumin excretion.

In conclusion, majority of hypertensive patients had controlled ambulatory BP except for the night time and office blood pressure. The overall percentage of non dippers in this study was high, however the associated cardiovascular risk with the non dippers was found to be insignificant.

### **LIMITATION**

Ambulatory blood pressure monitoring is patient dependence and commitment to wear the device for 24 hours thus to get accurate reading. However, most of the patients are unable to do so as majority are Malay and Muslim in which they have to remove the device at each prayer time or when they want take a bath.

The use of single measurement of ABPM can result in over estimation of its prevalence of dippers and non dippers as well as the underestimation of the true percentage of non dippers.

### **RECOMMENDATION**

This study shows high percentage of non-dipper in mild to moderate hypertensive patients however there's no significant cardiovascular risk to non dippers. Cohort study should be better done in non dippers group to look for the cardiovascular event.

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- 28.

## APPENDIX

Table 1: Socio-demographic of 105 hypertensive patients attending Family Medicine Clinic HUSM

	Mean	SD	n	%
Age (year)	51.8	9.34		
Race				
Malay			91	86.7
Chinese			14	13.3
Gender				
Male			59	56.2
Female			46	43.8
Occupation				
Unemployed			62	59.0
Employed			43	41.0
Smoking				
No			67	63.8
Yes			38	36.2
Duration of hypertension	4.2	3.94		
Number of antihypertensive	1.6	0.65		
Diabetes Mellitus				
No			86	81.9
Yes			19	18.1
Body Mass Index (kg/m <sup>2</sup> )				
Normal BMI			13	12.4
Overweight			92	87.6
Waist Circumference (cm)				
Normal WC			29	27.6
Abnormal WC			76	72.4
Total Cholesterol (mmol/L)				
Normal TC			12	11.4
Abnormal TC			93	88.6
HDL (mmol/L)	1.4	0.37		
LDL (mmol/L)	3.5	1.03		
TG (mmol/L)	1.7	0.85		

Table 2: Blood pressure profile based on ABPM and office blood pressure.

	Systolic	Diastolic
	Mean (SD)	Mean (SD)
ABPM		
Daytime	132.2 (11.72)	82.4 (9.41)
Nighttime	123.4 (12.78)	76.2 (9.01)
24 Hour	128.5 (11.52)	79.8 (8.74)
Office BP	144.2 (15.16)	90.2 (9.71)

Figure 1: Percentage of dippers and non dippers

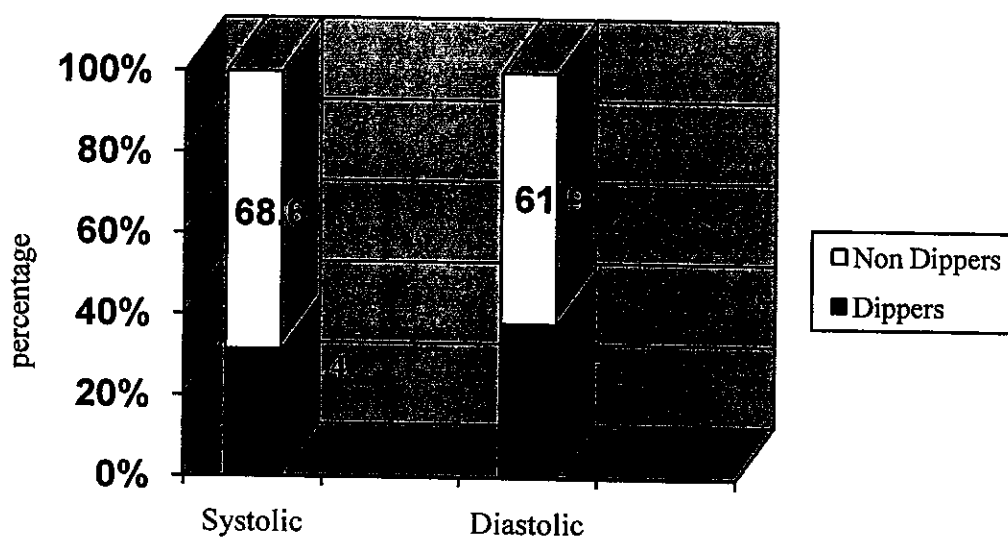


Table 3: Simple Logistic Regression analysis to determine the associated factors for systolic non dippers

Factors	Systolic non dippers		Crude OR <sup>a</sup>	95% CI <sup>b</sup>	wald	p-value
	Yes n (%)	No n (%)				
Age(M ≥ 55 years) (F ≥ 65 years)						
No	31(43.05)	12(36.36)	1.00			
Yes	41(56.64)	21(63.64)	0.76	0.32,1.77	0.42	0.518
Gender						
Male	39(54.17)	20(60.61)	1.00			
Female	33(45.83)	13(39.39)	1.30	0.56,3.01	0.38	0.537
Smoking						
No	44(61.11)	23(69.70)	1.00			
Yes	28(38.89)	10(30.30)	1.46	0.61,3.53	0.73	0.392
Diabetes						
No	57(79.17)	29(87.88)	1.00			
Yes	15(20.83)	4(12.12)	1.90	0.58,6.27	1.13	0.287
Overweight (kg/m <sup>2</sup> )						
No	9(12.50)	4(12.12)	1.00			
Yes	63(87.50)	29(87.88)	0.97	0.27,3.39	0.00	0.956
Increase waist Circumference(cm)						
No	16(22.22)	13(39.40)	1.00			
Yes	56(77.78)	20(60.60)	2.28	0.93,5.55	3.26	0.071
HDL (mmol/L)	1.44 <sup>c</sup> (0.41) <sup>d</sup>	1.35 <sup>c</sup> (0.31) <sup>d</sup>	1.87	0.59,5.90	1.14	0.285
LDL (mmol/L)	3.40 <sup>c</sup> (1.06) <sup>d</sup>	3.69 <sup>c</sup> (0.98) <sup>d</sup>	0.76	0.51,1.14	1.75	0.186
TG (mmol/L)	1.64 <sup>c</sup> (0.85) <sup>d</sup>	1.77 <sup>c</sup> (0.87) <sup>d</sup>	0.84	0.53,1.35	0.49	0.483
High Cholesterol (mmol/L)						
No	9(12.50)	3(9.09)				
Yes	63(87.50)	30(90.91)	0.70	0.17,2.77	0.26	0.612

<sup>a</sup>OR = Odds Ratio

<sup>b</sup>CI = Confidence Interval

<sup>c</sup>mean

<sup>d</sup>SD

Table 4 : Simple Logistic Regression analysis to determine the associated factors for Diastolic Non Dippers.

Factors	Diastolic non dippers		Crude OR <sup>a</sup>	95% CI <sup>b</sup>	wald	p- value
	Yes Freq (%)	No Freq (%)				
Age(M ≥ 55 years) (F ≥ 65 years)						
No	29(44.62)	14(35.00)	1.00			
Yes	36(55.38)	26(65.00)	0.67	0.29,1.50	0.94	0.332
Gender						
Male	36(55.38)	23(57.50)	1.00			
Female	29(44.62)	17(42.50)	1.09	0.49,2.41	0.05	0.832
Smoking						
No	41(63.08)	26(65.00)	1.00			
Yes	24(36.92)	14(35.00)	1.08	0.48,2.47	0.04	0.842
Diabetes						
No	52(80.00)	34(85.00)	1.00			
Yes	13(20.00)	6(15.00)	1.41	0.49,4.08	0.42	0.519
Overweight (kg/m <sup>2</sup> )						
No	7(10.77)	6(15.00)	1.00			
Yes	58(89.23)	34(85.00)	1.46	0.45,4.71	0.40	0.524
Increase waist Circumference(cm)						
No	16(24.62)	13(32.50)	1.00			
Yes	49(75.38)	27(67.50)	1.47	0.62,3.52	0.77	0.381
HDL (mmol//L)	1.4 <sup>c</sup> (0.36) <sup>d</sup>	1.4 <sup>c</sup> (0.411) <sup>d</sup>	1.65	0.56,4.85	0.83	0.362
LDL (mmol//L)	3.5 <sup>c</sup> (0.99) <sup>d</sup>	3.5 <sup>c</sup> (1.12) <sup>d</sup>	1.01	0.69,1.48	0.00	0.952
TG (mmol//L)	1.7 <sup>c</sup> (0.93) <sup>d</sup>	1.7 <sup>c</sup> (0.73) <sup>d</sup>	0.96	0.60,1.51	0.03	0.856
High Cholesterol (mmol//L)						
No	5(7.69)	7(17.50)	1.00			
Yes	60(92.31)	33(82.50)	2.54	0.75,8.65	2.24	0.135

<sup>a</sup>OR = Odds Ratio

<sup>b</sup>CI = Confidence Interval

<sup>c</sup> mean

<sup>d</sup> SD