Detection of Cases of Hypertension and its Related Risk Factors among Individuals Aged 20 - 60 Years, El-Erebab Village, Gezira State, Sudan (2015)

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A Dissertation
Submitted to the University of Gezira in PartialFulfillment of the Requirements for the Awardof the Degree of Master of Science

in
Family Medicine
Department of Community and Family Medicine
Faculty of Medicine

June, 2015
Detection of Cases of Hypertension and its Related Risk Factors among Individuals Aged 20 - 60 Years, El-Erebab Village, Gezira State, Sudan (2015)

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Date: 11/11/2015
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Dedication

To humanity
Acknowledgement

My highest regards and deep appreciation and thanks to Dr. Salwa Elsanousi Hussein for her guidance, advice and continuous encouragements, support and supervision throughout this work.

Special thanks to all my family members for support, help and encouragement.

I would also like to extend special thanks to my faculty teacher for their respect, cooperation and encouragement.

Special thanks to my colleagues working in Elerebab Health Center and the village citizens for their compliance.
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Abstract

Hypertension is a major risk factor for stroke, myocardial infarction and congestive heart failure. It is usually asymptomatic, and regular screening (e.g. 3-yearly) is a vital primary care task. It causes 50% of all vascular deaths. The aim of the study was to detect cases through mercury sphygmomanometer determining the incidence of hypertension in individuals age 20-60 years, and to identify the related risk factors. This was an analytic cross-sectional community-based study. Systematic random sampling of 180 subjects were examined for their blood pressure using manual sphygmomanometer in standing and lying position. Three readings were performed for those who proved to be hypertensive. Also, cloth tape was used for measuring waist circumference and height. Sociodemographic and clinical data of the participants were collected using a questionnaire. This is done by visiting households covering four areas of El-Erebab village 45 subjects from each area. Hypertension appeared in 9 (5%) females and 5 (2.8%) males with an incidence rate of 7.8%. Their systolic blood pressure readings range between (140-170) and diastolic (90-100). This signifies that neither sex is affected more than the other. Hypertension was common among the age interval (55-60) followed by the interval (45-49). While no hypertension appeared in the rest intervals (25–44). Other risk factors are increased body weight 85.7% of hypertensive patients, large waist circumference 64% of hypertensive patients and illiteracy with 50% of hypertensive’s in this category. 21.4% of hypertensive patients taking excess animal fat. There was a significant association of the hypertensive with the following risk factors among the study group. These factors are ageing, illiteracy, increased body weight, taking excess animal fat and increased waist circumference. The researcher recommended regular checkups of blood pressure especially for the elderly in El-Erebab village. Health education about hypertension and its associated risk factors and complications should be directed towards the elderly in El-Erebab village along with other activities such as exercise and promoting healthy food habits including low salt and animal fats diet. Health education and counseling should be directed towards diabetics and other diseases that are known to induce hypertension along with cure and rehabilitation.
اكتشاف حالات فرط ضغط الدم وعوامل الخطر المرتبطة بهافي الأعمار ما بين 20-60 عامًا في قريه العريباب، ولاية الجزيرة، السودان (2015)
هبة الرحمن عيسى محمد يوسف

ملخص

فرط ضغط الدم هو عامل خطر رئيسي للسكتة الدماغية، احتشاء عضلة القلب وقصور القلب الاحتقاني. وهي عادة ما تكون بدون أعراض، والفحص المنتظم (على سبيل المثال 3 مرات سنويا) مهمة الرعاية الصحية الأولية. أنه يسبب 50% من جميع وفيات الأوعية الدموية. تهدف الدراسة التي الكشف عن حالات فرط ضغط الدم من خلال مقياس ضغط الدم الزئبقي وتحديد معدل الحدوث في الفترة العمرية (20-60) للفئة العمرية (20-60) للمستجيبين. وكذلك تحديد عوامل الخطر وسط المبحوثين. هذه الدراسة تحليلية تحليلية مستندة إلى الدراسة المجتمعية. كانت العينة عشوائية منتظمة أسفرت عن اختيار 180 مستجيبًا عبر الزيارات المنزلية التي غطيت أربع مناطق، 45 مستجيبًا من كل منطقة. تم قياس ضغط الدم بواسطة ميزان ضغط الدم الزئبقي للمستجيبين في وضع الوقوف والاستلقاء. عمت ثلاثة قياسات لمن يثبت لديه فرط في ضغط الدم بواسطة ميزان ضغط الدم الزئبقي. قياس الطول وعرض الخصر تم بواسطة شريط متر. تم جمع البيانات الديموغرافية الاجتماعية والسريرية عن طريق الاستبيان واجريت المقابلة بواسطة الباحث. فرط ضغط الدم ظهر في 9% من الإناث و 5% (2.8%) من الذكور. وتبلغ معدل الحدوث الكلي 7.8%. قراءات فرط ضغط الدم الانتقاضي كانت ما بين (140-170). والانتباهي (100-140). عامل الخطر المهيمن على التسبب في فرط ضغط الدم والصحة العمرية (55-60) كلها الفئة (45-54) في حين لم يظهر فرط ضغط الدم في الفئة العمرية الباقية (25-44). وعوامل الخطر الأخرى كالسمنة حيث توجد في 85.7% من المصابين بفرط ضغط الدم. وزيادة في محيط الخصر توجد في 64% من المصابين وتوجد الأمراض 50% من المصابين بفرط ضغط الدم. الذين يتناولون دهون حيوانية يمثلون 21.4%. توجد معنوية إحصائية بين فرط ضغط الدم وعوامل الخطر المرتبطة بالصيحة العامة، العمر، الأمراض، السمنة، تناول الدهون الحيوانية وزيادة في محيط الخصر. توصي الدراسة بالقياس المتكرر للضغط الدم خاصة للأولئك الذين يعانون من الصدأ والضغط. توجيهات التقييم الصحي تجاه فرط ضغط الدم والمخاطر والتعقيدات المتعلقة به مع تجنب التمريز الرياضي. وتبني اسلوب حياة جدير بمنع المرض مثل التقليل من تناول الملح والشحوم الحيوانية وعلاج الأمراض التي تزيد احتمال الإصابة بفرط ضغط الدم.
**List of Abbreviations:**

NCDs: Non-communicable diseases.
AU: African union.
HIV: Human ImmunoVirus.
AIDs: Acquired ImmunoDeficiency Virus
DALYS: Disability adjusted life years.
US: United states
SBP: Systolic blood pressure.
JNC7: Seventh joint nation committee.
JNC8: Eighth joint nation committee.
BMI: Body mass index.
HPT: Hypertension
W: Waist.
OR: Odds ratio.
OAC: Obesity action collision.
OCs: Oral contraceptive pills.
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Chapter One

Introduction:

1.1 Problem Definition:

Hypertension is a major risk factor for stroke, myocardial infarction and congestive heart failure. It is usually asymptomatic, and regular screening (e.g., yearly) is a vital primary care task. It causes 50% of all vascular deaths; most preventable deaths are in areas without universal screening\(^1\).

Blood pressure has skewed normal distribution within the population, and risk is continuously related to blood pressure, so it is impossible to define hypertension.

Whom to treat: all with blood pressure equal or more than 160/100 mmHg (sustained). For those equal or more than 140/90 mmHg, the decision depends on the risk of coronary events, presence of diabetes or end organ damage.

For many years diastolic pressure was considered to be more important than systolic pressure. However, evidence from the Framingham studies indicates that systolic pressure is the more important determinant of cardiovascular risk in the over fifties.\(^1\)

Definition of Terms:\(^1\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic</th>
<th>Diastolic</th>
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<tr>
<td>Optimal Bp&lt;120 mmHg</td>
<td>&lt;75 mmHg</td>
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<tr>
<td>Normal Bp</td>
<td>120-129 mmHg</td>
<td>75-84 mmHg</td>
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<td>High normal Bp</td>
<td>130-139 mmHg</td>
<td>85-89 mmHg</td>
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<tr>
<td>Mild HPT 140-159 mmHg</td>
<td>90-99 mmHg</td>
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<tr>
<td>Moderate HPT 160-179 mmHg</td>
<td>100-109 mmHg</td>
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<td>Severe HPT&gt;180 mm&gt;110 mmHg</td>
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Source: Oxford handbook of clinical medicine\(^1\).

It remains one of the most important preventable contributors to disease and death\(^2\). The higher the pressure the greater the risk and lower the expectation of life\(^7\). Hypertension and other cardiovascular diseases rank among the leading causes of disabilities and deaths from non-communicable diseases (NCDs) in Africa \(^3\). With rising prevalence and death rates now observed more in young and active adults\(^4\). Recently, the African Union (AU)
reported that hypertension is one of the greatest health challenges after HIV/AIDS in the continent\(^4\). This is in fact a priority globally as conclusions from the 2011 United Nations high level meeting on non-communicable diseases focus on a reduction of hypertension and other non-communicable diseases, especially in Africa, where the burden is rising at a faster rate compared to other parts of the world \(^5\). Worldwide, cardiovascular diseases account for about 17 million deaths, with complications from poorly controlled hypertension resulting in over 7.5 million deaths and 57 million disability adjusted life years (DALYS) \(^4\).

The relatively higher prevalence of hypertension in Africa has been linked to population growth and ageing, rising urbanization, mass migration from rural to urban areas, and an increased uptake of western lifestyles including tobacco and alcohol consumption \(^4\). Public health response from the governments of many African nations still remains low, as research findings show that a high number of hypertensive individuals are currently unaware of their condition \(^6\).

### 1.2 Prevalence Worldwide:

Prevalence of hypertension in Africa was 19.7% in 1990, 27.4% in 2000 and 30.8% in 2010, each with a pooled awareness rate (expressed as percentage of hypertensive cases) of 16.9%, 29.2% and 33.7%, respectively \(^4\).

Although hypertension remains more prevalent in economically developed countries (37.3%) compared to developing nations (22.9%), it is a much bigger problem in developing countries, in terms of actual numbers, awareness, treatment and complications \(^8\).

It affects 1 billion people worldwide. US – about 1 in 3 adults (73 million with hypertension (SBP> 140/90) \(^2\)

### In the Sudan:

Hypertension was recorded in Sudan (7.5%, mean age 35 years) in year 2011 \(^9\). As concerning the Gezira state the crude prevalence rate according to the State Ministry of Health, is 1.6 in year 2014 \(^10\). Household Survey in 2006 and STEPS survey of chronic disease risk factors in Khartoum found hypertension prevalence to be 20.1% and 20.4% respectively \(^11\).

### 1.3 Rationale:

1. High prevalence rate. Hypertension prevalence rate in developed countries is 37.3% while in developing countries is 22.9% \(^8\).
2- Hypertension was recorded in Sudan (7.5%, mean age 35 years) in year 2011\(^{(9)}\). As concerning the Gezira state the crude prevalence rate according to the State Ministry of Health, is 1.6 in year 2014\(^{(10)}\). reported cases-seeking treatment).

3- Major risk factor for stroke and myocardial infarction.

4- Goes asymptomatically.

5- Causes great loss in the working power-economical loss.

6- Poor screening activity in the context of the problem.

7- Detection is easily conducted (mercury sphygmomanometers).

1.4 **Main Objectives:**

To detect cases of hypertension through mercury sphygmomanometer to determine the proportion of hypertensive individuals age 20-60 years. Blood pressure will be taken in both postures (lying and standing).

1.5 **Specific Objectives:**

1- To detect proportion of hypertensive patient in ElErebab village.

2- To detect risk factors related to hypertension.

3- To identify complications among the study group.
Chapter Two
Literature review

2.1 Hypertension:

Hypertension (high blood pressure) refers to the pressure that blood applies to the inner walls of the arteries. The diagnosis of high blood pressure cannot be given if the patient is ill or is already on blood pressure medicine.

High blood pressure is based on the average of two or more properly measured blood pressure readings at each of two or more visits after an initial screening. The definitions are based on The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The JNC 7 Report (15).

Hypertension remains one of the most important preventable contributors to disease and death.

Abundant evidence from randomized controlled trials (RCTs) has shown benefit of antihypertensive drug treatment in reducing important health outcomes in persons with hypertension.

2.2 Causes of and Types of Hypertension:

- Essential hypertension
- Secondary hypertension:
  - Sleep apnea
  - Drug-induced
  - Chronic kidney disease
  - Primary aldosteronism
  - Chronic steroid therapy or Cushing’s syndrome
  - Pheochromocytoma
  - Coarctation of the aorta.
  - Thyroid or parathyroid disease JNC8 (2).
Indicators for risk of hypertension include obesity, abdominal obesity and weight gain. Obesity is measured by body mass index (BMI), which is determined by weight and height. BMI is highly correlated with direct measures of body fat in most populations. Normal BMI is 20-25, overweight is 25-29.9 and obese is greater than 30 (5). Not only is BMI important for determining hypertension risk, but fat distribution is as well\(^{(23)}\).

2.3 Risk Factors of Hypertension:

Hypertension is not only one of the major risk factors for most forms of cardiovascular disease, but that it is a condition with its own risk factors.

1-Non Modifiable Risk Factors:

a) Age:

Blood pressure rises with age in both sexes and the rise is greater in those with higher initial blood pressure. Age probably represents an accumulation of an environmental influences and effects of genetically programmed senesces in body systems.

B) Genetic Factors:

There is considerable evidence that blood pressure levels are determined in part by genetic factors, and that the inheritance is polygenic. The evidence is based on twin and family studies. Twin studies have confirmed the importance of genetic factors in hypertension. The blood pressure values of monozygotic twins are usually more strongly correlated than those of zygotic twins.

2-Modifiable Risk Factors:

a) Obesity:

Epidemiological observations have identified obesity as a risk factor for hypertension. The greater the weight gain, the greater the risk of blood pressure. Data also indicate that when people with blood pressure lose weight, their blood pressure generally decrease.
b) Salt intake:

There is an increasing body of evidence to the effect that a high salt intake (7-8 g /d) increases the blood pressure proportionally. Low sodium intake has been found to lower the blood pressure.

c) Saturated fat:

Recent evidence suggests that saturated fat raises the blood pressure as well as serum cholesterol.

d) Alcohol:

High alcohol intake is associated with an increased risk of high blood pressure. It appears that alcohol consumption raises systolic pressure more than the diastolic.

e) Physical activity:

Physical activity by reducing body weight may have an indirect effect on blood pressure.

f) Environmental stress:

The term hypertension itself implies disorder initiated by tension or stress. Since stress is nowhere defined, the hypothesis is untestable. However, it is an accepted fact that psychosocial factors operate through mental processes, consciously or unconsciously, to produce hypertension. (7)

2.4 Previous Studies:

Across sectional study was conducted in 2010 in Two Rural Communities in Penang, Malaysia by SyerRee Tee1 et al detect the prevalence of hypertension and its associated risk factors show that hypertension is estimated to cause 4.5% of the global disease burden. The prevalence of hypertension in Malaysia is 32.2% and added that age, education level, alcohol consumption and BMI are important risk factors associated with the prevalence of hypertension among the villagers. According to the same author that 50 out of 168 people were hypertensive, giving a prevalence rate of 29.8%. Elevated systolic pressure was noted among the widowed, illiterate, those with history of ever consuming alcohol and the obese (16).
According to a Descriptive, cross-sectional study on June 2010 to assess hypertension and its complications in Asesewa by Sahael Stapleton, the prevalence of hypertension was 27.3%. The thought to be rare in rural areas is no longer true for the pooled analysis, as they could identify 3 potential risk factors (alcohol drinking, smoking, and diabetes mellitus), which were associated with hypertension. Overall, prevalence of HPT increased with an advancing age of the participants.\(^{(17)}\)

Also according to a study done by Davies Adeloye et al. in Africa published: August 4, 2014 to estimate the prevalence and awareness rates of hypertension in Africa: A Systematic Analysis from all population-based studies on hypertension, conducted among people aged ≥15 from January 1980 to December 2013, show that the prevalence of hypertension is increasing in Africa, and many hypertensive individuals are not aware of their condition. Prevalence of hypertension in Africa was 19.7% in 1990, 27.4% in 2000, and 30.8% in 2010, each with a pooled awareness rate (expressed as percentage of hypertensive cases) of 16.9%, 29.2%, and 33.7%, respectively.\(^{(4)}\)

Study done by Naing C1, et al. 2014 aimed to synthesize the prevalence, awareness, and control of HPT, and investigate the risk factors for HPT in Myanmar. Seven studies (n=20,901) were included in this analysis. Overall prevalence of HPT in Myanmar was 22% in men and 22.7% in women. The proportions of awareness and controlled HPT were 55% and 11%, respectively. A weak but significant association was observed between HPT and alcohol drinking and smoking. HPT was considerably prevalent in Myanmar, while the levels of awareness and controlled HPT were low.\(^{(18)}\)

A retrospective cohort study of single blood pressure readings among potential blood donors at Juba Teaching Hospital 2010-2012 done by Rachel Wake BM et al. Show that South Sudan is thought to be undergoing an epidemiological transition with an increasing burden of non-communicable diseases such as hypertension. No current data exist on the prevalence of these diseases. Blood pressure readings of 5660 blood donors during 2010-12 at Juba Teaching Hospital were analyzed. Prevalence of hypertension was 19.3%, positively associated with older age and being male. This has implications for public health policy, indicating a need for prevention, screening, and treatment to prevent complications of hypertension.\(^{(19)}\)

A cross-sectional population-based study among a random sample of civil employees to detect the prevalence of hypertension in an urban community in Sudan done in Khartoum year
In a sample of 500 subjects, hypertension was detected in 91 (18.2%) subjects. Forty-two subjects (8%) had newly discovered hypertension and 49 (10.2%) were known hypertensive. There was no difference in symptoms between hypertension versus normotensives. Only 40.8% were on drug treatment, of whom 42.6% were compliant (8).

According to Cross-sectional survey among outpatients at the Obesity Research Center to determine the relation between Large waist circumference and risk of hypertension done by Guagnano MT et al demonstrate that Logistic regression shows that W is the most important anthropometric factor associated with the hypertensive risk. Among males with W > 102 cm the odds ratio (OR) for hypertension is three times that of males with W < 94 cm using casual BP measure (OR 3.04), nearly four times higher using 24 h BP mean (OR 3.97), and even five times higher using day-time BP mean (OR 5.19). Females with W > 88 cm have a risk for hypertension twice that of females with W < 80 cm, whatever BP measurement was take (casual, 24 h or day-time). Males with WHR > 0.96 and females with WHR > 0.86 show significant OR for hypertension only by 24 hour BP measurement and by day-time BP measurement. BMI seems to have no significant relationship to hypertensive risk. Age shows a significant relationship to hypertensive risk only considering males aged > or = 55 year and females aged > or = 50 year (20).

According to prospective study of oral contraceptive and hypertension among women in United States c done by Lisa Chasan found an increased risk of hypertension among current users of OCs that was highest among long-term users and decreased shortly after OC cessation. Risk of hypertension increased with increases in the potency of progestin (21).

In an article, How Weight Affects hypertension by Jaymee Delany excess body weight (including overweight and obesity) accounted for approximately 26% of cases of hypertension in men and 15% in women, OAC(Obesity Action Collision) -Pup Med (22).

In a review article by official publication of The State Medical Society of Wisconsin that stated stress can cause hypertension through repeated blood pressure elevations as well as by stimulation of the nervous system to produce large amounts of vasoconstricting hormones that increase blood pressure (24).
Chapter Three
Materials and Methods

3.1 Study Area:
El-Erebab Village:

The village lies on the East bank of the Blue Nile. 17 kilometers from Madani city. According to a survey designed by our team in 2013 the population was about 4626. All are Muslims.

About 20% bulk of the working power are farmers, 30% are workers in pricks fabrics (kamain) and 20% governmental workers. Others there are three basic schools one for girls and two for boys, two secondary schools one for girls and one for boys.

There are three bakeries and a suk where meat, vegetables and fruits are sold. There are three pipe lines water station and electricity, two communication towers, four mosques, one health center with a pharmacy and Sudan red crescent. From the East the village is connected by an asphalted road that joins the Khartoum Port Sudan road. It is bordered from the South with Shrief village where a graveyard is situated and North with Malkea village where is a nasty dumping area that soils the whole area with iconic nasty smoke

The Health Center:

It is situated to be accessible to all beneficiaries’. It has an office for the medical officer, a room for nurses, an awaiting room, a pharmacy, a laboratory room and respiratory Ventolin inhalation site, vaccination room, a room for antenatal care and a resuscitation room. Every room has satisfactory essential equipment, such as stethoscope, sphygmomanometer and health education materials with regards to non-communicable diseases including hypertension.

3.2 Study Subjects:

The study included individuals 20-60 years of age

3.3 Exclusion Criteria:

1- Pregnant women
2- Those who were already diagnosed.
3.4 Inclusion Criteria:

All males and females aged 20-60 years who have not been diagnosed in Elerebab village.

3.5 Study Design:

This is an analytic cross sectional community based study for detecting cases of hypertension using mercury sphygmomanometer at Elerebab village.

3.6 Sample Size:

Table (1) : Age and sex of individuals eligible for study participation

<table>
<thead>
<tr>
<th>age interval</th>
<th>Males</th>
<th>females</th>
<th>grand total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>232</td>
<td>215</td>
<td>447</td>
</tr>
<tr>
<td>25-29</td>
<td>187</td>
<td>187</td>
<td>374</td>
</tr>
<tr>
<td>30-34</td>
<td>173</td>
<td>164</td>
<td>337</td>
</tr>
<tr>
<td>35-39</td>
<td>173</td>
<td>150</td>
<td>323</td>
</tr>
<tr>
<td>40-44</td>
<td>137</td>
<td>127</td>
<td>264</td>
</tr>
<tr>
<td>45-49</td>
<td>117</td>
<td>138</td>
<td>255</td>
</tr>
<tr>
<td>50-54</td>
<td>51</td>
<td>64</td>
<td>115</td>
</tr>
<tr>
<td>55-60</td>
<td>44</td>
<td>67</td>
<td>111</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1114</strong></td>
<td><strong>1112</strong></td>
<td><strong>2226</strong></td>
</tr>
</tbody>
</table>

Source: Demographic Survey done by Elerebab health center care providers team 2013\(^{(12)}\).
**Formula for Determination of Sample Size:**\(^{(13)}\)

\[
n^0 = \frac{Z^2pq}{d^2} \quad n^o = \frac{2^2 \times 10 \times 90}{25} = 144
\]

\[
n = \frac{n^2}{1 + (n^o/N)} = 130
\]

- **n°**: The provisional Sample Size.
- **n**: The adjusted sample size.
- **Z**: value 1.96 = 2.
- **p**: The anticipated population proportion = 10%
- **q**: (1 - p) the complement of p = 90%
- **d**: The absolute precision required on either sides of the anticipated proportion = 5%
- **N**: The total population size.

This is the minimum sample size required for the study. The researcher increases the size of the sample to gain more statistical precision.

The selected sample size was 180.

**3.7 Sampling Technique:**

Systematic random sampling- every other house taking the odd numbers

The village was segmented into four parts (north, south, east and west),

Where 45 person were selected from each area. Then measurement of individuals blood pressure performed from door to door selecting odd numbers of houses (1-3-… etc).

**3.8 Data Collection:**

Data was collected by researcher through:

1- a questionnaire filled by interview for selected persons in their homes addressing the specified variables:

1) Dependent variables – hypertension

2) Independent variables:
   - Personal characteristics of respondent (age, sex, education ....etc)
   - Lifestyle of respondent (diet, smoking and stress)
   - Complications detected by complaints (breathlessness, cough, edema of face & decrease acuity of vision.)
2 – Recording blood pressure measurement and test its validity by repeated measurements. For conducting screening, luckily my colleagues (four doctors and four nurses) were willingly ready to participate. They were acquainted with the questionnaire context and method of measurement. 3-BMI was measured using digital balance to determine body weight and traditional cloth tape to measure waist. For calculation of BMI the following equation was used: weight(kg)/height²(m)*100\(^{(14)}\)

4-waist circumference was measured using traditional cloth tape. Where waist circumference more than 94 cm in men and more than 80 cm in women were considered as high risk factor for hypertension\(^{(1)}\)

3.9 Evaluation of Blood Pressure

Measurement (accuracy)

The following measures will be used to evaluate a screening test.

(a) Sensitivity = \(\frac{a}{a+c}\) × 100

(b) Predictive value of a positive test = \(\frac{a}{a+b}\) × 100

(c) Percentage of false positive = \(\frac{c}{a+c}\) × 100

<table>
<thead>
<tr>
<th>Table (2): Screening test by diagnosis(^{(7)})</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screening</strong></td>
</tr>
<tr>
<td>test result</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Negative</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Every letter will represent a value when result are obtained.

3.10 Data Analysis:

Data was collected cleaned coded, interpreted and analyzed using SPSS (Statistical Package for Social Science) version 16.

3.11 Ethical Consideration:

A permission from the village Health committee and health authority was taken, and a written consent from respondents was received.
Chapter Four

Results

4.1 Results:

The study recruited 180 subjects 105 were females and 75 males in the ratio (5:7). They were grouped in the age intervals shown on table (4)three measurements done for each hypertensive subject, in a day interval, and they showed no variation in the blood pressure values except for only one hypertensive subject who was proved to be normotensive. Hypertension appeared in 9(5%) females and 5 (2.8%) males with overall incidence rate 7.8%. Their systolic blood pressure readings range between (140-170), and diastolic (90-100) (Fig1). The P value being (0.638), transfigures that neither sexes is affected more than the other. The predictive value of a positive test equals 7.8%, false positive value equal 0.5, and sensitivity of the test equals 93.3%.

Table (3): The average three readings of blood pressure for hypertensive subjects. (standing-lying)

N.15

<table>
<thead>
<tr>
<th>Average first reading</th>
<th>Average second reading</th>
<th>Average third reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>160/100</td>
<td>150/100</td>
<td>150/100</td>
</tr>
<tr>
<td>140/100</td>
<td>150/100</td>
<td>160/100</td>
</tr>
<tr>
<td>150/100</td>
<td>140/100</td>
<td>160/90</td>
</tr>
<tr>
<td>170/100</td>
<td>160/90</td>
<td>170/100</td>
</tr>
<tr>
<td>190/100</td>
<td>160/90</td>
<td>160/100</td>
</tr>
<tr>
<td>160/100</td>
<td>150/90</td>
<td>160/100</td>
</tr>
<tr>
<td>150/100</td>
<td>160/100</td>
<td>150/100</td>
</tr>
<tr>
<td>150/90</td>
<td>140/90</td>
<td>150/90</td>
</tr>
<tr>
<td>140/100</td>
<td>140/90</td>
<td>140/100</td>
</tr>
<tr>
<td>150/100</td>
<td>140/90</td>
<td>150/90</td>
</tr>
<tr>
<td>170/100</td>
<td>160/90</td>
<td>160/100</td>
</tr>
<tr>
<td>150/100</td>
<td>160/100</td>
<td>150/100</td>
</tr>
<tr>
<td>150/90</td>
<td>140/90</td>
<td>150/90</td>
</tr>
<tr>
<td>140/90</td>
<td>120/80</td>
<td>120/80</td>
</tr>
<tr>
<td>150/100</td>
<td>160/100</td>
<td>150/100</td>
</tr>
</tbody>
</table>

This table shows the three readings of hypertensive patients, 6(42.8)% were in stage two and 8(57.1%) were in stage one. There is one patient proved to be with normal blood pressure.
Blood pressure values (systolic and diastolic) distribution among study subject at Elerebab village

166 (92.22%) of the study subject had normal blood pressure, while 14 (7.8%) were hypertensive their systolic blood pressure readings range between (140-170 mmHg) and diastolic (90-100 mmHg).
Reference to table (4), there was highly significant difference between age groups regarding hypertension. It was dominant among age interval was (55-60) followed by the interval (45-49). The least was the age interval (50-54), while no hypertension appeared in the rest intervals (25-44).

**Table (5): Sex and associated hypertension in El Erebab Village N:180**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Hypertensive</td>
</tr>
<tr>
<td>Male</td>
<td>70(38%)</td>
<td>5(2.8%)</td>
</tr>
<tr>
<td>Female</td>
<td>96(53%)</td>
<td>9(5%)</td>
</tr>
<tr>
<td>Total</td>
<td>166(92%)</td>
<td>14(7.8%)</td>
</tr>
</tbody>
</table>

**P=0.50**

According to this table, hypertension was evident in 5 (2.8%) males, and 9 (5%) females, showing that there was no significant difference in the occurrence of the disease in either sexes.
Table No (6 ) : N: 180

The association of occupation and level of education and hypertension among the study group in El Erebab Village

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Description</th>
<th>Normal</th>
<th>Hypertensive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>House Wife</td>
<td>Normal 75</td>
<td>8(4.4%)</td>
<td></td>
<td>83(46.1%)</td>
</tr>
<tr>
<td>Private Workers</td>
<td>Normal 45</td>
<td>5(2.7%)</td>
<td></td>
<td>50(27.7%)</td>
</tr>
<tr>
<td>Univ.S Student</td>
<td>Normal 28</td>
<td>0</td>
<td></td>
<td>28(15.5%)</td>
</tr>
<tr>
<td>Govern Workers</td>
<td>Normal 18</td>
<td>1(0.6%)</td>
<td></td>
<td>19(10.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>Normal 166</td>
<td>14(7.8%)</td>
<td></td>
<td>180(100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Description</th>
<th>Normal</th>
<th>Hypertensive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>Normal 14</td>
<td>5(26.3%)</td>
<td></td>
<td>19(10.5%)</td>
</tr>
<tr>
<td>Primary</td>
<td>Normal 40</td>
<td>4(2.2%)</td>
<td></td>
<td>44(24.4%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>Normal 49</td>
<td>3(1.6%)</td>
<td></td>
<td>52(28.8%)</td>
</tr>
<tr>
<td>University</td>
<td>Normal 63</td>
<td>2</td>
<td></td>
<td>65(36.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>Normal 166</td>
<td>14(7.8%)</td>
<td></td>
<td>180(100%)</td>
</tr>
</tbody>
</table>

\[P=0.1\]

This table shows that housewives are more affected 8 (4.44 %) than other subjects of the category while university level scored no hypertension. Back to the same table hypertension was found in 5 (2.78 %) private workers and 7 (3.89%) illiterates. The least category was university level of education 4 (2.22%). On subjects clinical examination, no complications ever detected.
Fig. (2) : N= 14:
Hypertension associated with the lifestyle in El-Erebab Village

85% of hypertensive subjects having hypertension in their families. As for smoking there were 2(14%) cases of hypertension were smoker. 35% of hypertensive patient has stressful life condition. 21.4 of hypertensive patient taking animal fat. Only 2(14%) hypertensive patient practice exercise. Excess salt takers were tow and both had hypertension.
Table (7) The BMI distribution among the study group N: 180

<table>
<thead>
<tr>
<th>Status of Hypertension</th>
<th>18.5 - 24.9 No Optimal</th>
<th>25 - 29.9 Is Overweight</th>
<th>30 - 34.9 Stage One</th>
<th>35 - 39.9 Stage Two</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>12 (6.66%)</td>
<td>88 (48.88%)</td>
<td>50 (27.77%)</td>
<td>13 (7.22%)</td>
<td>166 (92.2%)</td>
</tr>
<tr>
<td>Hypertensive</td>
<td>0</td>
<td>2 (14.3%)</td>
<td>8 (57.1%)</td>
<td>2 (14.3%)</td>
<td>14 (7.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>12 (6.7%)</td>
<td>90 (50%)</td>
<td>58 (32.2%)</td>
<td>15 (8.3%)</td>
<td>180 (100%)</td>
</tr>
</tbody>
</table>

P = 0.005

Table (7) shows that 58 (32%) of the subjects are overweight having BMI (25 - 29.9), 8 (13%) of overweight subjects were hypertensive. Obese subjects are 20 (11%), 4 (20%) of obese subjects were hypertensive. P 0.003; this fact goes side by side with the known risk factor of hypertension.

Fig. (3) : N: 14

Hypertension and Waist circumference among the study subject in El-Erebab village

9 (64.29%) of hypertensive subject had large waist circumference (risk factor), while 5 (35.71%) had normal waist circumference.
Table (8) hypertension and Waist circumference among the study group N:180

<table>
<thead>
<tr>
<th>status of hypertension</th>
<th>Waist circum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;94 cm. Males - &lt;80 Females (Normal)</td>
<td>&gt;94 cm male. - &gt;80 Female (Risk)</td>
</tr>
<tr>
<td>Normal</td>
<td>118 (65.6%)</td>
<td>48 (26.7%)</td>
</tr>
<tr>
<td>Hypertensive</td>
<td>5 (4.2%)</td>
<td>9 (15.7%)</td>
</tr>
<tr>
<td>Total</td>
<td>123 (68.3%)</td>
<td>57 (31.6%)</td>
</tr>
</tbody>
</table>

\[P=0.005\]

Table (8) shows that 123 subjects (68.3%) had normal waist circumference, 5 (4.2%) subjects with normal waist circumference were hypertensive. 57 (31.6%) subjects had abnormal waist circumference. 9 subjects (15.7%) were hypertensive. There was significant association between hypertension and waist circumference.

Fig. (4): N:14

Family history and hypertension among the study population in El-Erehab village

12 (85%) of hypertensive subject having hypertension in their families.
Table (9) The relation between hypertension and taking animal fat in El Erebab Village

N: 180

<table>
<thead>
<tr>
<th>State of Hypertension</th>
<th>plant fats</th>
<th>animal fats</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>157(87.2%)</td>
<td>9(5%)</td>
<td>166(92.2%)</td>
</tr>
<tr>
<td>Hypertensive</td>
<td>11(78.6%)</td>
<td>3(21.4%)</td>
<td>14(7.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>168(93.3%)</td>
<td>12(6.7%)</td>
<td>180(100%)</td>
</tr>
</tbody>
</table>

P = 0.02

The table shows that 3(21.4%) of hypertensive patient used to take animal fats.

Table (10) Hypertension and Associated diseases N: 14

<table>
<thead>
<tr>
<th>Age interval</th>
<th>Cardiac disease</th>
<th>Diabetes M</th>
<th>Thyroid disease</th>
<th>Atherosclerosis</th>
<th>Apparently healthy</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-44</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>45-49</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>50-54</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>55-60</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>HPT Total</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>14</td>
</tr>
</tbody>
</table>

There are 3 cases of diabetes in the age interval (55 -60) . The table showed that they are all hypertensive. One participant was cardiac, proved to be hypertensive .Eight (4.44%) were Apparently healthy, however ,proved to be with hypertension.
Table (11) : Screening test by diagnosis

<table>
<thead>
<tr>
<th>Screening test result</th>
<th>Hypertensive</th>
<th>Normotensive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>(a)14</td>
<td>(b)166</td>
<td>(a+b) 180</td>
</tr>
<tr>
<td>Negative</td>
<td>(c)1</td>
<td>(d)0</td>
<td>(c+d) 1</td>
</tr>
<tr>
<td>Total</td>
<td>(a+c)15</td>
<td>(b+d) 166</td>
<td>(a+b+c+d)</td>
</tr>
</tbody>
</table>

The predictive value of a positive test $=$ \( \frac{a}{a+b} \times 100 \% = 7.8\% \).

The sensitivity of the test by sphyngomanometer $=$ \( \frac{a}{a+c} \times 100 \% = 93.3\% \)

The percentage of false positive $=$ \( \frac{c}{a+c} \times 100 \% = 0.5\% \)
Chapter Five
Discussion

5.1 Discussion:

The study revealed that the incidence of hypertension in the study area is 7.8% similar to a cross-sectional population based study done by Somayia M Sherief\(^8\) among a random sample of civil employees to detect the prevalence of hypertension in an urban community in Sudan done in Khartoum in a sample of 500 subjects, in which Forty-two subjects (8%) had newly discovered hypertension and of them 49(10.2%) were known hypertension. The incidence rate by this current research seems to be quite low due to exclusion of already diagnosed and being an age specific prevalence rate if compared with the study done by Rachel Wake BM et al at Juba teaching hospital\(^{19}\) which showed that the prevalence of hypertension was 19.3%. But agrees with the prevalence rate reported by Sudan Household Survey 2006\(^{11}\).

The most affected age interval was (55-60) which agrees with the commonly known fact that hypertension is the disease of the elderly. Overall increases with the advancing age of the participant in study by Saheal Stapleton\(^{17}\). Hypertension was evident in 5 (2.7%) males, and 9 (5%) females showing that there was no significant difference in the occurrence of the disease in either sexes which agrees with study done by Nacing C et al\(^{18}\) which show that overall prevalence of hypertension in Myanmar was 22% in men and 22.7 in women. But it differ with Rashelet al\(^{19}\) who stated that prevalence of hypertension was 19.3% is positively associated with old age and being a male. The study showed that housewives are more affected than other occupations. This could be related to the physiological sphere of females and the stress due to being preoccupied by rearing children. This may also be due to the presence of female most of the time and their availability during the study time.

Reference to education, 7(50%) of the effected individuals were illiterates. Level of Education, alcohol consumption and BMI are important risk factors SyerRee et al\(^{16}\). It is generally known that awareness is linked with high levels of education although this is not always true.

The study also showed that hypertension is prevalent in more than 50% of the married subjects which could be due to being preoccupied by rearing children and being in continuous struggle to warrant food and shelter for their offspring within the current escalation of prices.
Obesity is a positive risk factor in the development of hypertension. As per a study by SyerRee\textsuperscript{(16)} that BMI is a very important risk factor. As well in an article, \textit{How Weight Affects hypertension} by Jaymee Delany\textsuperscript{(22)} excess body weight (including overweight and obesity accounted for approximately 26\% of cases of hypertension in men and 15\% in women).

In this current study 50\% and 26 \% of obese subject were hypertensive females and males respectively.

In this study most of hypertensive subjects had increased waist circumference. This agrees with Guagnano MT\textsuperscript{(20)} in which Logistic regression shows that weight is the most important anthropometric factor associated with the hypertensive risk.

One of the detected hypertensive had association with cardiac disease and three of them had diabetes mellitus concentrated in the age ranging (20-60) which conform with the Sahael Stapleton\textsuperscript{(17)} that diabetes is a risk factor of hypertension.

Concerning utilization of oral contraceptives showed that all hypertensive did not mention taking the contraceptive. However, the researcher believe that hypertension increases with an increased use of contraceptive among current users and was highest among long-term users and decreased shortly after oral contraceptive cessation. Risk of hypertension increased with increased potency of progestin Lisa\textsuperscript{(21)}.

As for symptoms of complications we found that there was no complications that is because most of hypertensive were in stage 1 and 2. This is supported by cross-sectional population based study by S Sherif\textit{et al}\textsuperscript{(8)} who have same findings.

Concerning smoking, there were 2(14\%) cases of hypertension among smokers that shows that smoking was not significantly related to hypertension which confirmed with study by Naing C \textit{et al}\textsuperscript{(18)}.

Concerning the occurrence of hypertension in families, 12 (85\%) of the hypertensive subjects confirmed having hypertension in their families that illustrates family history of hypertension is a good risk factor. This is confirmed by Parks Text books\textsuperscript{(7)}.

There were 5(38\%) hypertensive subjects who suffered from stress that was found to be an associated factor to hypertension in this study. This conforms with a review article by official
publication of The State Medical Society of Wisconsin that stated stress can cause hypertension through repeated blood pressure elevations as well as by stimulation of the nervous system to produce large amounts of vasoconstricting hormones that increase blood pressure.\textsuperscript{(24)}

Reference to salt according to park’s\textsuperscript{(7)}, there is an increasing body of evidence to the effect that a high salt intake increases blood pressure proportionately. This was confirmed by this current study.
Chapter Six

Conclusion and Recommendations

6.1 Conclusion:

- No change was noticed in the three readings of Bp except for one participant who was proved later to be normotensive.
- Overall prevalence rate was 7.8%.
- Hypertension is dominant in the age interval (55 – 60) followed by the interval (45 – 49).
- Hypertension is evident in females more than males.
- Housewives are affected more than other occupations and the least affected were university level of education.
- Data showed that hypertension is more prevalent in married subjects.
- Most of hypertensive subjects had excess body weight. The overweight subject have BMI (25 -29.9) which goes side by side with the risk factor (waist circumference).
- Hypertension subjects associated diseases, was diabetes cases in the age group (55 – 60).
- Hypertensive patient who take excess animal fats and salt were roved to have been prone to hypertension.
6.2 Recommendations:

- Regular checkup of blood pressure especially in elderly in El-Erebab village.
- Health education about hypertension, its associated risk factors and complications should be directed towards the elderly in El-Erebab village along with other activities such as exercise and promoting healthy food habits including low salt and animal fats diet.
- Health education and counseling should be directed towards diabetics and other diseases that are known to induce along with cure and rehabilitation.
References

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17. Sahael Stapleton Ghana 2010, Hypertension and its complication in Asesewa


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Appendices

استمارة الاستبيان

المعلومات الشخصية :

الاسم: ........................................
العمر: ...........................
الجنس: .............................
العمل نوعه: ............................عدد الساعات: ............................مرهق: ............................سهل: ............................
السكن: ..................................................
المستوي التعليمي: ..................................................

الحالة الاجتماعية: متزوج: ............. غير متزوج: ..........
الأمراض المصاحبة: ..................................................

الدخل الشهري: ..................................................
الإنفاق اليومي: ..................................................

هل تعنيكم ضغط دمكم؟ ................. نعم ............ لا .............
1- هل تشكو من ضيق في النفس خاصة ليلا أو الإجهاد حتى الخفيف؟
   نعم  لا

2- هل تشكو من ورم في الأرجل؟
   نعم  لا

3- هل تشكو من ورم في الوجه؟
   نعم  لا

4- هل لديك مشكلة في النظر؟
   نعم  لا حدد ............

5- هل تشكو من خففان؟
   نعم  لا

6- هل تعاني من دوخة أو صداع؟
   نعم  لا

7- هل تكح خصوصا ليلا؟
   نعم  لا

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8- هل تشك في نقص في قواك؟

9- حساب كتلة الجسم.

10- هل يوجد فائرنتك من هو مصاب بالضغط؟

11- هل تكثر من استعمال الملح؟

12- هل تميل الي استخدام الزيوت النباتية أم الحيوانية؟

13- هل تمارس الرياضة؟

14- هل لديك ما يقلقك ويسبب لك الضغط النفسي؟

15- هل أنت مدخن؟

16- كم سيجاره في اليوم؟

17- هل تتعاطى التمباك؟

18- الأمراض المصاحبة:

1- أمراض الكلى
2- أمراض القلب
3- السكري
4- مشاكل الغدة الدرقية
5- ضيق الشرايين

19- التاريخ الدوائي:

هل تتعاطى العقاقير الآتية:

1- مسكنات الألم
2- البريدنولون
3- الهرمونات

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<th>الصيدلة الثانية</th>
<th>الصيدلة الأولى</th>
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<th>المحيط الخصر</th>
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</tbody>
</table>

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**Questionnaire**

**Personal data:**


Sex: ...........................................

Occupation: ............Hours.............Tired sum........ Easy............

Residence: .....................................

Educational level: ..............................

Status: Married........Not..................

Monthly income: .............................

Daily expenses: .............................

Do you know how much your BP is?

Yes.................No.................

1- Do you complain from short of breathing?

Yes.................No.................

2-Have you edema of lower limps?

Yes.................No.................

3-Have you face edema?

Yes.................No.................

4-Have you complain of sight defect?

Yes.................No.................

5-Have you palpitation?

Yes.................No.................

6-Have you dizziness or headache?

Yes.................No.................

7-Do you have nocturnal cough?

Yes.................No.................

8-Do you complain from tiredness?

Yes.................NO.................

9-BMI

wight...............length..............

10-Is any one of your family has hypertension?
11-Do you take excess salts?
   Yes.................No..............
12-What do you usually take animal fats or plant fats?
   Animal fats............... plant fast................
13-Do you practice sport?
   Yes.................No..............
14-Do you have social or emotional stress
   Yes.................No..............
15-Are you a smoker?
   Yes.................No..............
16-If yes how many cigarettes?
   Yes.................No..............
17-Do you snuff?
   Yes.................No..............
18-Associated diseases: .................................................................
   a- Renal disease .......... yes ...........no..............
   b- Heart disease ........... yes ............. no
   c- Diabetes mellitus......... Yes .............no
   d- Thyroid disease ..........yes...........no
   e- Atherosclerosis.........yes...........no
19-Drug history:
Are you taking this drugs?( drugs inducing hypertension )
   1- Analgesic ............. dose
   2- Prednisolone ........... dose
   3- Hormones

<table>
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<th>Waist circumference</th>
<th>Weight</th>
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<th>Bp value 1</th>
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