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Compliance with antihypertensive treatment among the patients who attend the PHC clinics in Hebron

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Dedication

This humble work is dedicated to the soul of my mother, my father, my wife, my son 'Sohaib", brothers and sisters with love and gratitude.

Mohammad Wridat

Declaration

I, here in, declare that no portion of the work referred to in this study has been submitted in support of an application for any other degree or qualification to this university or any other institution of learning.

Signature:……………

Mohammad A.M. Wridat

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Abstract

The current study is conducted to assess the rate of compliance with treatment regimen or plan of hypertensive patients and the factors that affect their compliance in the primary health care clinics in Hebron district. A cross-sectional design was utilized to achieve this purpose. The data was gathered between 10/07/2010 and 10/08/2010 using a self-reported questionnaire filled by the researcher and another two assistants for 292 patients attending the central primary health care centers in Hebron district (Karanteena: 109, Dora: 83, and Yatta: 100) who met the inclusion and exclusion criteria and agreed to participate in the study. The self-reported questionnaire consisted of ten sections and included 102 items.

Statistical analysis was performed using the statistical package for social sciences (SPSS), Version 15. Descriptive statistics, the Chi-squared and Fisher exact tests (p-value ≤0.05) were used to analyze the data. Also binary logistic regression was used to examine the association between the level of blood pressure control and some dependent variables.

Analysis of the patients' characteristics showed that the patients' age ranged between 37-87 years of which 65.1% were above the age of 55. Regarding their gender, 171(58.6%) were females and 121 (41.4%) were males. Only one fourth (23.6%) of participants were having normal body mass index (18-24.99kg/m^2), 53.1% were overweight (25-29.99 kg/m^2) and 23.3% were obese (≥30kg/m^2). Nearly 61% of them were under the Palestinian poverty line as defined by the Palestinian Central Bureau of Statistics.

For the measurement of the participants compliance rate, the researcher adopted different subjective and objective methods. The researcher measured their BP. as indirect indicator for their compliance. He also asked the participants subjective questions about their regularity on the doctor's appointment, their abidance to their doctor's advices regarding the healthy diet and physical activity, and finally their regularity on taking their antihypertensive drugs as they are prescribed to them.

The main result of the current study was that, in general, there is a poor compliance rate with the treatment plans among the hypertensive patients. Only 57.9% of the participants in the

study were compliant with their treatment plans and had their blood pressure controlled below the targeted level of 140/90 mm Hg. And 53.4% were admitted to hospital once or more times due to hypertension. Also, the cross-tabulation between the compliance rate and the independent variables revealed that gender, BMI, and the smoking status have significant effect on BP. 65.75% of the participants suffered from hypertension for less that ten years and 69.5% of them had one or more co-morbidities. 35.29% were on single daily dose of antihypertensive medication, 51.36% were on twice daily dosing and 13.35% were on three doses a day.

Also, the findings indicate that, in general, the patients have good family support and encouragement and positive relationship with the treating doctor in the clinic. They also showed variation in their knowledge about hypertension and its treatment and the majority of the participants (72.6%) indicated that the drugs' usage instructions were "always or often" clear and simple.

The binary logistic regression analysis revealed a significant relationship between compliance and gender of patients, body mass index, the illness duration in years, the presence of diabetes as co-morbidity, the number of drugs, frequency of doctor visits, the patient's perception of hypertension as a serious disease, the clarity of treatment instructions given to the patient, the family support, the occurrence of drugs side effects and the cost. On the other hand, binary logistic regression showed no statistically significant relationship between compliance and age of the patient, education level, work status, smoking status, marital status, family history of hypertension, daily regimen, and drugs' regimen interruptions.

Finally, the participants had low compliance rate (57.9%) with their treatment plans which could have adverse effects on their ability to control their blood pressure level and to minimize or delay the appearance of its complications.

ملخص الدراسة

أجريت الدراسة الحالية من اجل تقييم مدى التزام مرضى الضغط في عيادات الرعاية الأولية في منطقة الخليل بالخطة العلاجية لكل منهم و كذلك البحث عن الاسباب التي تؤثر في مدى التزامهم. استخدمت دراسة كمية مقطعية من اجل تحقيق هذا الهدف. جمعت المعلومات اللازمة للدراسة بواسطة استبانات قام الباحث بتعبئتها مع اثنين من المساعدين من 292 مريض ممن استوفوا شروط المشاركة في هذا البحث من المراجعين في العيادات المركزية (109 من الكرنتينا و 83 من دورا و 100 من يطا) في منطقة الخليل في الفترة الواقعة ما بين 2010/7/10 و 2010/8/10. أداة هذه الدراسة كانت عبارة عن استبانة تتكون من عشرة أبواب و 102 سؤال.

استخدم برنامج الرزم الاحصائية للعلوم الاجتماعية (SPSS) لتحليل العينة, حيث استعملت النسخة 15 من هذا البرنامج. كذلك استخدم التحليل الوصفي, بالاضافة الى الكاي المربع (x^2) وفشر المضبوط (fisher exact test) مع درجة دقة 5% (p value <0.05) لتحليل المعلومات. كما استخدم تحليل الارتداد اللوجستيكي من اجل فحص العلاقة بين التحكم في مستوى ضغط الدم و بعض المتغييرات التابعة.

تحليل بيانات المرضى اشارت الى ان اعمارهم تراوحت بين 37-87 سنة و ان 65.1% منهم كانوا فوق سن 55 سنة. بالنسبة للجندر فقد كان 58.6% منهم اناثا بينما 41.4% كانوا من الذكور. حوالي الربع منهم فقط (23.6%) كانوا ضمن المعدل الطبيعي لمؤشر كتلة الجسم (18- 99 و24 كغم/م2), 53.1% منهم كانوا من زائدي الوزن (25-29.99 كغم/م2) و 23.3% منهم كانوا من البدناء ($\leq$ 30 كغم / م2).

استخدم الباحث عدة طرق مختلفة لقياس مدى التزام المشاركين, فقام بقياس ضغط الدم كمؤشر غير مباشر على مدى التزامهم بالخطة العلاجية. كذلك قام بسؤال المشاركين أنفسهم عن مدى التزامهم بمواعيد الطبيب و نصائحه بالأكل الصحي و النشاط البدني و كذلك مدى التزامهم بأخذ أدويتهم باستمرار كما هي موصوفة لهم.

النتائج الرئيسية لهذه الدراسة تشير انه يوجد ضعف في مدى التزام مرضى ضغط الدم المرتفع مع الخطة العلاجية إذ انه فقط 57.9% من المشاركين في الدراسة كانوا ملتزمين بالخطة العلاجية و تمكنوا من التحكم بضغط الدم لديهم ضمن المعدل المطلوب و هو اقل من 90/140 ملم زئبقي.كما أن 53.4% منهم قد دخل المستشفى مرة أو أكثر بسبب مرض الدم المرتفع. كما أن الجدولة المتقاطعة أظهرت وجود علاقة ذات دلالة إحصائية بين مستوى ضغط الدم للمرضى وكل من الجنس, مؤشر كتلة الجسم ونسبة التدخين للمشاركين. 65.75% من المشاركين يعاني من المرض لفتر اقل من عشر سنوات و 69.5% منهم يعانون من مرض مزمن آخر على الأقل. أما بالنسبة للعلاج 35.29% منهم كانوا يعالجون بجرعة واحدة يوميا من الدواء, 51.36% يعالجون بجرعتين يوميا و 13.35% كانوا يعالجون بأخذ ثلاث جرعات يوميا.

أيضا أظهرت النتائج أن المرضى المشاركين في الدراسة يتمتعون بشكل عام بدعم و تشجيع جيدين من العائلة و كذلك لهم علاقة ايجابية مع الطبيب المعالج لهم في العيادة.و أظهرت كذلك وجود فروقات في مدى المعرفة لديهم بما يتعلق بمرض

ضغط الدم المرتفع و عملية علاجه . كما أن معظم المرضى(72.6%) قالوا أن التعليمات الخاصة بالعلاج كانت دائما سهلة وواضحة بالنسبة لهم.

التحليل اللوجستيكي الارتدادي الثنائي بين أن هناك علاقة ذات دلالة إحصائية بين الالتزام بالخطة العلاجية و السيطرة على معدل ضغط الدم و جنس المريض, مؤشر كتلة الجسم, طول فترة المرض, المصابون بداء السكري, عدد الادوية, تكرار زيارة الطبيب, النظرة لمرض ضغط الدم المرتفع على انه مشكلة جدية, وضوح التعليمات الطبية, دعم العائلة, وجود أعراض الجانبية للأدوية و الكلفة.

من جهة أخرى, فان التحليل اللوجستيكي الارتدادي الثنائي بين ايضا انه ليس هناك علاقة ذات دلالة إحصائية بين الالتزام بالخطة العلاجية و السيطرة على معدل ضغط الدم و عمر المريض, مستوى التعليم, العمل, التدخين, الحالة الاجتماعية, التاريخ المرضي للعائلة, عدد مرات اخذ الدواء في اليوم و عدد مرات عدم الالتزام بالخطة العلاجية.

أخيرا, اظهر المشاركون في الدراسة مستوى التزام سيء (57.9%) بالخطة العلاجية الموضوعة لكل منهم مما قد يكون له أثرا سلبيا على مقدرتهم في السيطرة على مستوى ضغط الدم و كذلك مقدرتهم على تقليل أو تأخير ظهور مضاعفات المرض لديهم.

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Definitions

Hypertension: Hypertension is a chronic medical condition in which the blood pressure is persistently elevated. It is also referred to as high blood pressure or shortened to HT, HTN or HPN. The word "hypertension" by itself normally refers to systemic arterial hypertension.

Essential (primary) hypertension: It means that no medical cause can be found to explain the raised blood pressure.

Secondary hypertension: means that the high blood pressure is a result of another medical condition, such as kidney disease, tumors or disturbances in the endocrine system.

Compliance with treatment: The extent to which the patient behavior coincides to the recommendations of his/her treating doctor and to his/her assigned therapeutic plan and drug regimen.

Perception: the process of attaining apprehension or understanding of the environment by organizing and interpreting sensory information. The perception of hypertension is how does the patient evaluate and where does he/she rank hypertension from health point of view.

Knowledge: acquaintance or familiarity with someone or something, that can include facts, information, principles gained through experience and or education.

Chi-squared test: test of independence for the two qualitative variables to determine whether the observed frequencies markedly differ from that we would expect by chance. This test could be one-way or two-way chi-squared.

Fisher test: is a statistical significance test used in the analysis of contingency tables where sample sizes are small to determine if there are non-random associations between two categorical variables.

Abbreviations

HTN	Hypertension
MoH	Ministry of Health
WHO	World Health Organization
SPSS	Statistical Package for Social Sciences
PHC	Primary Health Care.
BP.	Blood pressure
X^2 test	Chi-squared test
PCBS	Palestinian Central Bureau of Statistics
CVDs	Cardiovascular diseases
CVA	Cerebro-Vascular Accidents.
MI.	Myocardial infarction
TIA.	Transient ischemic attack
HF.	Heart failure
CHF.	Congestive heart failure
SBP.	Systolic blood pressure
DBP.	Diastolic blood pressure
AHA.	American Heart Association

Chapter One

Introduction

1.1. Introduction

This study is designed to assess the compliance rate with the treatment plan and the factors that affect it among the hypertensive patients attending the primary health care centers in Hebron city because a review of the literature revealed lack of compliance among the chronically diseased patients in general and the hypertensive patients in particular (WHO, 2003).

The Primary Health Care is the first level of contact between the individual and the health system where essential health care is provided and the majority of prevailing health problems can be managed. These services are provided by the primary health care centers which usually are located close to the people and include: health education and promotion, illness prevention, care of the sick people, advocacy and community development. Primary health care (PHC) became a core policy for the World Health Organization (WHO) with the Alma-Ata declaration in 1978 and the "Health- For- All by the year 2000" program.

Before discussing the problem statement, the aim and the objectives of the current study it is important to obtain an overview of the number and levels of the primary health care centers in the West Bank, Hebron, and south Hebron directorates. By the end of the year 2010, the population of Palestine reached 4048403, 62% in West Bank and 38% in Gaza strip. Hebron directorate located in the southern part of West Bank and is the biggest governance in regard to the total population which was 620417 (14.9%) of the population of Palestine (Palestine MoH 2010).

In Palestine, the Ministry of Health is the major provider of primary health care services which are provided free of charge to all individuals enrolled in the government health insurance and they only pay a small co-payment for the drugs, the laboratory test, and the radiological examinations. Prenatal care, vaccination, and treatment for children under the age of three years are provided free of charge to all people regardless of their insurance status.

The network of the primary health care centers (PHC) has been considerably developed in Palestine and there are 706 centers (572 in West Bank and 134 centers in Gaza strip). The Palestinian Ministry of Health (MoH) operates 453 of them (64.16%) (394 in West Bank and 59 in Gaza strip), the UNRWA operates 59 centers (8.35%) (41 in West Bank and 18 in Gaza strip) and the non-governmental organizations (NGOs) operates 194 centers (27.49%) (137 in West Bank and 57 in Gaza strip) (MoH, 2011).

The primary health care centers in Palestine are classified into four levels according to the services they provide and the number of people they serve in their catchment's area. These four levels are:

Level one: provides preventive health services such as health education on MCH, safe water and sanitation, healthy nutrition ..etc, record keeping and follow-up and provision of first aid as well as MCH services. This also provides curative services such as first aid and the doctors visit them once or twice a week. It is staffed by a health guide or a registered nurse to serve population sites below 1,000 persons.

Level two: health clinic provides preventive services such as MCH, vaccination, and health education. This clinic provides curative services in the form of general practitioner services and is staffed by a general practitioner and nurses. It provides all preventive, general curative and some laboratory services throughout the week and provide its services to sites populated by 1000 to 3000 persons.

Level three: which involves health centre that provides the same services as level two clinic plus the routine laboratory tests and preventive dentistry. It provides a wider range of health services which includes preventive dentistry, laboratory services and specialist doctor services. They are located in sites of 3000-10000 persons.

Level four centre: these are super specialist clinics which are usually available in the district hospitals, offers comprehensive health care services such as general medicine, consultations by a variety of specialists, laboratory services, X-ray and emergency care around the clock. The fourth level clinic is located in areas with more than 10,000 population and there are no services excluded from package.

In West Bank there are 86 centers of level one, 216 centers of level two, and 80 centers of level three. In Hebron & South Hebron there are 81 centers of level one, 28 centers of level two, and 16 centers of level three and the major three central clinics are: Karanteena, Yatta and Dora. These PHC centers provide multiple activities and programs including preventive medicine, non-communicable diseases programs including diabetes and hypertension, community health, mother and child health, environmental health….etc (Hebron Health Directorate). The following table shows the number and levels of the 44 clinics (See table 1.1).

Table (1.1): Number and levels of PHC clinics in West Bank, Hebron and South Hebron directorates.

Directorate	Level- II PHC clinics	Level-III PHC clinics	Total
West Bank	216	80	296
Hebron	7	13	20
South Hebron	21	3	24
Totals	28	16	340

1.2.   Problem Statement

Hypertension is one of the most common diseases all over the world and its prevalence is increasing by the years. The World Health Organization (WHO) considers it as the major risk factor for cardiovascular diseases (CVD) which in turn are responsible for around one third of the global deaths each year and thus it was named "the number one killer" by the WHO in its annual report (WHO, 2002). Globally, 972 million had hypertension in 2000 and this number will reach 1.56 billion by the year 2025 (Kearney et al. 2005). The WHO estimated that hypertension caused 7.1 million deaths, about 13% of the total, contributing by 4.5% to the global disease burden that is 64 million disability adjusted years (DALYs) (WHO/ISH, 2003).

In Palestine, cardiovascular diseases is the number one killer contributing to 25.4% of the total deaths in 2010 (29.6%of those 20-59 years and 30.9% of those 60 years and above) and cerebrovascular diseases was the second cause of death in the same years counting for 12.1% (6.4% of those 20-59 years and 17% of those 60 years and above). Hypertension is one of the

most common non-communicable diseases and it constitutes 3.1% of the total deaths in 2010 (1.4% of those 20-59years and 4.4% of those who were 60 years and above) (Palestine MoH. 2010).

High blood pressure, if left untreated or uncontrolled, it has many serious complications that might affect the vital organs of the body such as the heart, the brain, the kidneys and the eyes. For example, it may lead to arteioscelerosis (Riccioni, 2009), stroke and other CVAs ((Donnan et al.,2008), hypertensive nephroscelerosis (Ruilope et al., 2001), and hypertensive retinopathy (Rodriguez & Zurutuza, 2008).

Non-compliance with treatment might be one of the crucial factors that keep hypertension difficult to control leading to its various complications. Unfortunately, there is lack in studies that assess compliance with anti-hypertensive treatment among patients with hypertension in Palestine. Indeed, to our knowledge this may be the first study ever conducted among the Palestinian hypertensive patients for this purpose.

1.3. The rationale and importance of the study

As discussed formerly, this study may be the first in Palestine and the findings may help the health policy planners as well as the health professionals treating hypertension to gain more control over the disease and its complications by improving their patients' compliance. Thus saving lives and huge amounts of money that are spent yearly on treating the complications of this disease.

1.4. Study aim and objectives:

1.4.1. Study aim

The main aim of this study is to assess the rate of compliance and the factors that may affect the compliance with anti-hypertensive treatment plans among the hypertensive patients who attend the primary health care clinics in Hebron area.

1.4.2. The specific objectives of the study

1- To assess the relationship between the socio-demographic variables such as gender, age, marital status, level of education...etc and other independent variables that may affect patient's

compliance with anti-hypertensive treatment plan such as knowledge, cost, family support…etc.

2- To assess the compliance rate of the hypertensive patients with their treatment plan.

3- To identify the factors that may affects the compliance rate of the hypertensive patients with their treatment plan.

1.5. Research questions

What is the compliance rate of the hypertensive patients with their treatment plan and what are the factors that may affect their compliance ?.

1.6. Feasibility of the study:

1- The researcher's interest and his professional knowledge of the disease and its treatment aspects facilitated the process of conducting this research.

2- The researcher himself is working as a dispensing pharmacist in the study setting which facilitated the access to the patients who participated in the study and to the medical staff who were helpful.

3- Ethical approval was obtained from Al-Quds University, the head of Primary Health Care Directorate in West Bank, the head of South Hebron Health Directorate and the head of Hebron Health Directorate.

1.7. Possible limitations of the study

● The participants may tend to answer in a manner which they consider socially or medically acceptable so as to please the researcher.

● Only the three central clinics in Hebron city area were selected for this study, so the generalization of the study findings may be limited to other cities in Palestine.

• This study was conducted in governmental primary heath care centers, so the generalization to other centers such as UNRWA and NGOs may be limited.

• This study utilizes a cross-sectional design by which causal inferences or incident rate estimation of compliance is not possible.

1.8. Summary:

1-The main provider of primary health care in Palestine is the Palestinian Ministry of Health and it provides its services through a network of PHC clinics that cover the whole area of the West Bank and Gaza strip.

2- The chronically diseased patients (hypertensive and diabetics) make a great part of those receiving treatment in the PHC clinics.

3- The aim of the current study is to assess the rate of compliance with treatment regimen among the hypertensive patients who attend the PHC clinics in Hebron area and the factors that affect their compliance.

4- The chapter also presents the problem statement, the study objectives, research questions, feasibility and the limitations of the current study.

CHAPTER TWO
LITERATURE REVIEW

2.1. Section one: introduction

Cardiovascular diseases are the class of diseases that involve the heart and or blood vessels "arteries and veins". While the term technically refers to any disease that affects the cardiovascular system, it is usually used to refer to those related to atherosclerosis (arterial disease).These conditions usually have similar causes, mechanisms, and treatments. Due to the silent nature of the cardiovascular diseases as in general, these cardiovascular problems are detected by the time the problem is usually quite advanced and having progressed for decades. Therefore, there is an increased emphasis on preventing them by modifying their risk factors, such as healthy eating, exercise, and avoidance of smoking (Anthea. 1993).

Most countries face high and increasing rates of cardiovascular diseases. Each year, heart diseases kill more Americans than cancer. In recent years, cardiovascular risk in women has been increasing and has killed more women than breast cancer (USA government, 1999).

There are many types of the cardio-vascular diseases (CVDs) which can be shortly described as the follows: (American Heart Association, 2011)

1-Atherosclerosis: which is a condition in which a substance called "plaque" builds up on the inner walls of the blood vessels. This buildup narrows the arteries, making them hard for the blood to flow through.

2- Heart attack / myocardial infarction (MI): this occurs when the blood flow to a part of the heart is blocked by a blood clot. If this clot cuts off the blood flow completely, the part of the heart muscle supplied by that artery begins to die.

3- Stroke of which there are three subtypes: (a) Ischemic stroke which happens when a blood vessel that feeds the brain gets blocked, usually from a blood clot. It is the most common type

and accounts for 87% of all stroke cases. When the blood supply to a part of the brain is shut off, brain cells will die. The result will be the inability to carry out some of the previous functions as before like walking or talking. (b): Hemorrhagic (bleeding) stroke which occurs when a blood vessel within the brain bursts. The most likely cause is uncontrolled hypertension and (c) transient ischemic attack (TIA): often called a "mini stroke", and caused by a temporary clot but these warning strokes should be taken very seriously.

3 - Heart Failure (HF): this doesn't mean that the heart stops beating but that the heart isn't pumping blood as well as it should. Heart failure, sometimes called congestive heart failure (CHF) as the heart keeps working, but the body's need for blood and oxygen isn't being met.

4 - Arrhythmia: which is an abnormal rhythm of the heart. There are various types of arrhythmias. The heart can beat too slowly, too fast or irregularly. For example, bradycardia is when the heart rate is less than 60 beats per minute while tachycardia is when the heart rate is more than 100 beats per minute. An arrhythmia can affect how well the heart works. The heart may not be able to pump enough blood to meet the body's needs

5- Heart valves problems: When heart valves don't open enough to allow the blood to flow through as it should, it's called stenosis. When the heart valves don't close properly and allow blood to leak through, it's called regurgitation. When the valve leaflets bulge or prolapse back into the upper chamber, it's a condition called mitral valve prolapse. When this happens, they may not close properly. This allows blood to flow backward through them.

Cardiovascular diseases (CVDs) are the main non-communicable diseases (NCDs) and are major public health concern world-wide. Globally, CVDs are the number one cause of deaths. An estimated 17.1 million died of CVDs in 2004 representing 29% of all global deaths and this number is expected to rise to 23.6 million by 2030. Of these deaths, 7.2 million were due to coronary heart diseases (CHD) and 5.7 million were due to stroke and 82% of all these deaths occurred in the low and middle-income countries (WHO, 2011). For example, in the United States of America (USA), CVD has been the number one killer every year since 1900 except 1918 and in 2003. One or more types of the CVDs affected 71.3 million individuals representing 34.2% of all population and caused around 9.1 million (37.3%) of the deaths in

the same year. Of the CVDs, high blood pressure (HBP) affected 65 million (32.3%), coronary heart disease affected 13.2 million (6.9%), stroke affected 5.5 million (2.6%) and heart failure (HF) affected 5 million (2.3%) (NHANES 1999–2002). According to the WHO report (2001), CVDs accounted for 9.2% of the total deaths in the African region in 2000 compared to 8.15% in 1990. (WHO, 2001)

The following table (2.1) shows the estimated annual deaths that occurred in world regions due to the most common forms of the CVDs: (WHO report, 2004)

REGION	High Blood Pressure (HTN)	Ischemic Heart Diseases	Cerebrovascular Diseases	Cardiovascular Diseases (CVD)
THE AMERICAS	135 000	921 000	542 000	1 928 000
EUROPE	179 000	2 373 000	1 447 000	4 927 000
MIDDLE EAST	97 000	538 000	227 000	1 079 000
AFRICA	60 000	332 000	359 000	1 036 000
SOUTH ASIA	152 000	2 039 000	1 059 000	3 911 000
WESTREN PACIFIC	284 000	993 000	1 957 000	3 825 000

Finally, in Palestine, the CVDs is still the leading cause of deaths accounting for 25.4% of all deaths in general. It was responsible for 29.6% of deaths that occurred in 20-59 years old people and 30.9% of deaths occurred in those who were 60 years or over in the years 2010. Also, the cerebro-vascular disease was the second cause of deaths and accounted for12.1% of the total deaths (6.4% of those 20-59 years and 17% of those 60 years and above). Hypertension is among the most common non-communicable diseases in Palestine and it constitutes 3.1% of the total deaths in 2010 (1.4% of those 20-59years and 4.4% of those who were 60 years and above) (Palestinian MoH, 2010).

The cost is a crucial factor in the treatment of diseases especially the chronic ones as they last for life and constitute a large proportion of the patient's income. For example, the United States of America pays nearly € 310.23 billion as direct and indirect annual costs for treating the patients affected by CVDs (Haase et al, 2006). In 2006, CVDs also cost the European

Union about €169 billion (Leal et al, 2006). Further, in China, the direct annual costs of CVDs were estimated to be €30.76 billion representing 4% of its gross national income (Gaziano, 2007) and in South Africa, 25% of the country's health care spending is devoted to the CVDs. (Center for Global Health and Economic Development, 2004).

As hypertension is considered the first cause of CVD and is the main focus of this study, the next section discusses the definition, prevalence, and etiology in more details.

2.2. Section two: High Blood Pressure (HBP)/ Hypertension.

Hypertension is a chronic medical condition in which the blood pressure is persistently elevated. It is also referred as high blood pressure or shortened as HT, HTN, or HPN. High blood pressure is defined as a systolic blood pressure (SBP) which is equal or above 140 mmHg and or a diastolic blood pressure (DBP) which is equal or above 90mmHg (Oscar & Oparil, 2000).

There are four main types of hypertension which are classified according to its etiology as the following:

1- Primary or essential hypertension which affects about 90-95% of hypertensive patients. It has unknown medical cause and might be caused by a combination of several factors (Carretero & Oparil, 2000) such as obesity, especially in those with body mass index over 25 (Haslam & James, 2005), stress and potassium deficiency (Tsigos, 2006), high sodium intake (table salt) (Lackland, & Egan, 2007), some mutated genes (Dickson & Sigmund, 2006) or normally inherited from parents or ancestors (Luma & Spiotta, 2006) (Wang & Sun, 2009). The risk of primary hypertension also increases with age (Kosugi et al. 2009).

2- Secondary hypertension, which as the name implies, is occurred as a result of a condition that affects other organ(s) of the body such as the kidneys' tumors, brain tumors, blood arteries, heart, congenital problems (e.g. coarctation of the aorta) or the endocrine system which affects 5-10% of the patients (Mayo Clinic, 2008). For example, hypertension appears in more than 80% of those who suffer from Cushing syndrome (Dodt et al. 2009).

3- Exercise hypertension which is the elevation in blood pressure during exercise. The upper normal systolic values during exercise reach levels between 200-230 mmHg and it may be regarded as a precursor to establish hypertension at rest (Pierdomenico et al, 2009).

4- Pregnancy hypertension which appears in about 2-3% of pregnant women and disappears after delivery. It may continue with some ladies and considered as precursor or indicator for the possibility of developing hypertension in the future (Gibson, 2009).

Also, the American Heart Association (AHA) classified the blood pressure for adults who are 18 years and above into four types as seen the table (2.2): (1) normal blood pressure which is defined as a systolic blood pressure less than 120mmHg and a diastolic blood pressure of less than 80mmHg, (2) systolic blood pressure of 120-139 mm Hg or a diastolic blood pressure of 80-89 mmHg which is known as pre-hypertension or borderline hypertension, (3) hypertension which is defined as systolic blood pressure of ≥140 mmHg or diastolic blood pressure ≥90 mmHg which is divided into two stages; stage one includes those patients with systolic blood pressure 140–159 mmHg or diastolic blood pressure 90–99 mmHg and stage two includes patients with systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥100 mmHg (4) finally, there is isolated systolic hypertension which refers to an elevated systolic pressure to ≥140 mm Hg with normal diastolic pressure which is common in old people.

Table 2.2. Classification of blood pressure according to the AHA.

Classification		SBP (mmHg)	DBP (mmHg)
Normal		90-119	60-79
Pre-Hypertension		120-139	80-89
Hypertension	Stage-1	140-159	90-99
	Stage- 2	≥ 160	≥ 100
Isolated systolic hypertension		≥ 140	< 90
Source: American Heart Association (AHA), 2003.			

SBP: systolic blood pressure, DBP: diastolic blood pressure**.**

Prevalence of hypertension:

Hypertension is one of the most common diseases in the world and its prevalence is increasing by the years because of the increasing life expectancies and the contributing risk factors such as: increasing obesity, physical inactivity, unhealthy diet, and the modern life styles. The World Health Organization (WHO) considers hypertension as the major risk factor for cardiovascular diseases (CVD) which in turn are responsible for around one third of the global deaths each year. In 2002, hypertension was named "the number one killer" by the WHO in its annual report (WHO, 2002). Also, in the year 2000, the WHO estimated the number of patients with hypertension in the world to be 972 million of which 640 million are living in the developing countries and 330 million are living in the developed world. Also, it expected this number to increase and reach 1.2 billion in 2010 and 1.56 billion by the year 2025 (Kearney et al.2005).

Further, high blood pressure affected 20.1% of all Americans who were 20-100 years of age in the years 2002 (NHANES 2002), 32.1% of the British who were 16-100 years of age in 2003 (MoH England, 2003) and 14% of the Australians who were 18-100 years in the year 2005 (AIHW, 2006). In the Eastern Mediterranean Region, the prevalence of hypertension averages 26% and it affects about 125 million individuals (EMRO WHO. 2005). For example, it affected 22.2% of the Jordanians who were 18-100 years in the year 2002 (Jordanian MoH, 2002), 26.7% of the Egyptians who were 15-65 years in 2006 (Egyptian MoH, 2006), 26.1% of the Saudis who were 30-100 years in 2001(SHA. 2001), 28.8% of the Syrians who were 15-65 years in 2002 (Syrian MoH, 2002) and 23.1% of the Lebanese who were 30-100 years in 2005 (Tohme, 2005).

In Palestine, Hypertension is one of the most common non-communicable diseases but there is a lack of studies that assess its prevalence in the general population of the West Bank or Gaza strip. The Palestinian Ministry of Health reported that hypertension was the seventh direct cause of death in the Palestinian territories in the year 2003. Further, it was responsible for 2.58% of the deaths that occurred in 2009 among those who were 20-59 year and for 5.32% of the deaths of those who were 60 years and above. In 2010, it constitutes 3.1% of the total deaths of Palestine (1.4% of those 20-59 years and 4.4% of those who were 60 years and above). Furthermore, it was a major risk factor for the cardiovascular diseases (CVDs) which

are the number one killer in Palestine contributing to 25.4% of the total deaths in 2010 (29.6%of those 20-59 years and 30.9% of those 60 years and above). The cerebrovascular diseases were the second cause of death in the same years counting for 12.1% (6.4% of those 20-59 years and 17% of those 60 years and above). (Palestine MoH. 2010).

Finally, in 2010, the UNRWA in its annual report stated that they had 40424 hypertensive registered patients in their clinics in the West Bank and Gaza (12918 in West Bank & 27506 in Gaza strip) and other 30066 registered patients with hypertension and diabetes (12584 in West Bank & 17482 in Gaza strip) which means a total of 70490 hypertensive patients in Palestine attending the UNRWA clinics. They also have indicated that the prevalence of hypertension among the Palestinian refugees who aged 40 years and over was 15.8% in the West Band and 17.3% in Gaza strip (UNRWA, 2010)

Causes of hypertension:

Usually the exact causes of hypertension are unknown. When the causes are known such as preeclampsia, kidney disease, tumors or certain medicines, it is called secondary hypertension and this constitute only 5-10% of all hypertension cases. For primary hypertension which accounts for 90-95% of all hypertension cases, the exact cause is not known but there are several risk factors that have been highly associated with the condition. These include: smoking, obesity or being overweight, diabetes, sedentary lifestyle, aging…etc. Although these are not causes by themselves, they can increase a person's chances of developing the condition. All these factors are discussed in more detail below. Some well-known causes of secondary hypertension are: (Mayo clinic, 2008)

 (1) Preeclampsia : It is also known as pregnancy-induced hypertension (PIH) or toxemia of pregnancy. It is a condition that can occur during pregnancy and results from a narrowing of the blood vessels. Because of this narrowing, women with this condition can have decreased blood flow to the kidneys, brain, liver, retina, and placenta. Symptoms include high blood pressure, swelling of the hands and face, and protein in the urine (Drife & Magowan, 2004). Preeclampsia affects 5-8% of all pregnancies and women who have PIH are at greater risk for developing hypertension and other coronary artery disease later in life (Sabour et al. 2007)

(2) Pheochromocytoma which is a tumor that most commonly occurs within special cells of the adrenal gland called chromaffin cells. This type of tumor produces too many hormones called catecholamines, which include adrenaline. The high levels of these hormones can cause potential serious complications, including severe high blood pressure, headaches, and sweating (Young, 2007).

(3) Aldosteronism in which the adrenal glands produce too much of the hormone "aldosterone", and one of the main symptoms of aldosteronism is high blood pressure (Young, 2007).

(4) Hyper- and hypothyroidism: in which the thyroid produces an excess amount of its hormones more than the body needs and it is also known as an overactive thyroid or thyrotoxicosis. Excessive thyroid hormone induces systemic vasoconstriction, an increase in blood volume, and an increase in cardiac activity which can lead to hypertension (Klabunde, 2011). Hypothyroidism is a condition in which the thyroid doesn't produce enough hormones to meet the body needs and it causes secondary hypertension. The exact mechanism is not clear but it may be related to decreased tissue metabolism reducing the release of vasodilator metabolites, thereby producing vasoconstriction and increased systemic vascular resistance and hypertension (Stabouli et al. 2010)

(5) Coarctation of the aorta which is a rare hereditary disorder that is one of the most common causes of hypertension in children. This condition is characterized by a narrowing of a segment of the aorta, the main large artery coming from the heart. The aorta delivers blood to the arteries that supply all of the body's organs, including the kidneys. This defect causes hypertension (Mayo Clinic, 2008).

(6) Acromegaly: which is a hormonal disorder that results when the pituitary gland (the gland responsible for regulating several key hormones) produces too much growth hormone. The condition is usually caused by a tumor, and the most common symptoms are the abnormal growth of the hands and feet, fatigue, impaired vision, impotence, and high blood pressure. Its prevalence is about 35%, ranging from 18-60% and the incidence is higher than that in general population (Bondanelli et al. 2001). Also a retrospective study was conducted by

Vitale et al. (2005) in Italy to determine the prevalence and determinant of hypertension in acromegalic patients among 200 patients with acromegaly and 200 nonacromegalic subjects, matched for sex, age, body mass index (BMI) and smoking habits. The finding revealed that hypertension was found in 46% of patients of acromegaly and in 25% of controls (P < 0.0001), without any difference between men and women (Vitale et al. 2005).

(7) Cushing's syndrome: which is a hormonal disorder that occurs when a person's tissues are exposed to an excess of the hormone cortisol. This disease is sometimes called "hypercortisolism.". The symptoms vary, but can include extreme weight gain, excess hair growth, and high blood pressure appears in more than 80% of people with this syndrome (dodt et al. 2009).

(8) Sleep apnea: which is a sleep disorder characterized by interruptions of a person's breathing while he or she is asleep. People who have it will often snore loudly and be sleepy during the daytime. If sleep apnea is untreated, the chances of having high blood pressure, a heart attack, or stroke are increased (Dempsey, 1997; Goodfriend & Calhoun, 2004)

(9) Birth control pills: for millions of women, oral contraceptive pills are an effective way to avoid pregnancy. According to the Centers for Disease Control and Prevention, oral contraceptives are the leading birth control method used by women age 30 and younger (17% of these women use birth control pills). While oral contraceptives are safe, birth control pills can increase the risk for high blood pressure. Users who are older than 35, obese, and/or smoke are generally more at risk. Also, the risk for high blood pressure increases with age and the duration of birth control pill use (O'Brien et al. 2007).

For primary (or essential) high blood pressure which is much more common than secondary and accounts for 90-95% of hypertension, the basic cause is multi-factorial, that is, there are several factors whose combined effects produce hypertension and no single cause has been identified (Carretero & Oparil, 2000). Most people with primary hypertension don't even realize that they have it as the majority of people with this type of high blood pressure feel no different from those who have normal blood pressure. That's why hypertension is often referred to as "the silent killer". Nevertheless, certain risk factors have been recognized in people with essential hypertension (WHO. 2002). For example:

(1) High salt intake: essential hypertension develops more in persons or societies that have a fairly high intake of fat and salt. Salt is responsible for water regulation in the body, it is taken up by the gastro-intestinal tract and excreted by the kidneys and excess fat stick to the inner walls of the blood vessels making them narrower and less elastic (Forrester, 2004; Bachtler, 2009).

 (2) Ethnicity: African Americans have more risk than others in USA to develop hypertension. One explanation is genetic, even though no causative gene has been confidently identified. Environmental and behavioral correlates to ethnicity are alternative explanations (Forrester, 2004; Fejerman, 2006)

 (3) Obesity: the WHO has set an international formula to calculate the body fat contents and put an indicator called body mass index (BMI) to describe that. The body mass index (BMI) equals a person's weight in kilograms (kg) divided by his/her height in meters (m) squared. Since BMI describes body weight relative to height, it is strongly correlated with total body fat content in adults. According to the WHO criteria, the BMI is categorized as follow: (1) underweight when the BMI is below 18.5 kg/m², (2) normal BMI when it lies between 18.5-24.9kg/m², (3) overweight when BMI is 25-29.9kg/m², and (4) obesity is defined as BMI of 30kg/m² or more (WHO, 2011).

Excess weight gain contributes to increased blood pressure in most patients with essential hypertension. Although the mechanisms of obesity hypertension are not fully understood, increased renal sodium re-absorption and impaired pressure natriuresis play key roles (Kevin, 2004; Rahmouni et al. 2005; Hall et al. 2010). Also, the American Obesity Association (AOA) states that the risk of developing hypertension is five to six times greater in obese Americans, age 20 to 45, compared to non-obese individuals of the same age (AOA, 2010).

(4) Family history (genetic susceptibility): Approximately 30% of cases of essential hypertension are attributable to genetic factors. For example, in individuals who have one or two parents with hypertension, high blood pressure is twice as common as in the general population (Winnicki et al. 2006; Luma & Spiotta, 2006; Wang & Sun, 2009).

(5) Aging: as age increases, the risk of hypertension also increases ((Kosugi et al. 2009). Generally the risk increases in stages as the person gets older. Usually men develop hypertension more often between the ages 35-55 years while women develop it more after menopause (Stibich, 2007; Pergola et al. 2011). Hypertension is very prevalent in older (60-79 years) and elderly (>=80 years) people. For example, a population bases survey in Canada found that 21.3% of the overall population of adults aged 20-79 years and 51.6% of those 60-79 years of age had hypertension (Logan, 2011)

(6) Having diabetes: Hypertension affects approximately 70% of patients with diabetes and it is approximately twice as common in persons with diabetes as in those without (Lago et al. 2007).

(7) Smoking: It is the number one risk factor over which we have control. Not only does smoking immediately raise the blood pressure temporarily, but the chemicals in tobacco can damage the lining of the arteries' walls causing endothelial dysfunction and dyslipidemia. Smoking-induced alterations in growth factors, adhesion molecules, and even in genes can accelerate the progression of atherosclerosis which increases the blood pressure. Secondhand smoke can also increase your blood pressure (Tsiara et al. 2003). A prospective cohort conducted by Bowman et al. (2007), including 28,236 individuals and lasted for nearly ten years, revealed that the incidence of hypertension increases among people who smoke 15 or more cigarettes a day (Bowman et al. 2007).

(8) Excessive alcohol consumption: Epidemiological studies have demonstrated a positive relationship between heavy alcohol use and hypertension. For example, a study conducted by Stranges et al. (2004) to investigate the association of current alcohol consumption and aspects of drinking pattern with hypertension risk in a sample of 2609 white men and women from western New York, aged 35 to 80 years, and free from other cardiovascular diseases. Hypertension was defined by systolic blood pressure $\geq$140 mm Hg or diastolic blood pressure $\geq$90 mm Hg or use of antihypertensive medication. Odds ratios (95% confidence intervals) were computed after adjustment for several covariates. The findings of this study showed that compared with lifetime abstainers, participants reporting drinking on a daily basis (OR, 1.75; 95%CI; 1.13 - 2.72) or mostly without food (OR, 1.64; 95%CI; 1.08-2.51) exhibited

significantly higher risk of hypertension independent of the amount of alcohol consumed (Stranges et al. 2004).

(9) Prolonged and poorly managed stress and potassium deficiency increases the risk of developing high blood pressure (Tsigos, 2006)

(10) A lack of exercise and sedentary life style increases the risk of being overweight and hence increases the risk of developing hypertension. Also people who are inactive tend to have higher heart rates (Pickering, 2003). For example, a cross sectional study was conducted by Guo et al (2001) in Hangzhou, China to study the compliance of antihypertensive drugs and its related factors in inpatients and outpatients with hypertension. Also it aimed to investigate the utilization of antihypertensive medicament and to explore the difference of the blood pressure control between the compliant and incompliant groups. In this study, the findings revealed that the main risk factors of the hypertensive patients were in the order as: disorder of lipo-metabolism, smoking, left ventricular hypertrophy (LVH), and diabetes mellitus (Guo et. al. 2001).

Possible complications of hypertension

The complication in medicine is defined as "an unfavorable evolution of a disease or a health condition as a result of another disease or a medical treatment. The disease can become worse in its severity, show a higher number of signs and symptoms, show new pathological changes, or become widespread throughout the body and affect other organ systems. A medical treatment such as drugs or surgery may produce adverse effects and/or produce new health problem(s) by itself or a new disease may also appear as a complication to a previous existing disease" (Dorland Medical Dictionary, 1998).

As mentioned previously, hypertension is one of the risk factors for other cardiovascular diseases in the developed and developing countries as well (Chobanian et al. 2003). Its complications are numerous and life threatening. The speed and severity of appearance of these complications are influenced by many factors such as: genetics, dietary habits and the general life style. Patients who are aware of their medical condition and take the preventive measures seriously may have better control over their blood pressure and minimize and delay

its complications (Safar et al, 2009 & Gaddam et al, 2009). The complications of hypertension may affect many organs in the body such as: the heart, the kidneys, the brain…etc.

Globally, hypertension is one of the major risk factors for the death (Chobanian et al. 2003). For example, 62% of cardiovascular diseases and 49% of the ischemic heart diseases are attributable to high blood pressure. The WHO estimated that hypertension caused 7.1 million deaths, about 13% of the total, contributing by 4.5% to the global disease burden that is 64 million disability adjusted years (DALYs) (WHO/ISH, 2003). In 2009, the WHO indicated that the risk of myocardial infarction (MI) is doubled in patients with hypertension compared to normal people and the risk increases as blood pressure level increases. It also estimated hypertension to cause 12.8% of the premature deaths (WHO, 2009). According to the WHO report, hypertension had killed "135000" Americans, "179000" in Europe, "97000" in the Middle East, "60000" in Africa, "152000" in South Asia and "284000" individuals in the Western Pacific region in the year 2004 and the number is increasing with years.(WHO, 2010).

For example, a meta-analysis carried out by Munger et al. (2007) to examine the prevalence of non-adherence as a risk factor in the management of chronic diseases, with a specific focus on antihypertensive medications, factors leading to increased incidence of non-adherence and the strategies needed to improve adherence. The findings of this meta-analysis revealed that patients with hypertension are at greater risk of stroke, end-stage renal failure, and heart disease and that hypertension contributes to the prevalence of other cardiovascular risk factors (Munger et. al. 2007).

Further, the effects of hypertension on the heart can cause many diseases such as myocardial infarction (or heart attack) whose risk is doubled in hypertensive patients (WHO, 2009), heart failure which is manifested by the inability of the heart to pump the blood to the different parts of the body adequately (Pedrinelli et al.2009), and left ventricular hypertrophy (LVH) (Levy et. al. 1994).

On blood vessels, hypertension increases the hardness of the blood arteries causing a condition known as arteriosclerosis (Riccioni, 2009). It is also the most modifiable risk factor

for stroke or cerebrovascular accident (CVA), a condition in which the brain losses some of its functions as a result of a shortage of blood supply either due the blockage of some artery (clot) or due to leakage of blood (hemorrhagic) (Donnan et. al. 2008).

Also, uncontrolled hypertension is associated with increased risk of incident of HF and that the risk was significant only for those with SBP ≥160 mmHg. Uncontrolled hypertension was also associated with increased risk of other cardiovascular morbidity and mortality. For example, a prospective cohort study was conducted by Iyer et al (2010) in USA to assess the effect of uncontrolled BP on the incident of heart failure (HF) in a propensity-matched cohort of cardiovascular health study (CHS) community-dwelling participants with a history of hypertension and without HF at baseline in old adults (≥ 65 years). This cohort study included 1021 pairs of participants with controlled and uncontrolled hypertension who were recruited from four US counties and from four states and were balanced on 31 baseline characteristics. The participants were picked from 5795 cardiovascular health study participants, ≥ 65years, of which 2562 with self-reported physician diagnosed hypertension with no heart failure (HF) at baseline of whom 1391 had uncontrolled hypertension (defined as SBP ≥ 140 or DBP ≥ 90 mmHg). At the beginning, BP was measured using a sphygmomanometer and the average of two readings was used. The findings of this study revealed that new-onset HF developed in 23% and 26% of participants with controlled and uncontrolled hypertension respectively with a hazard ratio (HR) of 1.39 (95%CI,1.12-1.73;P=0.003) associated with uncontrolled hypertension. Also, all-cause mortality occurred in 44% and 48% of participants with controlled and uncontrolled hypertension respectively, with hazard ratio of 1.21 (95% CI; 1.04-1.41; P=0.014) associated with uncontrolled hypertension. The dose-response association between the uncontrolled hypertension and the incident HF occurred in 22%, 23% and 31% of matched patients with SBP <140 mmHg, 140-159 mmHg and ≥160 mmHg respectively. Compared with SBP <140 mmHg, hazard ratios for incident HF associated with SBP 140-159 mmHg and ≥160 mmHg were 1.06 (95% CI, 0.86-1.31; P=0.572) and 1.58 (95% CI; 1.27-1.96; P<0.0001) respectively (Iyer et al. 2010).

Finally, hypertension also exerts its effects on the small blood vessels of the retina which is the lining of the inner surface of the eye causing a condition known as hypertensive

retinopathy which might be asymptomatic for a long period of time or be manifested as visual disturbances and headache. It is used as a sign of accelerated or sever hypertension (Rodríguez & Zurutuza, 2008). Furthermore, hypertension affects and damages the nephrons (building blocks) of the kidneys leading to a chronic renal disease named as hypertensive nephropathy or hypertensive nephroscelerosis. The effects of hypertension on the human kidneys can be identified by some laboratory tests such as blood urea nitrogen, serum creatinine, serum electrolytes and urinalysis particularly for proteinuria (Ruilope et. al. 2001)

Treatment of hypertension

The ultimate goal of treatment of hypertension is to reduce the blood pressure as much as possible toward the optimal level (≤120/80mmhg) so that the patient has a lower risk of complications**.** For the hypertensive patients who are on medication treatment, the World Health Organization (WHO) has set the goal of treatment to get a blood pressure level of less than 140/90 mmHg for those with no co-morbidity (Chobanian et. al. 2003) and a blood pressure level of less than 130/80 mm Hg if the patient suffers from chronic kidney disease (National Kidney Foundation Guideline, 2002) or if he is diabetic (American Diabetes Association, 2003).

The stages of the treatment of hypertension depend on the stage of the disease and the presence of other chronic diseases such as diabetes mellitus or kidneys insufficiency. But in general, in the pre-hypertension stage (SBP: 120-139 & DBP: 80-89) the same preventive life style modifications that are recommended for the general population are applied. These measure may include: dietary changes such as consuming less salty foods, quitting smoking, and limiting alcohol intake which have been proved effective in reducing blood pressure (Blumenthal et. al. 2010) (Pubbey et. al. 1992). Physical exercise also improves the blood flow through the arteries and reduces the blood pressure (Elley & Arroll, 2002). The most important segment of the life style changes is the reduction of body weight as more than 80% of hypertensive patients are those with body mass index (BMI) of more than 25 (Haslam & James, 2005).

After applying all the possible adaptive measure, if the blood pressure remains above the targeted level, the pharmacological (drug) therapy may be started. In some instances such as the presence of other chronic co-morbidities or if the patient shows up with more advanced stage of hypertension in which its complications already appeared, the medication treatment should be started directly in conjunction with the life style changes (Chobanian et al. 2003).

As mentioned above, the start of the medication therapy should not depend solely on the values of blood pressure ≥140/90, but also should take into account the patients risk of developing other diseases associated with hypertension such as cardiovascular and cerebro-vascular diseases or the presence of current end-organ damage. When the decision of the drug therapy is taken, the choice of particular antihypertensive drug(s) for treatment should be done carefully taking into consideration the patient's age, possible interactions with other drugs that the patient is taking for other conditions and the cost and adherence to treatment (Mark, 2010).

Nowadays there are many effective antihypertensive agents in the market and they belong to different classes and work by different mechanisms. Therefore, the choice of drug therapy should be based primarily on evidence from the clinical trials that document satisfying reduction in blood pressure and of cardiovascular and renal disease risks by reversing the targeted organ damage done by hypertension as well and be suited with the individual characteristics (age & race) and co-morbidities of each patient. As there is no single drug or class of drugs that have all these effects together, the medical practitioners often use combinations of different drugs to treat hypertension (ESH/ESC, 2003).

There are the different classes of the antihypertensive agents such as: (EMRO, 2005)

1- Diuretics: the drugs of this class work in the kidneys and make them excrete more water and sodium from the body that's why they are sometimes called "water pills". Examples of diuretics are Hydrochlorothiazide and Furosemide.

2- Beta-blockers: these drugs reduce the nerve impulses to the heart and blood vessels, this makes the heart beat slower and with less force. Blood pressure drops and the heart woks less hard, an example of this category is Atenolol.

3- Angiotensin converting enzyme inhibitors: ACE-inhibitors prevent the formation of a hormone known as angiotensin which is a natural chemical that narrows the blood vessels. The ACE inhibitors cause the blood vessels to relax and the BP is reduced. A well known example of these agents is the drug Enalapril.

4- Angiotensin II receptor blockers: these medications help relax the blood vessels by blocking the action but not the formation of the hormone "angiotensin" that narrows blood vessels such as Losartan.

5- Renin inhibitors: which slow down the production of "Renin" which is an enzyme produced by the kidneys that starts a chain of chemical reactions that increases blood pressure such as Aliskiren.

6- Calcium channel blockers: (CCBs) which work on the calcium channels in the smooth muscles of the blood vessels and the heart. The vessels relax and become wider and the blood pressure goes down. Amlodipine is an example of this category.

7- Alpha-blockers: these drugs reduce the nerve impulses to the blood vessels, thereby reducing the effects of the natural chemicals that narrow the blood vessels such as Doxazocin.

8- Alpha-Beta blockers: they act by both mechanisms of alpha and beta blocker such as Carvedilol. They reduce the nerve impulses to the blood vessels and slow the heart beat to reduce the amount of blood that is pumped with each beat.

9- Centrally-acting agents: these medications prevent the brain from signaling the nervous system to increase the heart rate and narrow the blood vessels. Methyldopa is the example of this class of drugs.

10- Vasodilatators: which act directly on the smooth muscles of the blood vessels causing them to relax and the blood pressure goes down. Isosorbide mono-nitrate and Isosorbide di-nitrate are two examples.

Despite the availability of effective antihypertensive agents and the wide experience of medical professionals in the treatment of hypertension, it is still one of the leading causes of death worldwide and a major risk factor for cardiovascular morbidity and mortality (Chobanian et al. 2003). Many studies in the USA and Europe indicated that patients with well-controlled blood pressure represent only a small fraction of the hypertensive population. For example, Lioyd-Jones et al. (2002) in USA, conducted a prospective analysis of the cross sectional national data in which he included all Framingham Heart Study subjects examined between 1987-1999 who had untreated or uncontrolled hypertension (SBP $\geq$140 or DBP $\geq$90 mmHg). The results indicated that out of 2475 hypertensive participants who were uncontrolled (treated or untreated) at baseline, only 988 (39.9%) were controlled at follow up. Another study conducted by Hajjar (2003) in USA, to analyze and compare the results of the NHANES survey conducted in 1999-2000 (n=5448) with the two phases of NHANES III conducted in 1988-1991 (n=9901) and 1991-1994 (n=9717). Only those individuals who were 18 years and above were included in this analysis. The results revealed that hypertension was controlled in only 31% of the patients. Similar findings were found by Wang (2004) who conducted a cross-sectional analysis of a representative data collected from 4805 adults aged 18 years and over who were surveyed in 1999-2000 NHANES. The results showed that hypertension was controlled only in 31 % of the hypertensive patients.

Such a failure in the control of hypertension has been largely attributed to poor compliance with long-term antihypertensive medication. For example, Schroeder et al (2004) had performed a systemic review of randomized controlled trials in which he searched for all-language publications in the Cochrane Controlled Trials Register, MEDLINE, EMBASE, and CINAHL in April 2002. He included 38 studies testing 58 different interventions and containing data on 15519 patients. These studies were conducted in 9 countries between 1975-2000. They concluded that the lack of adherence to the antihypertensive medications was the major reason for poor control of hypertension. As well, Krousel-Wood et al. (2004)

conducted a meta-analysis of many studies that dealt with hypertension treatment aspects. The results of the meta-analysis showed that adherence to antihypertensive treatment is a complex but important factor in achieving blood pressure control and reducing the risk of cardiovascular diseases. Also it reported that approximately 50% of hypertensive patients adhere to their prescribed medications and less than one third of them have controlled blood pressure. The next section discusses compliance in more details.

2.3. Section three: Compliance/ Adherence to treatment

Compliance and adherence are synonyms and have been defined as "the extent to which a person's behavior coincides with the medical instructions" (Haynes, 1979). However, the WHO stated that this definition is not sufficient as the term "medical" does not cover all the intervention techniques used in the treatment of chronic diseases and the term "instructions" implies that the patient is a passive recipient of expert advice as opposed to an active partner in the treatment process (WHO, 2001). The WHO re-defined adherence as "the extent to which a person's behavior – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider" (Sabaté, 2003).

The WHO believed that the compliance rate with the long term treatment of chronic diseases averages 50% in the developed countries and much less than that in the developing countries because of the differences in health resources and inequity in access to health care (WHO. 2003). Many studies have been conducted worldwide among chronically diseased patients such as hypertension to assess their compliance rates with their treatment. For example, it was found that only 51% of the hypertensive patients in USA and 66% in France appeared to be compliant with their prescribed treatment (Munger, 2000: Girerd et al. 2001).

In Finland, a cross sectional study was conducted by Jokisalo et al (2002) in the primary health care centers to study the factors that were related to the health care system as well as the patients self-reported non-compliance with their antihypertensive medications. In this study 30 PHC centers were randomly selected out of 250 health centers and 2219 patients

were contacted and 1782 (80%) agreed to participate and filled in and returned the self-reported questionnaire. The results of this study revealed that 14% of males and 13% of females reported non-compliance with the antihypertensive medication. The prevalence rates of reported non-compliance for men were as follow in different age groups: 17% (<55 years), 18 %(55-64 years), 9% (65-74 years) and 13% (≥75 years) and the respective prevalence rates for women were 15%, 17%, 13% and 9% (Jokisalo et al.2002).

Also, a prospective case control study was conducted by Nuesch et al. (1997) in Switzerland to compare the compliance with treatment among patients with hypertension responsive to treatment versus patients with treatment resistant hypertension. About 5000 new patients have been seen and about 20000 patient visits have occurred in this hospital each year over the previous five years of this study. All the patients who were in the department during May to December 1997 were systemically and prospectively screened for inclusion into the study irrespective of the reason of the admission. 110 hypertensive patients who were taking stable treatment with at least two antihypertensive drugs for at least four weeks were included in the study. A questionnaire was filled out by the treating resident for each participant after taking their written consent. The patient was defined as having hypertension if his BP was >140/90 mmHg if he aged ≤60years or >160/90 mm Hg if aged > 60 years or if he was taking antihypertensive drugs and had a history of arterial hypertension. BP level was considered within the normal range if the mean daytime SBP was <135 mmHg and DBP <85mmHg. The patients whose daytime mean BP was normal at the beginning of the study were defined as responsive to treatment (control group), while those with BP above the normal range were defined as non-responsive. The compliance of the patients with their treatment was monitored over four weeks using a medical event monitoring system (MEMS) in which the drugs were supplied in two containers which allow electronic recording of cap openings and closures and at the end of the observation period. The researchers calculated the mean percentage of the prescribed doses removed from the MEMS devices and considered patients whose values were ≥80% as compliant. The final results of this study revealed that complete data were available for 103 patients (5 patient were lost on follow up) of whom 86 (83.5%) took ≥85% of their prescribed doses (compliant) and 17 (16.5%) took <85% (non-compliant) (Nuesch et. al. 2001).

Another cross-sectional study was conducted by Guenette et al. (2005) in the Quebec City area, Canada, from May 2001 to June 2002 to assess the level of agreement between self reported adherence with prescribed drug and a measure of adherence based on pharmacy data. In this study, 17 pharmacists from 17 different pharmacies were recruited for the study and in each pharmacy, the clients were selected randomly from a computerized list of people aged 65 years or more who had filled drugs at least four times until one day before the list was printed. A total of 514 individuals aged ≥ 65 years were approached to participate in this study. Of these, 379 met the inclusion criteria and 189 (48.6%) agreed to participate. So 189 individuals (52males & 137females) and 880 drugs were included in this study. Data collection took place by interviewing the participants in their homes. The interview included a test to identify those having cognitive impairment (Katzman validated instrument). The findings of the study showed that 90 individuals (48%) of the self reported participants were adherent to their treatment (63.5%males and 41.6%females) whereas 95 individuals (50%) were adherent to their treatment according to the pharmacy records (59.6%males and 46.7 females). Also self-reported individuals were adherent to 81% of the drugs, while the pharmacy records showed adherence for 83% of the drugs (Guenette et al, 2005).

In Greece, one observational cross sectional study was conducted by Eugenia et al. (2005) from January 1997 to December 1999 to compare rates of blood pressure control with the level of adherence to anti-hypertensive treatment. The patients in this study were interviewed by the same doctor using pre-coded questionnaire and data were obtained in the first two days after admission and prior to surgery. The inclusion criteria included awareness of hypertension and hypertensive medications and those aged more than 80 years as well as those with acute disease, mental disorders or evidence of malignancy were excluded from the study. From 1380 initially judged eligible, 1000 (55% men and 45% women) were finally included in the study. After the participants had filled the questionnaire, three sitting BP measurements were taken in the right arm with a pre-tested mercury sphygmomanometer two minutes apart. The average of the three readings was used as the BP level and hypertension was regarded controlled if the average reading was less than 140/90 mmHg. The findings of this study revealed that only 15% of the participants had compliance (95% CI, 12-17) and

uncontrolled BP was significantly more common among non-compliant hypertensive patients (Eugenia et al. 2005).

Further, a cross sectional study was conducted by Guo et al (2001) in Hangzhou, China to study the compliance of antihypertensive drugs and its related factors in inpatients and outpatients with hypertension. Also it aimed to investigate the utilization of antihypertensive medicament and to explore the difference of the blood pressure control between the compliant and incompliant groups. In this study, the clinical data of 816 inpatients and 497 outpatients of Sir Run Run Shaw Hospital of Zhejiang University were reviewed. The findings of this study revealed that compliance rate was 63.4% among the inpatients, 77.3% when being discharged and 43.7% among the outpatients (Guo et. al. 2001).

In addition, a population based cross-sectional survey of cardiovascular risk factors was conducted by Bovet et al. (1994) in the Seychelles. In this survey, a random age and sex stratified sample of the residents aged 25-64 years was drawn from the entire population of Mahe using a computerized census data. Of the 1226 eligible subjects, 1067 participated in the study (504 men and 563 women) with an overall 87% participation rate. Of these 1067 participants, 161 had BP readings ≥ 160/95 mm Hg at the time of the survey and 155 of them participated in further checks of whom 50 participants (33 males and 17 females, aged 35.9-58.6 years) had BP ≥ 160/95 mm Hg at their third visit. These 50 participants were put on a daily one-pill regimen of hypertension treatment for one year and the medications were supplied to them in small bottles with a cap containing a microelectronic chip that recorded the date and time the bottle was opened. The satisfactory compliance was defined as taking the medication on 6-7 days a week on average which corresponds to a mean compliance level of ≥86%. The findings of this study showed that 46% of the new hypertensive patients achieved satisfactory compliance and only 26% of them achieved this level over the twelve month period (Bovet et al, 2002).

In Africa, a cross-sectional study was conducted by Van Der Sande (2000) in the capital Banjun and the rural areas around Farafenni, Gambia to explore the blood pressure patterns and the cardiovascular risk factors in the rural and urban communities of Gambia. The

findings of this study revealed that the overall compliance with treatment was as low as 27% and the researcher recommended interventions to modify the risk factors of hypertension at the population level and to improve control of diagnosed hypertension to prevent future increase in cardiovascular morbidity and mortality (Van Der Sande, 2000).

In Arab countries, a cross-sectional study was carried out by Al-Swielem and Elzubair (1998) in Saudi Arabia to investigate the compliance of hypertensive patients and their knowledge and misconceptions about hypertension in a primary health care setting. In this study, four primary health care centers were randomly selected from a total of 10 centers serving the city population. All patients with primary hypertension for at least one year and who were registered in those selected centers were included in the study. 190 hypertensive patients (139 females and 51 males) attending those clinics were eligible for participation in the study. The mean age was 49.9 +- 11.7 years. The Saudi nationals constituted 72.6% of the participants and the overall BMI was 30.04 +- 5.64: 27.6 +- 3.98 for males and 30.8 +-5.96 for females. The mean duration of hypertension was 7.03 +-6.23 years. The data were collected by trained interviewer using a structured questionnaire. The findings of this study revealed that 34.2% of the participants were compliant with treatment when assessed according to the therapeutic outcome; while, the self-reported method revealed that 74.7% of the participants were compliant (Al-Swielem & Elzubair, 1998).

Finally, a cross-sectional study was conducted by Elzubair (1997) in Sudan to assess the hypertensive patients' drug compliance, the factors associated to compliance, status of BP control and the occurrence of complications. This study included 198 hypertensive patients (76.3% females and 23.7% males) who were registered at and attended the Department of Medicine, Kassala Teaching Hospital. The data were collected using a structured questionnaire and included information about the patients' sex, age, education, and information regarding the aspects of treatment such as disease duration, treatment duration, number of antihypertensive drugs, drugs regimen and the source of drugs. The presence of complications was documented by the presence of symptoms of cardiovascular, neurological or renal complications. The overall mean age of participants was 53.03 +-11.2 years for males and 56.1 +-11.1 years for females. About two thirds (61.6%) of the participants had some

education while the rest were illiterate. Each patient was ordered a three-weeks supply of anti-hypertensive pills and was requested to return the remaining pill container after two weeks without telling them the reason for supplying them that particular number of pills. On return, the remaining pills were counted and the compliance rate was calculated as a percentage of the used pills to the total prescribed pills. The findings of the study showed that the compliance rate was 59.6% (n=118) as measured by the pill-count method. It was found that 92% of the compliant patients had controlled BP compared to 18% of the un-compliant patients and 30.1% of the compliant patients had complications in comparison with 46.3% of the un-compliant participants (Elzubair et al, 2000).

Factors that affect the compliance of hypertensive patients

Patients' compliance with their antihypertensive treatments is a complex but important factor in achieving blood pressure control and reducing adverse cardiovascular outcomes, health care costs and increased morbidity and mortality. Several studies have shown the importance of patient's adherence and have outlined factors that affect patient compliance with prescribed therapy (Krousel-Wood et al. 2004). The patient's noncompliance with treatment may occur through a variety of mechanisms and manifested by behavior patterns such as delay in acquiring medical care, avoiding community preventive programs, appointment irregularity, medication failure and resisting or not maintaining the prescribed therapeutic regimen. Further, the patient's compliance with his/her treatment is influenced by many factors such as: the awareness of the disease health education, clarity of written instructions for taking medications, complexity of treatment schedule, family support, patient's perception of his/her medical condition, the cost of treatment plan and the physician-patient relationship (Mahender et al, 1978). Several studies have been conducted to assess these factors including systemic reviews in many countries and they examined more than one factor.

For example, a systematic review of literature was done by Jin et al. (2008) to identify the most common factors that affect non-compliance from the patient's perspective. The researchers searched through the Medline database from 1970 to 2005. Only English-language journal articles with abstracts were included. The populations were adolescents aged

13-18 years and adults aged 19 years and older. The identified articles were retrieved manually to select original articles which focused on the topics of interest. A total of 2095 articles that evaluated the factors contributing to therapeutic non-compliance were identified. Out of these articles 102 articles have met the inclusion and exclusion criteria and hence were selected and used in the review. The factors that were identified from these reviews were categorized as following: patient-centered factors, therapy-related factors, healthcare system factors, social and economic factors, and disease factors. A large proportion of the retrieved studies suggested that the elderly people might have higher compliance and that the trend of compliance increase with the increasing age. Regarding race, 16 studies were retrieved and findings indicated that the Caucasians were believed to have good compliance, while African-Americans, Hispanics and other minorities were found to have poor compliance. Also, 22 studies related to gender revealed contradictory results and the researcher concluded that gender may not be a good predictor of non-compliance. The effect of educational level on non-compliance was assessed after reviewing 13 articles which focused on the impact of educational level and several studies found that patients with higher educational level might have higher compliance while some studies found no association. The marital status (being married) was positively associated with patient's medication compliance but some recent studies found no effect. The patient's beliefs and motivation about therapy were the focus of 23 studies and the findings of these studies revealed that it was strongly related to their compliance, while 15 studies showed an association between the patient's negative attitude towards therapy and their compliance. Further, 17 articles evaluated the effect of the patient-prescriber relationship to the patient's compliance and concluded that a healthy relationship based on patients trust in the prescriber and prescriber support, empathy, and respect to the patient gave rise to good compliance. Regarding the health literacy, patients with low health literacy were reported to be less compliant with their therapy. The patients' knowledge about their disease and treatment was not always adequate. The researcher concluded that patient's education and counseling about medications were very useful strategies in improving the patient's compliance. Several studies about compliance among patients with asthma, hypertension and renal transplantation found that patients who smoked or drank alcohol were more likely to be non-compliant. This review also revealed that compliance did not correlate with the number of drugs prescribed, but with the number of dosing times every day of all

prescribed drugs and that the rate of compliance decreased as the number of daily doses increased. The duration of treatment period also affected the compliance, as acute illnesses are associated with higher compliance than chronic diseases. Also the duration of treatments that lasts for several months had adverse effect on the patient's compliance. However, some studies found that the longer duration of the disease resulted in good compliance. The cost of therapy was a crucial issue in the patient's compliance and some studies found that patients who had no insurance cover or had no income were more likely to be non-compliant to their treatment. Moreover, the general findings from these articles showed that patients who had emotional support and help from family members, friends or healthcare providers were more likely to be compliant to the treatment. Finally, the main factors identified relating to the healthcare system include the availability and the accessibility to healthcare, long waiting time during the clinic visits, difficulty in getting prescriptions filled, and the patients general satisfaction with the clinic visit contributed to poor compliance (Jin et al. 2008).

Another meta-analysis carried out in USA by Munger et al. (2007) to examine the prevalence of non-adherence as a risk factor in the management of chronic diseases, with a specific focus on antihypertensive medications. Also it aimed to identify the factors leading to increased incidence of non-adherence and the strategies needed to improve adherence. Regarding the factors affecting adherence, the findings showed that only 20% of the old patient (≥65years) exhibit good adherence (defined as ≥80% of days that patient has antihypertensive drugs available) and that blood pressure becomes more difficult to control with increasing age. Also taking more than one antihypertensive drug decreases the patient's willingness or ability to comply with the overall regimen and the patient 's adherence with the antihypertensive agents was consistently lower in patients with another chronic conditions such as asthma, chronic obstructive pulmonary disease, depression, gastrointestinal disorders, and osteoarthritis. Regarding the effects of race and gender; African American (AA) were found to be less compliant with their hypertensive medications when compared to Hispanics and Whites and women exhibited more non-adherence than men. The adverse effects of antihypertensive medications lead to increase adherence interruptions. Also, the findings revealed that adherence was poorer in patients receiving poly-pharmacy and that the drugs cost was a barrier to adherence with therapy. The researcher suggested some strategies to improve adherence. For example, the proper selection of antihypertensive agents with a good

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tolerability profile and least side effects, the use of long-acting drugs to minimize dosing frequency, the use of complex interventions that include patient's education and motivational approaches, the use of improved methods for monitoring adherence and the development of new drugs with improved characteristics such as symptoms reduction, tolerability and dosing schedule (Munger et al.2007).

Moreover, a prospective cohort study was conducted by Kressin et al. (2001) in the USA to explore the associations between the patients' race, self-reported experiences with clinicians, attitudes and beliefs about hypertension, and ultimately, medication adherence among a sample of hypertensive patients with no racial disparities in BP control. The study recruited 793 white and African-American patients previously diagnosed with hypertension from three medical centers and the patients were provided with informed consent. The original study population was 11731 hypertensive patients and after a 14-month period of tracking them as they presented for care, 1210 were approached to participate in the study. 203 were excluded for different reasons and 214 refused to participate in the study, thus 793 patients were included in the final cohort (78.7% response rate). The researchers assessed three primary domains of interest that were (1) patient experience with the provider (2) patient characteristics and (3) antihypertensive medication adherence. All analyses were conducted using SAS 9.1.3 software. The results of this study revealed that less than half of the study participants had controlled BP indicating a room for improvement in BP care. Also, the patients' beliefs appeared to be significantly associated with BP medication adherence. African-American and White patients were equally likely to have a blood pressure greater than 140/90 mm Hg (54% vs. 57%, p=.41) and the adherent patients were 1.5 times more likely to have controlled BP than non-adherent patients after controlling for co-morbidities, BMI, age, and site of care (p=.0433). African Americans (AA) reported that their providers were more active in counseling and advising them about BP and how important were their medications. There were some similarities in perception about BP medications and the differences between races were not statistically significant in this regard. African Americans were less adherent on 3 of the 6 single items assessing adherence, more likely to stop medication when one feels worse, not taking medications on purpose, and forgetting to take medications (Kressin et al. 2007).

Further, in UK, a meta-analysis was conducted by Schroeder et al. (2002) at the University of Bristol including randomized controlled trials and it searched for all language publications in the Cochrane Controlled Trials Register, MEDLINE, EMBASE, and CINAHL in April 2002. This review included 38 studies testing 58 different interventions and containing data on 15519 patients. The studies were conducted in 9 countries between 1975 and 2000 and the duration of follow-up ranged from 2 to 60 months. The findings of these studies showed that reducing the number of daily doses appeared to be effective in increasing adherence to blood pressure and it lowered medication with a relative increase in adherence of 8% to 19.6%. Motivational strategies were partly successful in 10 of 24 studies with increase of adherence of about 23%. Complex interventions with more than one technique increased adherence in 8 of 18 studies ranging from 5% to a maximum of 41%. The patients' education alone seemed largely unsuccessful (Schroeder et. al. 2004).

In Finland a cross sectional study was conducted by Jokisalo et al (2002) in the primary health care centers to assess the factors that affect the compliance of patients with their antihypertensive medications. In this study 30 PHC centers were randomly selected out of 250 health centers and 26 health centers with a total of 255 general practitioners agreed to participate in the study. 2219 patients were contacted and 1782 (80%) agreed to participate and filled in and returned the self-reported questionnaire. Later on, one patient was excluded because of missing data and 220 were excluded from the analysis because they were not currently using any antihypertensive medication. Thus the final study population consisted of 1561 patients and 615 (39.4%) were men and 946 (60.6%) were women with a mean age of 64.2 +- 11.4 years. The mean SBP was 152.8 mmHg +- 19.9 and the mean DBP was 88.2 mmHg +- 10.1. Also, 20% of men and 21% of the women had their blood pressure under 140/90 mmHg. The mean number of antihypertensive drugs was 1.6 +- 0.7 and half of the patients were on one drug only. The researchers used a self-reported questionnaire which consisted of 82 items about lifestyle, the health care system, medications, BP measurement and the patients' experience related to the treatment of hypertension. The original questions were answered on a 5-point likert scale (1= absolutely agree, 2=somewhat agree, 3=somewhat disagree, 4=absolutely disagree and 5= does not concern me). The blood pressure was measured by trained nurses twice after 15 minutes of rest in the sitting position using a

mercury sphygmomanometer. The results of this study revealed that the majority of patients (88%) reported having one or more health care system related problems and 92% reported having patient-related problems. Those with system-related problems were four times more likely to be non-compliant and those with patient-related problems were over two times more likely to be non-compliant. The patients who had experienced adverse drug effects were significantly more likely to be non-compliant (17%) than those without adverse drug effects (11%). Also, in patients group using two drugs, non-compliance was less prevalent among the more highly educated than among the less educated (OR: 0.5, 95% CI: 0.26-0.98). Further, among the patients with higher education, non-compliance was less prevalent in the group with two drugs than in that with one drug (OR: 0.47, 95% CI: 0.23-0.97) (Jokisalo et al.2002).

Also, in Canada, a post hoc exploratory analysis was conducted by Sigrid et al. (2011) as a subset to the Simplified Therapeutic Intervention to Control Hypertension (STITCH) study. STITCH was a cluster randomized controlled trial of hypertension management conducted in southwestern Ontario between 2005 and 2007 to assess the determinants of BP control. Data were collected in 45 general practices which enrolled patients with uncontrolled hypertension each enrolling up to 50 patients with uncontrolled hypertension. Antihypertensive medication changes throughout a 6-month follow-up period were documented. The eligibility criteria for participating in this study were as follow: men or women, 18 years or older, had uncontrolled hypertension (defined as SBP≥140 mmHg or DBP ≥90 mmHg for patients without diabetes and SBP≥130 mmHg or DBP≥80 mmHg for patients with diabetes), with no history of ischemic heart disease, atrial fibrillation, peripheral vascular disease, stroke or chronic kidney disease of final stages. The analysis included 2030 patients and the results of this study had identified many factors that contribute to poor BP control. These factors included systemic health care delivery factors, financial consideration (both for the patient as well for the health care system), the number of drugs prescribed, the low use of single-pill combinations, and a number of factors related to the patient's behaviors reflected by measures of adherence to antihypertensive prescriptions. It also revealed that patients with diabetes and hypertension(co-morbidity) demonstrated the lowest rates of BP control as only 35% of these patients had BP below the recommended target for them (130/80 mmHg) as compared to

66% control in the general hypertensive population whose target was 140/90 mm Hg (Sigrid et al. 2011).

Furthermore, in Greece, an observational cross sectional study was conducted by Eugenia et al. from January 1997 to December 1999 to compare rates of blood pressure control with the level of adherence to anti-hypertensive treatment and factors influencing compliance in Greek patients. From 1380 initially judged eligible, 1000 (55% men and 45% women) were finally included in the study. The findings of the study revealed that compliance was more common among those aged <60 years (22.3% vs 3.8% of those over 60, p=0.005), those living in city and those with better level of education. Compliance was also better among those followed by private doctor and the difference was attributed to the effect of counseling which was frequently provided by private doctors. Compliance was also more common among those taking single dose per day and those who never changed their antihypertensive regimen (Eugenia et. al. 2005).

In addition, in Portugal, a cross-sectional study was conducted by Morgado et al. (2010) to assess the factors associated with poor blood pressure control in Portuguese hypertensive population. The study was conducted in hypertension outpatient clinic in the university teaching hospital of Cova da Beira Hospital Center in the Eastern Central Region of Portugal. All the patients who attended the clinic from July to September 2009 were requested to participate in a structured interview including demographic data, medication adherence, knowledge about hypertension and its risks, indications of antihypertensive medications and the presence of drugs side effects. The inclusion was for all patients who were 18 years and over with diagnosis of hypertension and on medication for at least 6 months. The exclusion criteria were dementia, pregnancy, and breast feeding. A total of 197 (out of 222 attended the clinic) (89%) patients meeting the inclusion criteria and consenting to participate completed the interview. The statistical analysis of the study variables was conducted using SPSS for Windows, version 17.0. The overall mean age of the included participants was 60+-12 years and 40.1% were males and 59.9% were females. The findings showed that the predictors of medication non-adherence were: unawareness of target BP values (OR, 3.7, P<0.001), a report of drugs side effects (OR=3.7, P<0.002), lack of BP monitoring (OR= 2.5, P=0.015)

and unawareness of medication indications (OR= 2.4, P=0.021), and the hypertension risks (OR=2.1, P=0.026) (Morgado et al. 2010).

As well, in China, one study was conducted by Guo et al (2001) to study the compliance with antihypertensive drugs and its related factors in inpatients and outpatients to investigate the utilization of antihypertensive medications and to explore the difference of the blood pressure control between the compliant and incompliant groups. In this study, the clinical data of 816 inpatients and 497 outpatients of Sir Run Run Shaw Hospital of Zhejiang University were reviewed. The findings of this study revealed that the causes of incompliance were as the following: the side-effects of the medications, the failure to control blood pressure and the financial problems. It was found that the compliant patients controlled their blood pressure well with little fluctuation while the outpatients were worst compliers and the range of fluctuation in their BP was large (Guo et al, 2001).

Further, in Seychelles, a population based cross-sectional survey of cardiovascular risk factors was conducted by Bovet et al. (1994) and a stratified sample of the residents aged 25-64 years was drawn from the entire population of "Mahe" using a computerized census data. The sample included 1067 participants with an overall 87% participation rate and the compliance was defined as taking the medication on 6-7 days a week on average which corresponds to a mean compliance level of ≥86%. The findings showed that the compliance was better among 23 participants who regularly attended medical follow-up and there was direct association between 12-month compliance level and having highly skilled occupation, having good health awareness and regularity at medical appointments. On the contrary, there was an inverse relationship between mean compliance level and heavy drinking (Bovet et al, 2002).

In Arab countries such as Sudan, the multiple regression analysis of the study that was conducted by Elzubair (1997) showed that the only variable that was positively and significantly associated with non-compliance was the inability to purchase the drugs (Elzubair, 2000).

Moreover, in Saudi Arabia, the cross-sectional study that was carried out by Al-Sowielem and Elzubair (1998) revealed that the compliance rate was significantly higher among illiterate

participants than the educated ones and those participants who were over 55 years of age were more compliance than those who were younger than 55 years. Also the patients who were regular on follow-up had higher compliance rate than those who were irregular (37.8% and 17.6% respectively: P<0.02). There were no significant differences between males and females and they concluded that there is a need for health education for the hypertensive patients (Al-Sowielem and Elzubair, 1998).

Finally, a prospective case-control study was conducted by Catherine et al (1995) in the Seacroft General Hospital, Leeds, to determine the effects of self medication program on knowledge of drugs and compliance with treatment in elderly patients. In this study 88 patients from four hospital wards were recruited to participate (45 patients were on self medication program and 43 were controls). The researchers excluded those patients who were discharged to a nursing home or other institution or were terminally ill. Verbal consent was obtained from all participants. On admission, the eligible patients were referred to the pharmacist who took a drug history for each patient, their drug regimen was simplified as possible and all unnecessary medications were stopped. The participants in the self medication program were asked for additional written consent and were initially assessed by the pharmacist and a primary nurse regarding their understanding of medication, ability to read labels, and ability to open closures. On discharge, they were supplied by medications for two weeks with a reminding chart and were ordered not to get other medications from their general practitioners. The investigator visited the patients at home after 10 days of discharge and conducted a structured interview and a tablet count. The compliance rate was calculated for each medicine by dividing the number of tablets taken by the correct number and expressed as percentage. The results of this study showed that the mean compliance score for the patients in the self medication program was 95% compared with 83% in the control group (difference 12%, 95%CI, P< 0.02). The number of patients who knew the purpose of their medicine in the self medication group was 90% compared to 46% in the control group (difference 44%, 95% CI, p<0.001). Also, 95% of the patients in the self medication group stated that they preferred to take the drugs by themselves instead of the nurse given then, 88% felt that it helped them to feel in control of their medicines, 43% felt more confident taking their medicines at home as a result of the program and 43% reported that it had increased their

understanding of their drug treatment. These results showed the clear benefits of the educational programs on compliance and treatment outcomes (Catherine et al 1995).

In summary, previous studies concluded that many factors may affect the patients' compliance with their hypertension treatment regimen such as the cost, the number of drugs, the drugs' side effects, the daily regimen, their relationship with the medical staff…etc. However, in Palestine, there is a lack of studies that assess the compliance rate and the factors that affect compliance with treatment plan among the Palestinian patients with hypertension. Next section discusses the framework of the current study.

Chapter three

Conceptual framework

3.1. Introduction

The conceptual framework, is a tool structured from a set of broad ideas and theories taken from relevant fields of enquiry that help researchers to properly identify the problem they are looking at, guide their inquiry, frame their questions and find suitable literature. Most academic researchers use a conceptual framework at the outset because it helps the researcher to clarify his research question and aims (Smyth, 2004).

As the research moves on, the conceptual framework became the heart of the study. It strengthen the researcher and keep the research on the track by providing clear links from the literature to the research goals and questions, informing the research design, and providing reference points for discussion of literature, methodology and analysis of data. In the current study, the conceptual frame work was developed depending on the literature review of prior studies that tackled the same topic and the valuable advices and comments from knowledgeable and expert people working in the field of medicine and public health in the School of Public Health, School of Pharmacy, and the Faculty of Human Medicine in Al-Quds University as will be discussed in more detail in chapter four.

The major concepts of study framework focus on compliance and the different factors that affect it, as seen in figure (3.1.). Each concept will be discussed in more details below.
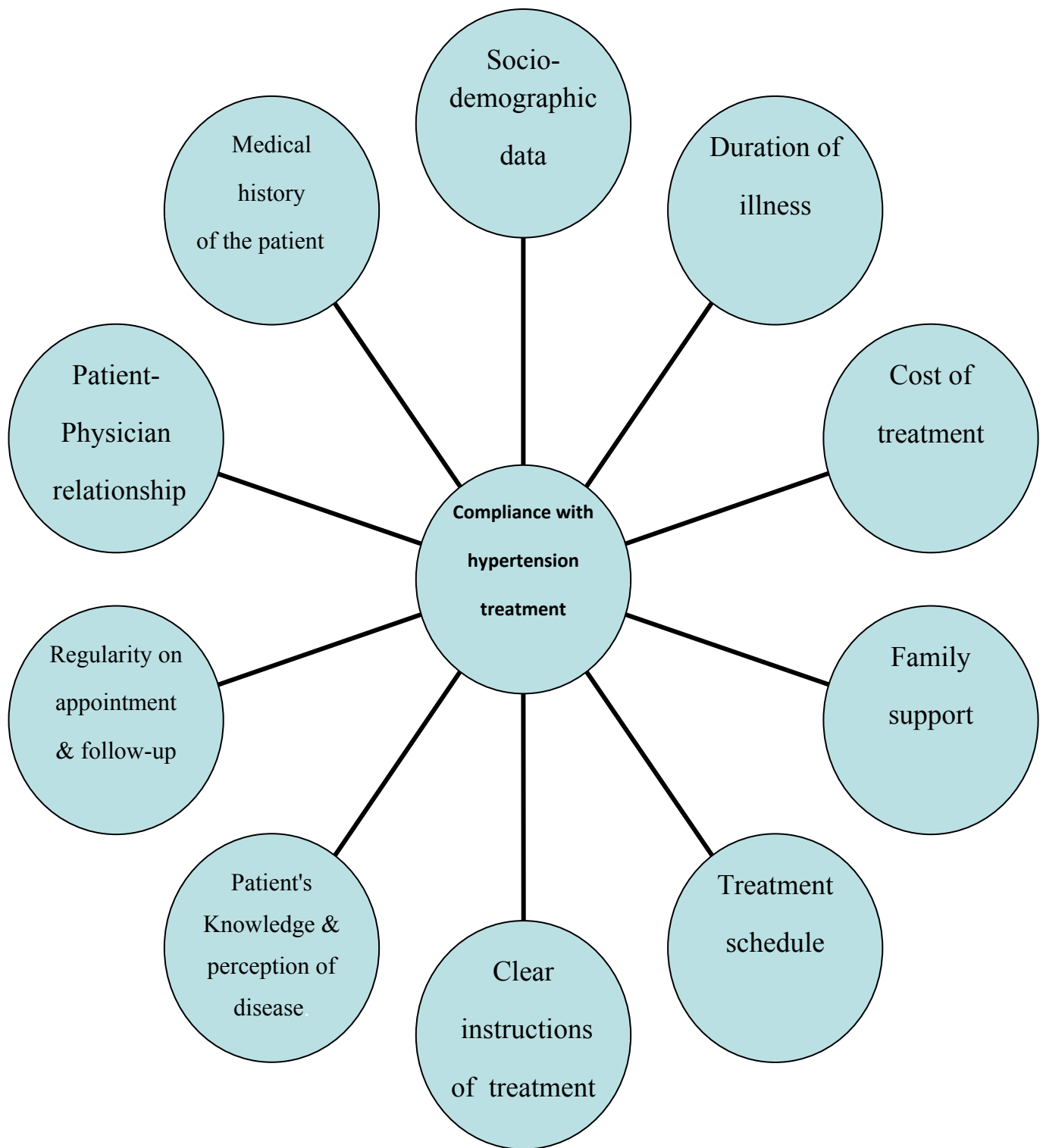
Figure (3.1.): Factors affecting the compliance with hypertension treatment regimen.

Note: this figure was created based on the literature review.

3.2. Definition and measurement of compliance

Compliance and adherence are defined as "the extent to which a person's behavior –taking medication, following a diet, and or executing lifestyle changes, corresponds with agreed upon recommendations from a health care provider" (WHO, 2011). This definition was adopted in this current study. As mentioned in earlier chapters, the non-compliance or non-adherence with treatment may occur through a variety of mechanisms and manifested by behavior patterns such as: (Mahender et al 1978)

- Delay in acquiring medical care.
- Avoiding community preventive programs.
- Appointment irregularity.
- Medication failure and resisting or not maintaining the prescribed therapeutic regimen.

The rate or degree of compliance with treatment can be measured by many ways, of which each has its advantages and drawbacks, such as:

1- Self-report of medication adherence: in which the patient is asked to report his or her degree of adherence to the prescribed drugs regimen and this is usually conducted by a pre-coded questionnaire or by interviewing the patient in person. This method was used by Guenette et al (2005), Girerd (2001), Elzubair et al. (2000) and Jokisalo (2001). The main drawback of this method is that the interviewee might try to please the researcher by reporting good compliance/adherence and because there are no stable factors that can reliably predict compliance.

2- Revision of pharmacy records: some pharmacies keep records of their customers which record the types of the medications they purchase and dates and amounts of each refill they make. By this method the researcher can assess the amounts of each drug that the patient has taken. It was also used as a comparison method by Guenette et al. (2005). The major disadvantage of this method is that the researcher can not be sure if the patient has taken the drugs he/she purchased or not.

3- Pill-count method: in which the patient is supplied by a certain number of pills and requested to return the remaining pills in the container after some time. On return, the remaining pills are counted and the compliance rate is calculated as a percentage of the used pills to the total prescribed pills and this method was used by Elzubair et al (2000). The remaining dosage units (e.g. tablet) are counted at the clinic visits and counting inaccuracies may result in inaccurate estimation of compliance. The important information (such as the timing of dosage and patterns of missed doses) is not captured using this strategy.

4- A recent innovation is the electronic monitoring device (medication event monitoring system (MEMS) and these are specially designed containers with an electronic chips at their edges. These chips record the time and frequency of container openings and on return these chips are removed. By using some computer software their contents can be printed out, thus the researcher can calculate the degree of the patient's adherence to his or her drugs and better describes the way patients take their medication. This method was used by Cramer (1991) and Nuesch et al (2001).

5- Biological-marker method in which blood or other body fluid samples are drawn from the patients and the drugs or their metabolites' levels in these samples are measured by chemical analysis and then compared to the supposed therapeutic levels according to pharmacologic calculations. If the levels match each other then the patient is said to be compliant with his or her treatment, otherwise he is not. This method is rarely used because it is invasive technique and need skilled personnel and laboratory work so it is more expensive. Furthermore, the findings can be misleading and are influenced by a variety of individual factors such as diet, absorption and the rate of excretion (Vitolins, 2000).

6- Treatment or therapeutic outcomes method, in which the patient is said to be compliant if he or she attains the required or targeted result of the treatment. For example, the targeted level of hypertensive patient might be blood pressure of <140/90 mm Hg and so every patient who reached this level is said to be compliant or adherent to his treatment. Those whose blood pressure level remains above this limit are said to be non-compliant. This method was used by Al-Sowielem and Elzubair (1998) and it is utilized in the current study.

3.3. Factors that affect compliance

The patient's compliance with his or her treatment is influenced by many factors (Mahender et al. 1978) and in the current study these variables were classified into ten components as follows: socio-demographic variables, duration of illness, patient-physician relationship, regularity on appointments and follow-up, patient's knowledge and perception of the disease, the clarity of treatment's instructions, the treatment schedule, the family support, and finally the total cost of the treatment plan as shown in figure (3.1).

A: Socio-demographic variables: these included the independent factors such as age, gender, place of residence, education level, socioeconomic level, BMI, and the smoking status of the participants and were presented in section one of the questionnaire (questions 1-10) (See appendix C). These variables were studied by Al-Soweilem & Elzubier (1998), Munger (2007), Kressin (2007).

B: The medical history of the patient: it was explored in section two including questions 11 to 30 of the questionnaire such as the duration of illness and treatment, the way they were diagnosed, the presence of other chronic diseases, the number of medications they are taking for hypertension and other chronic diseases if present, the number of times they were hospitalized due to hypertension, the presence of hypertension in their relatives, the place and methods of obtaining their medications, the frequency of visiting their treating doctor, the frequency of measuring their blood pressure, the possession of sphygmomanometer at home, the frequency of changing the drugs regimen by the doctor, and the frequency of medication interruption against the prescribed regimen (See appendix C). This section enables us to quantify the effects of the different aspects of the patient medical history on his or her compliance or adherence rate and were studied by Al-Soweilem & Elzubier (1998), Coyne (2000) Tozawa (2001) Nuesch et al (2001), Ayumu & Fujita (2003), Munger (2007), Kressin (2007), and Boris & Wijk (2009).

C: Patient's knowledge and perceptions of the disease: the patient's knowledge is defined as the amount of facts and correct information that the patient has about the disease, where the perception is how do they evaluate their disease. Section three of the questionnaire (questions

31-46) included a self-assessment of general health, their perception of hypertension as a serious disease and the possibility of controlling and or preventing it, their knowledge about the risk factors of hypertension (such as heredity, age, gender, physical inactivity, foods and body mass index, tension and anger), their knowledge and perceptions about the medications of hypertension such as their side effects, doses and the necessity to take them correctly and regularly (See appendix C). Many previous studies found an association between the patients' knowledge and perception of their disease and the rate of their compliance to their treatment such as: Coyne (2000), Volpe & Dedhiya (2006), Kressin (2007), Khan (2008), Gupta (2009), Dolor (2009), and Morgado (2010).

D: The duration of illness: which means how long the patient has been living with the disease as this was studied by many previous studies such as Al-Soweilem & Elzubier (1998), Nuesch et al. (2001), Bovet et al. (2002), Ayumu & Fujita (2003), Cramer (2008), and Jin (2008). Section four of the questionnaire included four questions (questions 47-50) that assess the effect of the long duration of hypertension as a chronic disease on the patient's desire to take his/her drugs regularly and continuously, the patients desire to abide by the dietary style advised by the treating doctor, and the effects of the chronic nature of hypertension on the patient's general mood and his general life style (See appendix C).

E: The treatment schedule which is defined as the frequency and timing of taking the drugs per day and the number of drugs. Section five of the questionnaire included five questions (q51-q55) that asses the effect of these issues on the patients' desire to take their medications and their ability to remember the regimen all the time (See appendix C). The questions focused on the effects of other chronic conditions and their medications on the patients' compliance with the daily treatment regimen. Also, patients were asked about their preference of the combined pills that contains more than one drugs at the same time. Previous studies that reported statistically significant associations between the patients' treatment schedule and their compliance with the treatment plan were: Al-Soweilem & Elzubier (1998), Coyne (2000), Bloom (2001), Nuesch et al. (2001), Ayumu & Fujita (2003), Thrail (2004), Schroeder (2004), Eugenia (2005), Kressin (2007), Jin (2008), Ingersoll & Cohen (2008), and Sigrid (2011).

F: Patient- physician relationship: including the patient-provider interaction especially that the doctor has been shown to have a strong impact on the patients' compliance with their treatment (Coyne 2000, Jin 2008, and Thrail 2004). Section six of the questionnaire included twelve questions (q56-q67) about the type of relationship between the patients and their doctors, the way their doctors behaved with them and whether they were seen by the same or different doctors in every visit. They were also asked about the time span they were spending with the doctor in every visit and the behaviors of the medical staff in the clinic they attended for their treatment. These variable have been reported to affect the patient's compliance in many previous studies such as Ayumu & Fujita (2003), Schroeder (2004), Eugenia (2005), Kressin (2007), Torrey (2009), and Jokisalo (2001).

G: Clarity of treatment instructions: Section seven of the questionnaire included nine questions (q68-q76) about how clear and understood the written medical instructions that were given to them by the doctor, the clarity and simplicity of the explanations that were given by the medical staff and the simplicity of the language that the doctor and the medical staff in general were using. Also they were asked if they were given advices about their recommended life style modifications and whether they had ever received explanation about the medical tests they performed, the changes that were recommended to their drugs or drugs –regimens, and if they were ever trained to self-measure their blood pressure at home (See appendix C). From the literature, Torrey (2009) and Jokisalo (2001) reported that the clarity and simplicity of the medical instructions given to patients had a significant effect on their compliance with their treatment plans.

H: Family support: The social support from friends and family members has been observed to have great effect of the patient's attitudes and behaviors (Kressin 2007, Jin 2008, and Jokisalo 2001). Section eight of the questionnaire included seven questions (q77-q83) about the support and the help that the patients got from their family members such as financial support, help in taking their drugs, in measuring their blood pressure, in reaching the medical facility when needed, and the help and the encouragement to abide by the drugs regimen and the recommended life style (See appendix C).

I: Patient's regularity on appointments and follow-up: section nine of the questionnaire included thirteen questions (q84-q96) about the patient's regularity on the medical appointments, measuring of blood pressure, taking their antihypertensive medications, doing the recommended physical activities, and doing the recommended life style modifications. These factors were tested in Al-Soweilem & Elzubier (1998), Bovet et al. (2002), Eugenia (2005), Morgado (2010), and Jokisalo (2001) studies.

J: Cost of treatment: which means the amounts they pay to get the medication and the money they spend to achieve the recommended lifestyle changes…etc. The treatment costs play a major role in the availability of the medications and other medical needs (Coyne 2000, Guo et al 2001, and Munger 2007). So section ten of the questionnaire included six questions (q97-q102) about the continuity of health care needs that this care be affordable at the patient level, the total cost of treatment of hypertension and whether it was affordable, reasonable, and if it caused troubles to the patients and made them less compliant with their treatment plans (See appendix C). In Sudan, Elzubair et al (2000) found that the treatment cost was the only statistically important obstacle to the patient compliance. Similar results were reported by Jin (2008), Torrey (2009), and Sigrid (2011).

3.3. Summary:

1- This chapter presented the conceptual framework which was taken from different studies and a group of experts in public health and medicine.

2- Compliance was assessed indirectly by measuring the blood pressure of the patients and considering it as indirect indicator for compliance.

3- The factors that affect compliance were grouped into ten components as the follow:

- The socio-demographic variables.
- The medical history variables.
- The duration of illness variables.
- The patient-physician relationship variables.
- The regularity on appointments and follow-up variables.
- The patient's knowledge and perception of the disease.
- The clarity of treatment's instructions.
- The treatment schedule variables.
- The family support variables.
- And finally the total cost of the treatment plan of the patient.

Chapter four

Methodology

4.1 Introduction

As discussed in previous chapters, there is a lack in studies that assess the factors that affect the compliance of hypertensive patients with their treatment plan in Palestine. This chapter discusses the methodological issues of the current study including: the study design, the target population, sampling approach, data collection, analysis and the ethical considerations.

4.2. The study design

As discussed above, the main aim of the current study is to assess the participants' compliance with their antihypertensive treatment plans and to identify the factors that affect their compliance in three central clinics in Hebron area. Therefore a descriptive cross-sectional study was utilized because it is highly useful for descriptive purposes. This design is also known as prevalence study because the exposure to the risk factor(s) and the occurrence of the outcome are measured concurrently over a short period of time in the study population. The chosen design can give some indications about the association among the different factors under investigation and their outcomes (Polgarr & Thomas, 1997).

4.3. The study target population

The study targeted population was the patients with primary hypertension who attend the three central primary health care clinics in Hebron area and aged 18 years old and over.

4.4. Settings of the study

The study was conducted in the three primary health care clinics in Hebron that are: Dora, Karanteena and Yatta. These three settings were selected because they are appropriate for the purpose of the study. Moreover, these are the three largest, third level and central Primary Health Care clinics serving the people in Hebron and South Hebron area. The third level clinic as defined by the Palestinian Ministry of Health is a medical center that works at all

days of the week, provides the following services; preventive medicine, general medicine, laboratory tests, specialized services to child and mother care and a pharmacy for dispensing drugs and serves area with more than 6000 population. (MoH, 2009)

4.4.1. Karanteena PHC clinic

Karanteena primary health care clinic is located in the old city of Hebron. It was built during the ottoman era in the 19th century. It was under the Israeli civil administration until the year of 1994 in which the Palestinian Liberation Organization signed the peace agreement with Israel, after which the responsibility of the Palestinian Health Care System was transferred to the Palestinian Authority. Karanteena clinic, being a third level center, provides a variety of medical services to the people of the area in addition to people who come from the surrounding villages. As a part of the Palestinian health care system, it provides its services to all citizens of the area who carry a valid insurance card issued by the Palestinian Ministry of Health or that issued by the Labor Ministry without charges but a small amount of co-payment (Hebron Health Directorate, 2009).

Karanteena center provides diversity of medical services through different clinics such as: general medicine clinic, high risk pregnancy clinic, maternity and child health care, orthopedic clinic, diabetes clinic, dermatology clinic, ENT clinic, and laboratory and pharmacy services. There are about five thousand files of patients who attend the clinic for health care services out of which there are 448 files for patients with hypertension (Hebron Health Directorate, 2009).

4.4.2. Dora PHC clinic

It is a central third level primary health care center located in the middle of the city of Dora, about 15 kilometer from Hebron. It was a part of Hebron Health Directorate until June 2008 in which south Hebron Health Directorate was inaugurated and since then Dora PHC center became part of it and under its administration.

It provides its services to about 25,000-30,000 citizens of the catchment area and deals with them according to the Palestinian Ministry of Health protocols regarding the insurance card

and the co-payments. Similar to Karanteena clinic, it provides a variety of health care services such as: general medicine clinic, maternity and child health care, vaccination, diabetes clinic, dermatology clinic, ENT clinic, laboratory tests and pharmacy services. There are 3700 files in the clinic for patients who attend the clinic for health care services out of which there are 342 files for hypertensive patients (South Hebron Health Directorate, 2009).

4.4.3. Yatta PHC clinic

It is the largest primary health care center in South Hebron area and located in the city center of Yatta. It was administered by Hebron Health Directorate until June 2008 after which its administration was transferred to South Hebron Health Directorate. It provides its services to more than 40,000 citizens in its catchment's area (South Hebron Health Directorate, 2009).

As a central and third level health care center in the area, it provides numerous medical services such as: maternity and child health care, vaccination, general medicine clinic, dermatology specialist doctor, ENT specialist doctor, diabetic and other chronic clinics, laboratory tests and pharmacy services. There are 4500 files in the clinic for patients who attend the clinic for health care services out of which there are 410 files for hypertensive patients (South Hebron Health Directorate, 2009).

4.5.1. Inclusion criteria

- Patients with primary hypertension regardless of other co-morbidities such as DM, Asthma and Arthritis.
- Patients who attend the selected PHC clinics for their anti-hypertensive treatment.
- Men and women aged 18 years and above.
- Men and women regardless of their literacy

4.5.2. Exclusion criteria

● Patients with any form of cognitive disability such as: autism and dementia because they generally depend on others to give them their medications.

- Patients with mental problems such as schizophrenia and sever depression because they are usually given their drugs by others.

● Patients who were recently diagnosed with hypertension (<1year) because such patients usually do not have a stable treatment plan (Al-Sowielem, 1998).

● Patients with secondary hypertension.

4.5.3. Sample Size

The total population of hypertensive patients who attended these clinics was 1200. The study sample was calculated using computer software (PEPI-for- Windows) which used the following formula and the sample size was found to be 292 patients.

$$ss = \frac{Z^2 * (p) * (1-p)}{c^2} = \frac{(1.96)^2 * (0.5) * (1-0.5)}{(0.05)^2} = 384.16$$

Where:

Z = Z value (here 1.96 for 95% confidence level)
p = percentage picking a choice, expressed as decimal (here 0.5).
c = confidence interval, expressed as decimal (here 0 .05 = ±5)

Then the correction for finite population:

$$New\ ss = \frac{ss}{1+ (ss-1/pop)} = \frac{384.16}{1+ (384.16-1 /1200)} = 291.81 \approx 292$$

Where: pop = population (here= 1200)

The number of patients to be recruited from each clinic was calculated proportionally to the total number of the hypertensive patients who attend the clinic regularly for anti-hypertensive treatment services using the formula:

Clinic sample size = (hypertensive patients who attend the clinic / total population of hypertensive patients) * (sample size).

= (hypertensive patients who attend the clinic / 1200) *(292).

The numbers were as follow: 109 patients from Karanteena, 100 patients from Yatta and 83 patients from Dora as shown in table (4.1) below.

Table (4.1): The population number and sample size from each clinic.

Clinic	Hypertensive patients who attend the clinic.	Sample size from the clinic patients*.
Karanteena	448	109
Yatta	410	100
Dora	342	83
Total	1200	292

* Clinic sample size= (hypertensive patients who attend the clinic /1200) * 292

4.5.4. The sampling approach

The sample was selected from the Primary Health Care clinics that belong to the Palestinian Ministry of Health in Hebron district. Purposive sampling of clinics was utilized in the current study because these are the three central and biggest clinics in Hebron area and hypertensive patients receive their treatment from them. Purposive sampling is a form of non-probability sampling in which the individual units are selected by some purposive method in a deliberate and non random fashion to achieve a certain goal. It is easier than other types of sampling and it can examine the participants' beliefs, practices and experiences. However, it is subject to bias of personal selection and as non-probability sampling, subsequent generalization from the findings of this method of sampling may not be valid (Polit & Hungler, 1999).

The systemic sampling method was used to select the participants from the three clinics. Systemic sampling is a convenient and objective way of selecting sample cases from a larger population according to a random starting point and fixed interval. The start point is random and then proceeds with the selection of *k*th element from the start point onward (usually

k=population size/sample size). It is easy, fast and inexpensive. The limitations of this method of sampling are that systemic bias may exist, and the results will not be representative of the population. In addition, estimating the sampling error is difficult when using systematic sampling design (Laura, 1995). Having decided the total sample size and the sample size from each clinic, the sampling interval was calculated by dividing the total study population by the sample size and found to be "four".

Formula: k= total population / sample size = 1200 / 292 ≈ 4.

So every fourth patient who attended these clinics and met the inclusion and exclusion criteria and agreed to participate in the study was recruited until they fulfilled the number needed from each clinic. The data collection took place during the period of July/10/2010 to August/10/2010.

4.6. Instrument of the current study

The data collection instrument of this study was a self- reported questionnaire. The questionnaire items were derived from six previous studies, the Long Form Patient's Satisfaction (PSQ-III) questionnaire and some were suggested by five PhD holder experts from AL-Quds University, as shown in table (4.2).

Table (4.2) Previous studies from which this study items were derived

Section	Question(s) and it's source
Independent Socio-demographic variables (12 questions).	From Al-Sowielem (1998) and Elzubair (2000) Studies.
Medical History related questions (18 questions).	Q1, Q2, Q6 from Al-Sowielem (1998) Study. Q3, Q7, Q10, Q11 from Elzubair (2000) Study Q14, Q15, Q17 from Eugenia et al. (2004) Study Q4, Q5, Q8, Q9, Q12, Q13, Q16, Q18 suggested by the experts.
Knowledge and Perception of hypertension related questions (16 questions).	Q6, Q7, Q16 from Al-Sowielem (1998) Study. Q11 from Thrall et al. (2004) Study. Q3, Q4, Q8 from Yadlapalli et al. (2009) Study. Q1, Q2, Q5, Q9, Q10, Q12, Q13, Q14 and Q15 were suggested by the experts.

Duration of illness related questions (4 questions).	All 4 questions were suggested by the experts.
Treatment Regimen related questions (5 questions)	Q3 from Eugenia et al. (2004) Study. Q5 suggested by the experts. Q2 from Quenette et al (2005) Study. Q1, Q4 were suggested by the experts.
Patients' Relationship With the Medical Staff related questions (12 questions)	Q1 from Al-Sowielem (1998) Study. Q8, Q11 from Thrall et al. (2004) Study. Q2, Q6, Q7 from (PSQ-III)*. Q3, Q4, Q5, Q9, Q10, Q12 were suggested by the experts.
Clarity of Drugs-Usage Instructions related questions (9 questions)	Q2, Q4, Q7 from Eugenia et al. (2004) Study. Q6 from (PSQ-III)*. Q1 from Thrall et al (2004) Study. Q3, Q5, Q8 Q9 were suggested by the experts.
Family support related questions (7 questions)	All 7 questions were suggested by the experts.
Regularity on Treatment Plan related questions (13 questions)	Q1, Q6 from AlSowielem (1998) Study. Q10 from Eugenia et al. (2004) Study. Q8, Q9 from Quenette et al (2005) Study. Q3, Q4, Q5 from Thrall et al (2004) Study. Q2, Q7, Q11, Q12, Q13 were suggested by the experts.
Costs of Treatment related questions (6 questions).	Q1, Q3 from (PSQ-III)*. Q2, Q4, Q5, Q6 were suggested by the experts.

* The Long-Form Patient's Satisfaction Questionnaire (PSQ-III).

The process of developing the questionnaire was that an initial draft of the questionnaire was prepared by the main researcher and his supervisor from the previous studies in literature review, five Ph.D. holder experts in public health, medicine and pharmacy from Al-Quds University were approached to evaluate the questionnaire and give their comments. They were two experts from the School of Public Health, two experts from the Faculty of Human Medicine and one expert from the School of Pharmacy. They revised the English and the

Arabic versions of the instrument and gave a number of valuable comments on the content, clarity and relevance of the questionnaire.

For better assessment of the clearance and relevance questionnaire to the topic, in the late stage of the questionnaire developing process, four focus groups (20 patients) of hypertensive patients (five patients in each) were carried out at Dahriyya, Yatta, Dora and Karanteena primary health care clinics to test the contents of the questionnaire and its language. Minor changes were done to the language of some questions.

In general, the questionnaire consisted of ten sections including 102 items, as shown in table (4.3) below. The topics of these ten sections were identified based on the previous studies related to hypertension and patients' compliance with treatment. Some questions of section one and section two were multiple choice questions, while all other questions were answered on a five-point likert scale (1-always, 2-often, 3-sometimes, 4-rarely, and 5-never). (See appendix C)

Table (4.3) Components of the questionnaire of the current study

No.	Sections of the questionnaire	Number of questions of the component.
1	Independent variables (eg. Socio-demographic data)	12 questions.
2	Medical history.	18 questions.
3	Knowledge and perception of HTN.	16 questions.
4	Duration of the illness.	4 questions.
5	Treatment regimen.	5 questions.
6	Relationship with the medical staff.	12 questions.
7	Clarity of drugs-usage instructions.	9 questions.
8	Family support.	7 questions.
9	Regularity on doctor's appointments and treatment plan.	13 questions.
10	Cost of treatment.	6 questions.
Total		102 questions

4.7. Validity and Reliability of the instrument

Reliability (also termed "reproducibility" or "repeatability") refers to the stability and consistency of information and assesses the extent to which the results agree when obtained by different approaches that is, different observers, study instrument, or procedures (Szklo & Javier, 2000).

The content validity of the current study instrument was done by conducting the four focus groups of hypertensive patients who attend four different PHC clinics in Hebron and South Hebron area in order to assess the language and content of the questionnaire. Also, the validity was examined by five experts from Al-Quds University.

4.8. Data collection

After sending a formal letter to the head of the Palestinian Primary Health Directorate explaining the purpose of the study, permission was granted in June 2010 from the Palestinian Ministry of Health.

After that the researcher trained two experienced staff nurses who were working in the PHC clinics in which the study was conducted to help in data collection. The purpose of the study, the items of the questionnaire, the inclusion and exclusion criteria of the study and the ethical considerations were discussed with them.

After that, the researcher and the two assistants started interviewing the participants and filling out their questionnaires in the three clinics. The data collection process took one month, starting on July, 10th and ending on August, 10th 2010. The medical teams in these clinics were very helpful and cooperative which played a crucial role in obtaining a high response rate from the participants

At the primary health care clinics, blood pressure was measured twice by qualified nurses, the first time before filling the questionnaire and after ten minutes of rest in the sitting position using a digital sphygmomanometer according to the WHO protocol. The second measurement was done after filling the questionnaire. The mean of the two readings was noted down in the questionnaire paper.

4.9. Data analysis:

The data were analyzed by using the Statistical Package for Social Sciences (SPSS), version15.0. The data were checked for entry errors (data clearance). Characteristics of the sample were obtained through descriptive analysis (frequencies and percentages). Relationships between selected variables were analyzed by using of chi-squared, Fisher exact test and the logistic regression.

4.10. Ethical considerations:

In order to conduct this study, a proposal of the study was submitted to the research committee of the School of Public Health at Al-Quds University, who gave approval to conduct this study according to the thesis preparation guide of the Faculty of Graduate Studies on the 12th of January, 2010.

Also before starting the survey and to gain access to the primary health care clinics, the head of the Palestinian Primary Health Directorate in West Bank was formally approached via an introductory letter from the School of Public Health at Al-Quds University. The letter presented information about the proposed study and its purpose, and he was asked to give his permission to conduct the study in the PHC clinics of Hebron area. A positive response was received on February 17th, 2010.

Furthermore, in order to maintain the ethical standards in this study, the questionnaire of this study was introduced to the participants along with a cover letter about its objectives and importance. An accompanying statement assuring the voluntary nature of their participation and that the participants had the right to refuse to participate. In addition, the participants were assured that anonymity and confidentiality would be maintained at all times, and that the data provided by the participants would be used for research purposes only and would be expressed only in general terminology. No names or codes or any other mechanism would be used to trace responses back to an individual participant.

Finally, all the data of this research were stored in a computer which was protected by a password and no body was allowed to access it except the researcher and the supervisor.

4.11. Summary

- A cross-sectional design was utilized in this study because it is cheap, quick and ethically safe.

- 292 patients from those who attended the targeted clinics (Karanteena, Yatta and Dora) between July 10th, and August 10th, 2010 were recruited to participate in the study.

- The data collection tool was self-reported questionnaire which was developed from many previous studies in the same field. The questionnaire consisted of ten questions about socio-demographic data of the participants and ninety two items related to different factors that affect compliance.

- The validity of the questionnaire was assessed by five experts from the Faculty of Medicine, the School of Pharmacy and the School of Public Health in Al-Quds University. The reliability of the instrument was tested by using Cronbach's Alpha coefficient and it was high 92%.

- The data was analyzed by using the Statistical Package for Social Sciences (SPSS), version 15.0.

Chapter five

Results

5.1. Introduction

In order to achieve the main aim of the current study of assessing the patients' compliance with the antihypertensive treatment and regimen and the factors that affect it, a cross-sectional study was utilized and a total of 292 questionnaires were filled in the three major primary healthcare clinics in Hebron area (Karanteena, Yatta, Dora) during July 2010.

This chapter presents the findings of the current study as following:

1- The characteristics of the study participants.
2- The compliance rate.
3- Participants' responses to the factors related to compliance questions.

5.2. Characteristics of the study participants

The hypertensive patients who attended the major three clinics in Hebron area (Karanteena, Yatta and Dora) were targeted to participate in this study. The sample consisted of 292 patients (109 (37.3%) from Karanteena clinic, 100 (34.2%) from Yatta clinic and 83 (28.5%) were from Dora clinic). (See figure 5.1)

28.5%

37.3%

34.2%
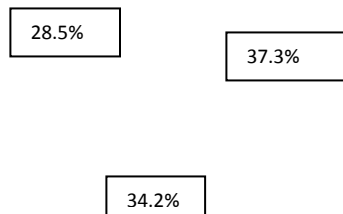
Figure (5. 1): The distribution of the participants by the clinic they attended.

Regarding the gender of the participants, 58.6% (n=171) were females and 41.4% (n=121) were males (See figure5.2).

41.4%

58.6%

Figure (5. 2): The distribution of the participants by gender

The participants' ages ranged from 37 to 87 years of which 34.9% (n=102) were fifty-five years or less and 65.1% (n=190) were above the age of fifty-five years (See figure 5.3)

34.9%

65.1%

Figure (5. 3): The distribution of the participants by their age group.

The majority of participants (76.4%, n=223) were either overweight (BMI= 25-29.99 kg/m^2) or obese (BMI=30 kg/m^2 or more) and only 23.6% (n=69) were having normal body mass indexes (BMI=18.5-24.99kg/m^2). Whereas the minimum weight among the participants was 52 kilograms and the maximum weight was 117 kilograms (See figure 5.4).

Figure (5.4): participants distribution according to their BMI.

*BMI: normal=18.5-24.99kg/m^2, overweight=25-29.99 kg/m^2, and obese=30 or more kg/m^2.

 For the marital status, two-thirds of participants (70.9 % n=207) were married, 3.4% (n=10) were single, 3.1% (n=9) were divorced and 22.6% (n=66) were widowed (See figure 5.5).

	22.6%	
3.1%		
3.4%		
	70.9%	
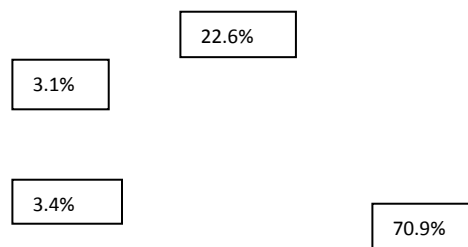
Figure (5. 5): The distribution of the participants by their marital status.

The educational level varied among the participants as 36.6% (n=107) received no education, 26.7% (n=78) had primary education that is one to six years of school education, 16.8% (n=49) received elementary education (seven to nine years of education), 5.2% (n=15) reached the secondary school and 14.7% (n=43) had a college or university degree (See figure 5.6).

Figure (5.6): The distribution of the participants by their level of education.

 Also the participants were asked about their employment and they responded as the following: 48.3% (n=141) were house wives and this is consistent with the high percentage of females in the study, 16.1% (n=47) were employed, 18.8% (n=55) were unemployed, 5.5% (n=16) were retired from their jobs and 11.3% (n=33) had their own business plans (See figure 5.7).

Figure (5.7): The distribution of the participants by their work status.

Regarding the participants' monthly income, 13.0% (n=38) were earning one thousand Israeli shekels or less, 35.3% (n=103) were earning 1001-2000 NIS, 25.3% (n=74) were earning 2001-3000 NIS, 9.6% (n=28) were earning more than three thousand Israeli shekels. 16.8%

(n= 49) were without income at all as neither they nor their direct guardian were employed (See figure5.8).

Figure (5. 8): The distribution of the participants by their monthly income.

In relation to their smoking status, 8.2% (n=24) indicated that they smoke less than ten cigarettes per day, 21.9% (n=64) smoke 10-20 cigarettes per day, 6.9% (n=20) smoke more than twenty cigarettes per day, 7.9% (n=23) were ex-smokers and interestingly 55.1% (n=161) stated that they had never smoked at all and this might be because the majority (58.6%) of the sample were females. (See figure 5.9).

Figure (5.9): The distribution of the participants by their smoking status.

The compliance rate.

Out of the 292 participants who participated in this study, 57.9% (n=169) were with blood pressure measurement of less than 140/90 mmHg which is within the target level according to the World Health Organization (WHO) and these participants were considered compliant with their treatment plans. Also 42.1% (n=123) were with uncontrollable blood pressure which read ≥140/90 mmHg. When cross tabulation was done between participants compliance and independent variables in section one of the questionnaire, only gender, BMI, and smoking status showed statistically significant relationships (as shown in table 5.1). For example, females were more compliant than males (62.6% vs 51.2%, P=0.05). Also those participants with normal body mass index were more compliant than others as 72.5% of them had controlled blood pressure versus 56.8% of the overweight and 45.6% of the obese (p=0.00). Furthermore, the smoking status had a significant relationship (p=0.05) with compliance and the smokers were (55-57% compliance) less compliant than the non or ex-smokers (61-64% compliance).

On the other hand, no significant relationship was found between the blood pressure reading and the age group of the participants, the clinic they attended, the marital status, the level of education, the work status, or the monthly income of the participants as shown in table (5.1).

Table (5.1): Cross tabulation of the participants' compliance rate by socio-demographic variables.

INDEPENDENT VARIABLE		BLOOD PRESSURE READING				P
		BP<140/90mmHg. (Compliant) 57.9%, n=169		BP≥140/90mmHg. (Noncompliant) 42.1%, n=123		
		F	%	F	%	
Gender	Male	62	51.2%	59	48.8%	0.05
	Female	107	62.6%	64	37.4%	
Age	≤55	65	63.7%	37	36.3%	0.17
	>55	104	54.7%	86	45.3%	
Clinic They Attend	Yatta	63	63%	37	37%	0.41
	Dora	47	56.6%	36	43.4%	
	Karanteena	59	54.1%	50	45.9%	
BMI (Kg/m²)	Normal	50	72.5%	19	27.5%	0.00
	Over Wt.	88	56.8%	67	43.2%	
	Obese	31	45.6%	37	54.4%	
Marital Status	Single	5	50%	5	50%	0.89
	Married	118	57.3%	88	42.7%	
	Divorced	6	66.7%	3	33.3%	
	Widow	39	59.1%	27	40.9%	
Education Level	None	59	57.8%	43	42.2%	0.08
	Primary	37	47.4%	41	52.6%	
	Elementary	32	65.3%	17	34.7%	
	Secondary	8	53.3%	7	46.7%	
	University	31	72.1%	12	27.9%	
Work Status	Employed	28	70%	12	30%	0.08
	Unemployed	26	47.3%	29	52.7%	
	Retired	9	56.3%	7	43.7%	
	House Wife	88	62.4%	53	37.6%	
	Own Business	15	45.5%	18	54.5%	
Monthly Income	≤1000	20	52.6%	18	47.4%	0.78
	1001-2000	56	61.5%	35	38.5%	
	2001-3000	44	59.5%	30	40.5%	
	>3000	14	50%	14	50%	
	None	29	59.2%	20	40.8%	
Smoking Status	<10 cig/day	7	57%	17	43%	0.05
	10-20 cig/day	36	56.3%	28	43.7%	
	>20 cig/day	11	55%	9	45%	
	Ex-smoker	14	60.9%	9	39.1%	
	Never smoke	99	61.5%	62	38.5%	

Also, the patients' compliance was assessed by other subjective questions that are related to important aspects of hypertension treatment. For example, the participants were asked about their obedience with the doctor's advices regarding their physical activity, food changes, weight reduction ....etc and cross tabulation was done between their BP readings and their answers to the previous questions, three questions (q2, q3 & q5) showed significant differences between the participants. For example, 64.5% of those who measure their BP on regular basis had controlled BP level while 35.5% of then had not, whereas 53.2% of those who answered "no" to this questions had controlled BP (p=0.05). Further, 69% of those who managed to do physical exercise as advised by their doctor had controlled BP while 31% had BP ≥140/90mmHg, whereas 55.1% of those who did not do physical exercise had controlled BP (p=0.05). Finally, 63.4% of those who managed to eat healthy foods as advised by their doctor had controlled BP level whereas 36.6% had BP ≥140/90mmHg, while only 52.7% of those who did not manage to eat healthy foods had controlled BP level (See table 5.2).

Table (5.2): Cross-tabulation between the compliance rate (BP. level) and some important aspects of treatment of hypertension.

	BP<140/90 mmHg 57.9%, n=169	BP≥ 140/90 mmHg 42.1%, n=123	P-value
1- You are always regular at your doctor's appointments?			
Yes (t= 227)	136 = 59.9%	91 = 40.1%	0.15
No (t= 65)	33 = 50.8%	32 = 49.2%	
2- You measure your BP on regular basis?			
Yes (t= 121)	78 = 64.5%	43 = 35.5%	**0.05**
No (t= 171)	91 = 53.2%	80 = 46.8%	
3- You manage to do physical exercise as advised by your doctor?			
Yes (t= 58)	40 = 69%	18 = 31%	**0.05**
No (t= 234)	129 = 55.1%	105 = 44.9%	

4- You manage to maintain a healthy weight as advised by your doctor?			
Yes (t= 90)	53 = 58.9%	37 = 41.1%	0.79
No (t= 202)	116 = 57.4%	86 = 42.6%	
5- You manage to eat healthy food (e.g. less salt) as advised by your doctor?			
Yes (t= 142)	90 = 63.4%	52 = 36.6%	**0.05**
No (t= 150)	79 = 52.7%	71 = 47.3%	
6- You manage to use your HTN drugs on regular basis as prescribed to you?			
Yes (t= 181)	105 = 58%	76 = 42%	0.9
No (t= 111)	64 = 57.7%	47 = 42.3%	

5.3. Section three: participants' responses to the factors related to compliance questions

The findings of each section are discussed below in more detail.

5.3.1. Section two: participants' medical history related questions:

This section included 18 questions related to participants' health in general and their state as hypertensive patients in particular as shown in table (5.3). For example, less than half of the participants (47.6%, n=136) reported that they were diagnosed by chance while they were doing a routine check up or going to the doctor for any other reason and 65.75% (n=192) suffered from hypertension for less than ten years. Further, 69.5% of them had a co-morbidity with other physical disease and 32.2% had diabetes mellitus.

Table (5.3): Participants' responses to the questions related to their medical history.

Variable	Answer	F.	%.
How you were diagnosed as hypertensive?	By chance	139	47.6%
	After symptoms	153	52.4%
The duration of your illness in years.	< 10 years	192	65.75%
	≥10<20 years	82	28.08%
	≥20years	18	6.17%
Do you take medications to treat chronic condition other than hypertension**?**	Yes	203	69.5%
	No	89	30.5%
Number of drugs you take for chronic conditions other than hypertension**.**	One	21	10.3%
	Two	99	48.8%
	3 or more	83	40.9%
Presence of other chronic disease as a co-morbidity:			
Diabetes	Yes	94	32.2%
Asthma	Yes	21	7.2%
Heart diseases	Yes	50	17.1%
Arthritis	Yes	81	27.7%
Cancer	Yes	6	2.1%
Other disease	Yes	12	4.1%
How many drugs do you take to treat your HTN (including diuretics)?	One	63	21.6%
	Two	167	57.2%
	3 or more	62	21.2%
Source of drugs (you can choose more than one answer):	PHC	265	91.4%
	UN clinic	33	11.4%
	Private sector	70	24.1%
	Other place (NGOs)	2	0.7%
How do you get your medications financially?	Free	4	1.4%
	Co-payment	276	95.8%
	Full cost	8	2.8%
Do family members have HTN?	Yes	166	56.8%
	No	126	43.2%
Your brother?	Yes	25	15.1%
Your sister?	Yes	37	22.3%
Your mother?	Yes	66	39.8%
Your father?	Yes	51	30.7%
Your son?	Yes	26	15.7%
Your daughter?	Yes	10	6%
How many times do you take your drug(s) per day?	Once	103	35.30%
	Twice	150	51.35%
	3 or more	39	13.35%

In the last month, how often you did not take your medications?	Once	35	12%
	Twice	62	21.2%
	≥3 times	48	16.4%
	None	32	11%
	Don't remember	115	39.4%
How many times did your doctor change your drugs or drug regimen since you were diagnosed with HTN?	Once	59	20.2%
	Twice	41	14%
	3 times or more	52	17.8%
	None	78	26.7%
	Don't remember	62	21.3%
Do you have a sphygmomanometer at home?	Yes	95	32.5%
	No	197	67.5%
How often do you measure your BP?	I don't measure it at all	26	8.9%
	Once a day	15	5.1%
	Once a week	74	25.3%
	Once a month	124	42.5%
	Once/ 3 months	51	17.5%
	Less frequently	2	0.7%
How often do you visit your doctor for your HTN?	Once a month	158	54.1%
	>1 visit / month	65	22.3%
	Once/ 3 months	43	14.7%
	Once/ 6 months	21	7.2%
	Other (specify)	5	1.7%
How often does your doctor do complete examinations to you (e.g. checking heart beats, chest, eyes, blood tests etc.)?	Every visit	18	6.2%
	Once a month	39	13.3%
	Every 3 months	35	12%
	Every 6 months	89	30.5%
	Never	89	30.5%
	Other (specify)	22	7.5%
Apart from prescribing pills, what other tasks does your doctor perform during the visit? (you can choose more than one answer).			
The doctor gives you information about BP during the visit?		59	20.3%
The doctor does a complete physical check up during the visit?		49	16.9%
The doctor gives you information about the best life style for you?		97	33.4%
The doctor explains to you the importance of controlling BP.?		60	20.7%
The doctor does nothing during the visit rather than prescribing drugs?		113	39%
How many times were you hospitalized because of your HTN complications?	Once	44	15.05%
	Twice	57	19.52 %
	3 times or more	55	18.83%
	None	136	46.6%

5.3.2. Section three: Knowledge and perception of hypertension disease related questions

In this section, sixteen questions were formulated to assess the participants' knowledge and perception of their hypertension. The questions discussed the main aspects of the disease and its treatment protocols as seen in table (5.4). The findings showed a variation in knowledge and weaknesses were mainly in questions related to etiology and treatment of hypertension. For example, 32.6% (n=95) indicated that hypertension is "always and often" inherited, 27.8% (n= 81) said that there is" always and often" a difference in the risk of getting hypertension between males and females.

Further, 24% (n=70) indicated that they "sometimes" felt that it was not necessary to take their medications. 16.8% (n=49) thought that it was "always or often" safe to decrease or increase their dose without consulting their doctors. Finally, 17.1% (n=50) of participants believed that hypertension "always or often" could be prevented. For more details refer to table (5.4).

Table (5.4): The participants' answers to the questions related to their knowledge and perception about hypertension disease.

Variable		Always	Often	Sometimes	Rarely	Never
In general, you consider yourself to be in good health.	No.	64	109	92	26	1
	%	21.9%	37.3%	31.6%	8.9%	0.3%
Your blood pressure is well-Controlled.	No.	28	132	110	20	2
	%	9.6%	45.2%	37.7%	6.8%	0.7%
You consider hypertension as a serious problem.	No.	97	99	75	18	3
	%	33.2%	33.9%	25.7%	6.2%	1%
Hypertension may lead to other serious problems (stroke, heart attack, renal failure… etc)	No.	82	96	82	23	9
	%	28.1%	32.8%	28.1%	7.9%	3.1%
You think hypertension has hereditary basis.	No.	44	51	90	54	53
	%	15.0%	17.5%	30.8%	18.5%	18.2%
You think the risk of getting HTN differs between males & females.	No.	37	44	74	67	70
	%	12.7%	15.1%	25.3%	22.9%	24%

You think the risk of hypertension increases with age.	No.	74	121	59	25	13
	%	25.3%	41.4%	20.2%	8.6%	4.5%
Decreasing tension and anger helps in controlling blood pressure.	No.	116	99	57	11	9
	%	39.7%	33.9%	19.5%	3.8%	3.1%
Dietary changes (e.g. less salt) may help in controlling blood pressure.	No.	85	110	68	16	13
	%	29.1%	37.7%	23.3%	5.5%	4.4%
Physical exercise may help in controlling my blood pressure.	No.	55	69	89	54	24
	%	18.9%	23.7%	30.6%	18.6%	8.2%
You think that it is necessary to take HTN medications regularly	No.	121	94	50	16	11
	%	41.4%	32.2%	17.1%	5.5%	3.8%
You think that HTN medications help me to control your BP.	No.	82	101	81	18	9
	%	28.2%	34.7%	27.8%	6.2%	3.1%
You feel it is safe or not necessary to take your medications.	No.	20	38	70	76	88
	%	6.8%	13%	24%	26%	30.2%
You think it is safe to increase/decrease your dose without consulting my doctor.	No.	12	37	67	68	108
	%	4.1%	12.7%	22.9%	23.3%	37%
Hypertension medications have serious side effects on your health.	No.	23	45	94	76	54
	%	7.9%	15.4%	32.2%	26%	18.5%
Hypertension can be prevented or its risk can be decreased.	No.	15	35	85	75	82
	%	5.1%	12%	29.1%	25.7%	28.1%

5.3.3. Section four: The duration of illness related questions:

This section assesses the effect of the duration of their illness on the participants' compliance with their treatment regimen as seen in table (5.5). This section included four questions. For

example, about half of the participants (50.7%, n=148) said it "always and often" affected their desire to take the drugs, 33.9% (n=99) indicated that as "sometimes" and 15.4% (n=45) reported that their desire of taking the antihypertensive medications was "rarely and never" affected by the duration of illness.

Table (5.5): The participants' responses to the questions related to the duration of illness and its effect on their compliance with treatment.

Variable		Always	Often	Sometimes	Rarely	Never
The long duration of your illness affects your desire to take my drugs.	No.	39	109	99	20	25
	%	13.4%	37.3%	33.9%	6.8%	8.6%
Because of the chronic nature of HTN, you don't take your drugs continuously.	No.	10	40	110	77	55
	%	3.4%	13.7%	37.7%	26.4%	18.8%
Because of the chronic nature of HTN, you don't follow the diet regimen and don't do recommended life-style changes.	No.	13	35	84	98	62
	%	4.4%	12%	28.8%	33.6%	21.2%
Because of the chronic nature of HTN you feel sad and depressed.	No.	19	66	113	52	42
	%	6.5%	22.6%	38.7%	17.8%	14.4%

5.3.4. Section five: The drugs' regimen related questions:

This section included five questions to explore the effect of the drugs' regimen on the participants' compliance as seen in table (5.6). For example, nearly half of the participants (51.4%, n=150) indicated that the frequent dosing of their drugs "always and often' affected their desire to take them, about one third (33.9%, n=99) said their desire to take the drugs was "sometimes" affected by the frequent dosing and 14.7% (n=43) reported that their desire to take the antihypertensive drugs was "rarely and never" affected by the number of times they had to take them per day.

Regarding their ability to remember their drugs regimen all the time, 33.2% (n=97) of the participants said it was "always and often" difficult for them to remember their drugs regimen

all the time, 44.9% (n=131) responded "sometimes". Finally, 26% (n=76) stated that the frequent change of their drugs' regimen by their doctor "always or often" decreased their desire of taking them whereas 37.3% (n=109) of them stated it as "rarely or never". Also the majority of the participants (72% (n=210) claimed that their adherence would have been "always or often" increased if they found all their drugs in one combined pill. (See table 5.6).

Table (5.6): The participants' responses to the questions related to the drugs' regimen:

Variable		Always	Often	Sometimes	Rarely	Never
Your drugs regimen (many times a day) decreases your desire of taking them.	No.	46	104	99	21	22
	%	15.8%	35.6%	33.9%	7.2%	7.5%
Your drugs regimen (many times a day), makes it difficult to remember them.	No.	16	81	131	38	26
	%	5.5%	27.7%	44.9%	13%	8.9%
The drugs you take for other chronic conditions affect your adherence to the treatment plan of hypertension.	No.	24	82	110	43	33
	%	8.2%	28.1%	37.7%	14.7%	11.3%
Frequent change of your drugs or drugs regimen by your doctor decreases your desire of taking them regularly.	No.	22	54	107	68	41
	%	7.5%	18.5%	36.7%	23.3%	14%
If you find all your drugs in one combined pill, this will increase your adherence to your drug regimen.	No.	134	76	50	15	17
	%	46%	26%	17.1%	5.1%	5.8%

5.3.5. Section six: The participants' relationship with the medical staff related questions:

As seen in table (5.7), this section included twelve questions that assess the effect of participants' relationship with the medical staff on their compliance with their treatment regimen or plan. In general, the findings revealed a good relationship between the participants and their treating doctor and the medical staff. For example, 53.1% (n=155) of the participants indicated that they were "always or often" seen by the same doctor when they visited the clinic, 26.7% (n=78) reported that as "sometimes".

Regarding the way they were treated during their visits to the clinic, 61.6% (n=180) of participants indicated that the doctor "always or often" treated them well during the visit and

only 5.8% (n=17) said they were "rarely or never" treated respectfully by the doctor. Furthermore, 49.3% (n=144) of the participants were "always or often" satisfied with the medical care they received in the clinic. Whereas, (50.7%, n=148) of the participants stated that the doctor hurried too much in order to finish the visit quickly and only 20.9% (n=61) answered that by "rarely or never". (See table 5.7).

Table (5.7): The participants' responses to the questions related to their relationship with the medical staff.

Variable		Always	Often	Some-times	Rarely	Never
The same doctor sees you in every visit you do to the clinic.	No.	56	99	78	33	26
	%	19.2%	33.9%	26.7%	11.3%	8.9%
The doctor treats you with respect when you visit the clinic.	No.	57	123	95	15	2
	%	19.5%	42.1%	32.5%	5.1%	0.7%
You are satisfied with the medical care you receive in the clinic.	No.	48	96	115	19	14
	%	16.4%	32.9%	39.4%	6.5%	4.8%
The doctor allows you to say everything you think is important for you.	No.	37	81	104	43	27
	%	12.7%	27.7%	35.6%	14.7%	9.2%
The doctor makes you feel foolish and embarrassed during the visit.	No.	14	26	54	82	116
	%	4.8%	8.9%	18.5%	28.1%	39.7%
The doctor acts too serious and formal toward you during the visit.	No.	30	73	121	44	24
	%	10.3%	25%	41.4%	15.1%	8.2%
The doctor is in hurry and wants to finish the visit quickly.	No.	61	87	83	40	21
	%	20.9%	29.8%	28.4%	13.7%	7.2%
The doctor ignores what you tell him about your condition.	No.	23	56	125	52	36
	%	7.9%	19.2%	42.8%	17.8%	12.3%

If you have a medical question, you can reach the doctor and ask him without problem.	No.	32	67	124	45	24
	%	11%	22.9%	42.5%	15.4%	8.2%
The doctor listens carefully to what you have to tell him.	No.	34	76	105	50	27
	%	11.6%	26%	36%	17.1%	9.2%
The doctor spends plenty of time with you during the visit.	No.	21	62	87	76	46
	%	7.2%	21.2%	29.8%	26%	15.8%
The medical staff deals with you friendly and with respect during the visit.	No.	81	101	72	27	11
	%	27.7%	34.6%	24.7%	9.2%	3.8%

5.3.6. Section seven: The clarity of drugs' usage instructions related questions:

The questionnaire included nine questions related to the clarity of the drugs-usage instructions given to the patient by the treating doctor and the medical staff in general. (See table 5.8)

The majority of the participants (72.6%, n=212) indicated that the drugs-usage instructions were "always or often" clear and simple. Further, More than one third of the participants (35.9%, n=105) indicated that the staff "always or often" explained to them the necessary life style modifications for their disease. Finally, 33.2% (n=97) of them reported that the treating doctor "always or often" gave them information or special advices to maintain their health and avoid illness, 41.1% (n=120) said "sometimes" and 25.7% (n=75) responded that they were "rarely or never" advised in this regard.

Table (5.8): The participants' responses to the questions related to the clarity of drugs' usage instructions:

Variable		Always	Often	Sometimes	Rarely	Never
The drug usage instructions given by the doctor are clear to me.	No.	96	116	59	18	3
	%	32.9%	39.7%	20.2%	6.2%	1%
The medical staff explains the necessary life style modifications for my condition.	No.	48	57	96	68	23
	%	16.4%	19.5%	32.9%	23.3%	7.9%
The medical staff show and train me how to perform self measurement of BP.	No.	41	40	56	56	99
	%	14%	13.7%	19.2%	19.2%	33.9%
The medical staff explains to me the importance of blood pressure control.	No.	66	91	98	29	8
	%	22.6%	31.2%	33.6%	9.9%	2.7%
The medical staff uses clear and simple language when giving me the instructions.	No.	55	139	87	9	2
	%	18.8%	47.6%	29.8%	3.1%	0.7%
The doctor tells me the reasons for every medical test he recommends for me.	No.	36	57	130	48	21
	%	12.4%	19.5%	44.5%	16.4%	7.2%
When my doctor changes my drug(s), he explains to me the reasons behind that.	No.	39	57	112	63	21
	%	13.4%	19.5%	38.3%	21.6%	7.2%
The doctor uses difficult medical terms without explaining to me what they mean.	No.	20	41	79	72	80
	%	6.8%	14%	27.1%	24.7%	27.4%
The doctor gives me information and advices about different ways to avoid illness and maintain health.	No.	35	62	120	49	26
	%	12%	21.2%	41.1%	16.8%	8.9%

5.3.7. Section eight: The family support related questions:

The degree of support that the family offers to their hypertensive patient in order to get the best results of treatment plan is another crucial factor that might affect patient's compliance. This section consisted of seven questions to explore this variable as seen in table (5.9) below.

Table (5.9): The participants' responses to the questions related to their family support.

Variable		Always	Often	Sometimes	Rarely	Never
Your family reminds you to take your hypertension's medications.	No.	104	105	46	24	13
	%	35.6%	36%	15.7%	8.2%	4.5%
Your family helps you to take your hypertension's medications.	No.	79	110	75	13	15
	%	27.1%	37.7%	25.7%	4.4%	5.1%
Your family helps you financially to get your hypertension's medications when you need.	No.	94	88	71	20	19
	%	32.2%	30.1%	24.3%	6.8%	6.6%
Your family helps you to measure your blood pressure.	No.	81	66	54	42	49
	%	27.7%	22.6%	18.5%	14.4%	16.8%
Your family helps you to reach the medical facility if you are tired or sick.	No.	141	62	62	12	15
	%	48.3%	21.2%	21.2%	4.1%	5.2%
Your family helps you to accomplish the life-style changes recommended by your doctor	No.	59	115	77	28	13
	%	20.2%	39.4%	26.4%	9.6%	4.4%
Your family encourages you to be compliant with your treatment plan.	No.	74	78	99	25	16
	%	25.3%	26.7%	33.9%	8.6%	5.5%

5.3.8. Section nine: The regularity on appointments and treatment plan related questions.

Thirteen questions were included in this section which discussed the participants' regularity on the doctor appointments and their adherence to the treatment plans recommended to them as seen in table (5.10). For example, the vast majority of them (77.8%, n=227) indicated that they were "always or often" regular on their doctor's appointments, 14.4% (n=42) indicated that they were "sometimes", and only 7.8% (n=23) reported that they were "rarely or never" regular on their doctor appointments.

Regarding how often they measure their blood pressure, 41.4% (n=121) said they "always or often" did that, 33.9% (n=99) responded "sometimes". For their weight, only 30.8% (n=90) of the study participants said that they "always or often" maintained a healthy weight as advised by their doctors and 31.2% (n=91) reported they "sometimes' tried to do that. Finally, 62% (n=181) of the participants reported that they "always or often" used their medications on regular basis as prescribed by their doctors (See table 5.9).

Table (5.10): The respondents' answers to the questions related to their regularity on their doctor appointment and treatment plans.

Variable		Always	Often	Sometimes	Rarely	Never
You are always regular at your doctor's appointments.	No.	122	105	42	9	14
	%	41.8%	36%	14.4%	3%	4.8%
You measure your blood pressure on regular basis.	No.	41	80	99	39	33
	%	14%	27.4%	33.9%	13.4%	11.3%
You do physical exercises according to your doctor's advice.	No.	13	45	101	55	78
	%	4.5%	15.4%	34.6%	18.8%	26.7%
You maintain a healthy weight according to your doctor's advice.	No.	22	68	91	58	53
	%	7.5%	23.3%	31.2%	19.9%	18.1%
You eat healthy foods (e.g. less salt etc) according to your doctor's advice.	No.	48	94	99	30	21
	%	16.4%	32.2%	33.9%	10.3%	7.2%
You use your antihypertensive drugs on regular basis as prescribed by your doctor	No.	77	104	89	14	8
	%	26.4%	35.6%	30.5%	4.8%	2.7%

You forget to take your medications because You have a busy life.	No.	14	39	93	95	51
	%	4.8%	13.4%	31.8%	32.5%	17.5%
When You feel well, you stop taking your antihypertensive medications.	No.	10	31	79	72	100
	%	3.4%	10.6%	27.1%	24.7%	34.2%
When You feel bad due to the side effects of drugs, you stop taking them without consulting your doctor.	No.	19	24	86	74	89
	%	6.5%	8.2%	29.5%	25.3%	30.5%
You visit the doctor personally for the follow-up and the drug prescription.	No.	117	114	43	10	8
	%	40.1%	39%	14.7%	3.4%	2.8%
You wait for a long time in the reception area whenever you visit the clinic.	No.	91	114	71	7	9
	%	31.2%	39%	24.3%	2.4%	3.1%
If you know that the medications will increase your weight, will you continue taking them.	No.	48	109	114	12	9
	%	16.5%	37.3%	39%	4.1%	3.1%
If you know that the medications will affect your sexual life, will you continue taking them.	No.	52	91	96	34	19
	%	17.8%	31.2%	32.9%	11.6%	6.5%

5.3.9. Section ten: The cost of treatment related questions:

Six questions discussed the effect of treatment's cost on the participants' compliance with their hypertension treatment plans as shown in table (5.11). For example, the participants were asked if the amounts that they paid for their health care were more than what they could normally afford and 26.4% (n=77) of the participants indicated that the health care costs were "always or often" more than what they could afford, the same percentages (26.4%, n=77) said the costs were "sometimes" beyond their affordability and 47.2% (n=138) said that the costs were "rarely or never" more than what they could afford.

Also, 16% (n=48) of the participants reported that they "always or often" did not follow their drugs' regimen or they ever went without the medical care they needed because they could not afford it, 43.8% (n=128) responded "sometimes", and 40.1% (n=117) indicated that they "rarely or never" went without the medical care they needed due to their inability of paying the costs. For full details refer to table (5.11).

Table (5.11): The participants' answers to the questions related to the cost of treatment and their compliance with the treatment plans.

Variable		Always	Often	Sometime	Rarely	Never
You have to pay for your medical care more than what you can afford.	No.	33	44	77	94	44
	%	11.3%	15.1%	26.4%	32.2%	15%
You don't follow drugs regimen or go without medical care because you can't afford.	No.	13	34	128	71	46
	%	4.5%	11.6%	43.8%	24.3%	15.8%
It is a problem for you to cover your share of the cost of medical care.	No.	25	47	116	70	34
	%	8.6%	16.1%	39.7%	24%	11.6%
You worry about having to pay large medical bills.	No.	17	55	114	59	47
	%	5.9%	18.8%	39%	20.2%	16.1%
The amounts you pay to cover your medical needs are reasonable.	No.	41	81	90	46	34
	%	14%	27.7%	30.8%	15.8%	11.7%
The high cost of your medications and treatment plan makes you less compliant with them.	No.	12	31	68	104	77
	%	4.1%	10.6%	23.3%	35.6%	26.4%

5.4. The participants' responses to the questionnaire items by some independent variables.

Cross-tabulation by using the Chi-squared test and Fisher exact test was done to assess the relationship between the questions of the questionnaire and some independent variables. The statistical significance was defined as a P-value of ≤ 0.05.

5.4.1. Cross-tabulation of the participants' responses to the questionnaire items by their gender.

The findings revealed that there are no statistically significant differences between males and females' responses to any of the questions related to the participants' knowledge, the duration of their illness, their regularity on doctor appointments, their relationship with the medical staff, the family support they receive, and the costs of the treatment plan(See appendix D).

For the drugs regimen items, cross-tabulation by gender revealed a statistically significant difference between males and females for one question only (q4). For example, the participants were asked if the frequent change of the their drugs or drugs' regimen by the doctor decreased their desire to take their medications and 27.3% of males versus 25.2% of females indicated that their desire was "always or often" decreased by the frequent change of their drugs or drugs regimen, 29.7% of males versus 41.4% of females said "sometimes" and 43% of males versus 33.4% of females reported that as "rarely or never" (p= 0.04). (See table 1, appendix D).

As for the clarity of drugs' usage instruction, cross tabulation showed no statistical significant relationship with their gender except questions 2 and 7**.** For example, the participants were asked about the clarity of information given to them by the medical staff about the life style changes and 35.5% of the males versus 36.2% of the females indicated that that medical staff members "always or often" gave them clear information about the necessary life style changes for their condition, while 37.2% of males versus 29.9% of females said "sometimes" and 27.3% of males versus 33.9% of females reported that as "rarely or never" (p = 0.01). (See table 2, appendix D).

For drugs' changes, 38.8% of the males versus 28.7% of the females said that the doctor "always or often" explained any change he/she made to their drugs, 28.9% of male versus 45% of females responded "sometimes" and 32.3% of males versus 26.3% of females responded that as "rarely or never". (p = 0.00). (See table 2, appendix D).

5.4.2. Cross tabulation of the participants' responses to the questionnaire's items by the clinic they attended:

In addition to gender, cross tabulation was done between all items of questionnaire and the clinic they attended for their medical care as shown in (appendix D). The findings revealed statistically significant differences for most of the questions related to the participants' knowledge and perception about hypertension disease (except q1, q2, q3, q5, q7, q15). For example, 55% of Yatta versus 59% of Dora and 67.9% of Karanteena clinic participants believed that hypertension may "always or often" lead to other serious conditions such as heart attack or stroke (p=0.04) . Also, 33% of Yatta versus 24.1% of Dora and 25.7% of Karanteena thought that the risk of getting hypertension "always or often" differed according to gender (p=0.01) (See table 3, appendix D).

Also, the majority of participants of Dora clinic (87.9%) versus 60% of Yatta and 75.2% of Karanteena indicated that decreasing tension and anger "always or often" helped to control their blood pressure (p=0.00). Further, 56% of Yatta versus 73.5% of Dora and 71.5% of Karanteena participants said they that the dietary changes "always or often" helped to control the blood pressure (p=0.04).

For the importance of physical activity in the control of blood pressure, 37% of Yatta versus 22.9% of Dora and 21.2% of Karanteena participants said that physical activity "rarely or never" helped them to control their blood pressure (p=0.01). Whereas, 56% of Yatta versus 81.9% of Dora and 75.2% of Karanteena participants thought that it is "always or often" necessary to take the hypertension medications regularly (p=0.00).

When the participants were asked if they think that the medications helped them to control their blood pressure, 53% of Yatta versus 74.7% of Dora and 62.4% of Karanteena participants responded "always or often" (p=0.00) and 23% of Yatta versus 15.6% of Dora and 20.2% of Karanteena said they "always or often" felt safe not to take their antihypertensive medications while 36% of Yatta versus 8.4% of Dora and 24.8% of Karanteena participants reported that as "sometimes". And 38% of Yatta versus 75.9% of Dora and 55% of Karnteena answered it "rarely or never" (p=0.00).

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Finally, 22% of Yatta versus 12% of Dora and 15.6% of Karanteena participants reported that they "always or often" felt safe to decrease or increase their drugs dose without consulting their doctor (p=0.00), and 40% of Yatta versus 72% of Dora and 53.2% of Karanteena participants believed that hypertension "rarely or never" could be prevented (p=0.00).

In addition, cross tabulation between the clinics they attended and the duration of illness related items showed no statistically significant relationships. Further, only two questions (q2 & q4) were statistically significant when cross tabulation was done between the clinic they attended and their drugs' daily regimen (See table 4, appendix D). For example, 40% of Yatta versus 24.1% of Dora and 33.9% of Karanteena participants said it was "always or often" difficult for them to remember to take their drugs due to their frequent daily regimen (p=0.02). Whereas 39% of Yatta versus 10.8% of Dora and 25.7% of Karanteena participants indicated that the frequent change of their drugs or drugs' regimen by the doctor "always or often" decreased their desire to take them (p=0.00).

For medical staff relationship, cross tabulation showed significant differences between the three clinics for all questions except for (q1, q3, q4, q6, q10). For example, 47% of Yatta versus 78.3% of Dora and 62.4% of Karanteena participants reported that the doctor "always or often" treated them with respect during the visit while 44% of Yatta versus 20.5% of Dora and 31.2% of Karanteena responded "sometimes" (p=0.00). (See table 5, appendix D).

Moreover, 23% of Yatta versus 14.4% of Dora and 17.4% of Karanteena reported that the treating doctor "sometimes" made them feel foolish and embarrassed (p=0.03). Also, 35% of Yatta versus 16.9% of Dora and 27.5% of Karanteena participants indicated that the doctor "always or often" ignored what they wanted to tell him/her and 31% of Yatta versus 53% of Dora and 45.9% of Karanteena participants said that it "sometimes" happened (p=0.04).

Furthermore, only 42% of Yatta versus 25.3% of Dora and 33% of Karanteena participants reported that they were "always or often" able to reach the doctor to ask him medical questions without a problem while 33% of Yatta versus 49.4% of Dora and 45.9% of

Karanteena participants responded as "sometimes" (p=0.00). Also 34% of Yatta versus 38.6% of Dora and 40.3% of Karanteena participants reported that the doctor "always or often" listened carefully to what they wanted to tell him/her (p=0.01).

For the way they were treated by the medical staff; 49% of Yatta versus 69.8% of Dora and 68.8% of Karanteena participants said they were "always or often" treated with respect while 32% of Yatta versus 25.35 of Dora and 17.4% of Karanteena participants answered it as "sometimes" (p=0.03).

Regarding the clarity of drugs usage instruction, the findings revealed significant relationship between the clinics they attended and four questions only (q2, q3, q4, q6). (See table 6, appendix D). For example, 46% of Yatta versus 36.2% of Dora and 26.7% of Karanteena participants indicated that the medical staff 'always or often" explained and gave them clear information about the necessary life style changes for their condition while 32% of Yatta versus 34.9% of Dora and 32.1% of Karanteena responded "sometimes" (p=0.02).

Participants were also asked if the medical staff ever showed or trained them to measure their blood pressure by themselves and 44% of Yatta versus 55.6% of Dora and 59.6% of Karanteena participants indicated that they were "rarely or never" trained to do so (p=0.00) meanwhile 68% of Yatta participants versus 37.4% of Dora and 53.2% of Karanteena participants reported that the medical staff "always or often" explained to them the importance of blood pressure control for their health (p=0.00).

Also, when the participants were asked if the treating doctor ever explained to them the reasons behind the medical tests he/she ordered for them, 29% of Yatta versus 24.1% of Dora and 18.4% of Karanteena participants said they were "rarely or never" told the reasons of the medical tests they ordered to do by their doctor (p=0.00).

Cross tabulation between family support related questions and the clinic they attended showed significant relationship with two questions only (q3, q5). (See table 7, appendix D). For example, 60% of Yatta 56.6% of Dora and 68.8% of Karanteena participants reported that their families "always or often" helped them financially to get their medications and 28% of

Yatta versus 27.8% of Dora and 18.4% of Karanteena participants responded "sometimes" (p=0.04).

Furthermore, 59% of Yatta versus 71.1% of Dora and 77.9% of Karanteena participants said that their families "always or often" helped them to reach the medical facility (clinic or hospital) when they were tired or sick and 29% of Yatta versus 15.7% of Dora and 18.4% of Karanteena responded as "sometimes" (p=0.00).

For the questions related to participants' regularity on their doctor appointments, cross tabulation showed statistically significant relationship for six questions (q1, q2, q7, q8, q11, q12). (See table 8, appendix D). For example, 68% of Yatta versus 80.7% of Dora and 84.4% of Karanteena participants said that they were "always or often" regular at their doctor appointments while 22% of Yatta versus 14.5% of Dora and 7.3% of Karanteena stated it as "sometimes" (p=0.00). Also, 40% of Yatta versus 39.8% of Dora and 44% of Karanteena participants stated that they "always or often" measured their blood pressure on regular basis whereas 38% of Yatta versus 25.2% of Dora and 36.7% of Karanteena indicated that they only "sometimes" measured their blood pressure on regular basis (p=0.00).

Further, 25% of Yatta versus 19.3% of Dora and 11% of Karanteena participants stated that they "always or often" forgot to take their medications because of their busy life while 26% of Yatta versus 36.1% of Dora and 33.9% of Karanteena participants answered "sometimes" (p=0.04). Also, 25% of Yatta versus 3.6% of Dora and 12% of Karanteena participants indicated that they had "always or often" stopped taking their medications when they felt well, while 27% of Yatta versus 28.9% of Dora and 25.7% of Karanteena participants responded that they "sometimes" did that (p=0.00).

furthermore, 53% of Yatta versus 54.2% of Dora and 54.1% of Karanteena participants said that they would "always or often" continue to take their antihypertensive medication even if they knew that they increase their weight and 35% of Yatta versus 39.8% of Dora and 42.2% of Karanteena participants answered it as "sometimes" (p=0.02).

Finally, 45% of Yatta versus 50.6% of Dora and 51.4% of Karanteena participants indicated that they would "always or often" continue to take their medications even if they knew that they would affect their sexual life (p=0.00).

Finally, cross tabulation between participants' responses to the questions related to the cost of treatment and the clinic they attended, revealed statistically significant relationship for three questions (q2, q3, q6). (See table 9, appendix D). For example, only 23% of Yatta versus 16.6% of Dora and 9.2% of Karanteena participants said that they "always or often" did not follow their drugs regimen or went without the medical care they needed because they could not pay the expenses (p=0.05).

Also, 26% of Yatta versus 25.3% of Dora and 13.8% of Karanteena participants claimed that they "always or often" had a problem to cover their share of the cost for the medical care they receive in the clinic, while 38% of Yatta versus 26.5% of Dora and 40.3% of Karanteena participants reported this as "rarely or never" (p=0.00). Finally, 21% of Yatta versus 15.1% of Dora and 8.3% of Karanteena participants said that the high cost of their treatment plans "always or often" made them less compliant, whereas, 53% of Yatta versus 58.4% of Dora and 73.4% of Karanteena participants reported that as "rarely or never" (p=0.01).

5.4.3. Cross tabulation of the participants' responses to the questionnaire's items by their age group:

Only three questions (q4, q10, q15) related to the participants' knowledge were statistically significant when cross tabulation was done according to the age group of the participant. (See table 10, appendix D). For example, 63.7% of the young participants versus 69.4% of the old participants thought that hypertension "always or often" leads to other serious conditions (p=0.01). Further, more than half of the young participants (51%) versus 37.9% of the old participants believed that physical activity "always or often" helped them to control their blood pressure (p=0.04).

Further, 22.5% of the young participants versus 23.7% of the old participants "always or often" thought that hypertension drugs had serious side effects that may affect their health,

whereas 51% of the young participants versus 41% of the old participants stated it as "rarely or never" (p=0.04)

Regarding the duration of hypertension disease; only one question was statistically significant (q3). (See table 11, appendix D). 59.8% of the young participants versus 52.1% of the old participants indicated that they "rarely or never" did not follow the diet regimen or the life style changes needed for their

For the drugs' regimen, three questions were statistically significant (q1, q2, q3). (See table 12, appendix D). For example, 42.1% of the young participants versus 56.3% of the old participants indicated that the frequent dosing of their drugs "always or often" decreased their desire to take them every day while 35.3% of the young participants versus 33.1% of the old participants said that it was "sometimes" the case with them (p=0.05).

Also, 32.3% of the young participants versus 33.7% of the old participants reported that they "always or often" had difficulty to remember their drugs regimen all the time, whereas 36.3% of the young participants versus 49.5% of the old participants answered that as "sometimes" and 31.4% of the young participants versus 16.8% of the old participants answered it as "rarely or never" (p=0.00).

Further, 28.4% of the young participants versus 40.5% of the old participants said that the drugs they were taking for other chronic conditions had "always or often" decreases their desire to take the antihypertensive medications or to follow the life style changes recommended by their treating doctor and 35.3% of the young participants versus 38.9% of the old participants responded "sometimes" (p=0.01).

Furthermore, the relationship with the medical staff did not differ significantly between the young (≤55years) and old participants (>55years) except (q6) for which only 16.6% of the young participants versus 26.7% of the old participants reported that the doctor was "rarely or never" formal and impersonal toward them during the visit while 44.2% of the young participants versus 30.7% of the old participants said "always or often" and 39.2% of the young participants versus 42.6% of the old participants stated it as "sometimes" (p=0.05). (See table 13, appendix D).

In addition to previous results, cross tabulation between participants' responses to the questions related to the clarity of drugs usage instructions and their age group revealed no statistically significant differences except for one question only (q3). The same percentages of the young and old participants (53%) reported that they were "rarely or never" trained how to perform self measurement of their blood pressure and 12.7% of the young participants versus 22.6% of the old participants said they were "sometimes" trained to do so whereas 34.2% of the young participants versus 24.2% of the old participants stated it as "always or often" (p=0.04). (See table 14, appendix D).

Similarly, most of the questions related to participants' regularity on doctor appointments revealed statistically significant differences between the different age groups for three questions only (q2, q12, and q13). (See table 15, appendix D). For example, 52% of the young participants versus 35.8% of the old participants reported that they "always or often" measured their blood pressure on regular basis and 33.3% of the young participants versus 34.2% of the old participants said they "sometimes" did that (p=0.01).

Also, 44.1% of the young participants versus 58.9% of the old participants believed that if they knew that their drugs would increase their weight they would "always or often" continue to take them, whereas 46.1% of the young participants versus 35.3% of the old participants stated it as "sometimes" (p=0.05). Further, 38.2% of the young participants versus 54.7% of the old participants said they would "always or often" use their drugs even if they knew they would affect their sexual life and 43.1% of the young participants versus 27.4% of the old participants responded "sometimes" (p=0.02).

Finally, cross tabulation did not reveal statistically significant differences between the young and old participants' responses to any of the questions related to their family support or the effect of the costs of their treatment plans on their compliance.

5.4.4. Cross tabulation of the participants' responses to the questionnaire's items by their marital status:

Also, cross-tabulation between participants' responses to questions related to their knowledge and perception of hypertension and their marital status revealed that only two questions (q3,

q5) had statistically significant relationship (See table 16, appendix D). For example, 50% of the single participants versus 36.2% of the married participants and 25.8% of the widow reported that they "always" considered hypertension as a serious problem. Whereas 20% of the single participants and 24.2% of the married participants versus 33.3% of the widow participants stated it as "sometimes" (p=0.01). Moreover 40% of the single participants and 29% of the married participants versus 88.9% of the divorced and 53% of the widow participants stated that they "rarely or never" thought hypertension has hereditary basis (p=0.00).

In addition, only one of the four questions related to the duration of illness revealed statistically significant relationship with participants' marital status. 80% of the single participants and 44.9% of the married participants versus 44.6% of the divorced and 65.2% of the widow participants stated that the long duration of their illness "always or often" affected their desire to take their medications. Whereas 38.6% of the married and 22.3% of the divorced participants versus 25.7% of the widow participants responded by "sometimes" while 20% of the single participants and 16.5% of the married participants versus 33.4% of the divorced and 9.1% of the widows stated it as "rarely or never" (p=0.00).(See table 17, appendix D).

For drugs' regimen, three questions (q1, q2, q3) yielded statistically significant relationship with marital status (See table 18, appendix D). For example, 60% of the single participants and 48.7% of the married participants versus 59.1% of the widow participants and 44.4% of the divorced reported that the frequent dosing of their drugs "always or often" decreased their desire to take them every day. Whereas, 10% of the single participants and 35.3% of the married participants versus 44.5% of the divorced and 31.8% of the widow participants stated it as "sometimes" (p=0.01).

Also, 50% of the single participants and 29.5% of the married participants versus 42.3% of the widow participants and 33.3% of the divorced participants indicated that it was "always or often" difficult for them to remember their drugs' regimen because they had to take their drugs many times a day. Further, 40% of the single participants and 44% of the married

participants versus 33.3% of the divorced and 50% of the widow participants stated that it was "sometimes" difficult for them to remember their drugs regimen (p=0.02).

Further, 30% of the single participants and 32.8% of the married participants versus 66.6% of the divorced and 43.9% of the widow participants reported that the drugs they were taking for chronic conditions other than hypertension "always or often" decreased their desire to take their antihypertensive drugs. Whereas, 60% of the single participants and 37.7% of the married participants versus 11.1% of the divorced and 37.9% of the widow participants indicated that as 'sometimes" (p=0.05).

Furthermore, no statistically significant differences were observed between participants' responses to the questions related to the relationship with the medical staff and their marital status except one question (q2) for which 70% of the single participants, 61.8% of the married participants and 66.7% of the divorced participants versus 59% of the widow participants indicated that the doctor had "always/often" treated them with respect during their visit.(p=0.01). (See table 19, appendix D).

Also, only three (q5, q6, q8) out of nine questions related to the clarity of drugs usage instructions had revealed statistically significant relationship with the participants' marital status (See table 20, appendix D). For example, 60% of the single participants and 67.6% of the married participants versus 66.7% of the divorced and 63.7% of the widow participants said that the medical staff "always or often" used clear and simple language when they gave them information and instructions regarding their disease control and medication. Whereas, none of the single participants and 3.9% of the married participants versus 22.2% of the divorced and 1.5% of the widow participants reported it as "rarely or never" (p=0.01).

Moreover, three items (q3, q4, q7) related to the family support had statistically significant relationship with the participants' marital status (See table 21, appendix D). For example, 40% of the single participants, 63.8% of the married participants and 55.6% of the divorced participants versus 62.1% of the widow participants stated that their families "always or often" helped them financially to get their medications. Whereas, 20% of the single

participants, 24.6% of the married participants and 22.2% of the divorced participants versus 25.3% of the widow participants responded by "sometimes" (p=0.03).

Also, 30% of the single participants, 52.2% of the married participants and 44.4% of the divorced participants versus 48.5% of the widow participants stated that their families "always or often" helped them in measuring their blood pressure, whereas 20% of the single participants, 29.4% of the married participants and 44.4% of the divorced participants versus 36.3% of the widow participants reported that their families "rarely or never" helped them in measuring their blood pressure (p=0.05).

Similar to previous findings, only three (q1, q4, q9) out of thirteen questions related to the participants' regularity on doctor appointments and the treatment plan revealed statistically significant relationship with their marital status (See table 22, appendix D). For example, 60% of the single participants and 76.8% of the married participants versus 66.7% of the divorced and 84.8% of the widow participants reported that they were "always or often" regular at their doctor appointments (p=0.05).

Furthermore, 40% of the single participants and 33.4% of the married participants versus 25.8% of the widow participants reported that they "always or often" managed to maintain a healthy weight whereas 60% of the single participants and 32.8% of the married participants versus 66.7% of the divorced and 46.9% of the widow participants stated that they "rarely or never" managed to maintain a healthy weight as advised by their doctor (p=0.02).

Regarding the treatment costs, two questions (q1, q3) of this section had statistically significant relationship with marital status (See table 23, appendix D). For example, 50% of the single participants and 26.6% of the married participants versus 22.3% of the divorced and 22.7% of the widow participants stated that they "always or often" had to pay for the medical care more than what they can afford and 50% of the single participants and 22.7% of the married participants versus 33.3% of the divorced and 33.3% of the widow participants stated it as "sometimes" (p=0.00).

Finally, 30% of the single participants and 24.6% of the married participants versus 22.7% of the widow participants and 33.3% of the divorced participants reported that they "always or often" had a problem to cover their share of the cost of their medical care (p=0.01).

5.4.5. Cross tabulation of the participants' responses to the questionnaire's items by their level of education:

Seven out of sixteen questions related to the participants' knowledge and perception of hypertension (HTN) revealed statistically significant relationship with the participants' level of education (See table 24, appendix D). For example, 44.8% of the none educated participants and 61.3% of those who got primary education versus 77.6% of those who got elementary education and 65.1% of those who got university education believed themselves to be "always or often" in good health whereas 38.1% of the none educated and 32.5% of those who got primary education versus 26.7% of those who got secondary education stated it as "sometimes" (p=0.00).

Furthermore, 61.9% of the none educated participants and 63.3% of those who got elementary education versus 60% of those who got secondary education and 74.4% of those who got university education believed that hypertension may "always or often" lead to other serious conditions while 27.6% of the none educated participants and 32.7% of those who got elementary education versus 33.3% of those who got secondary education and 13.9% of those who got university education indicated this as "sometimes". Also, 10.5% of the none educated participants and 4% of those who got elementary education versus 13.4% of those who got secondary education and 11.7% of those who got university education responded by "rarely or never" (p=0.02).

Moreover, 38.1% of the none educated participants and 37.6% of those who got primary education versus 53.3% of those who got secondary education and 58.1% of those who got university education thought that physical exercise "always or often" helped them to control their blood pressure whereas 30.5% of the none educated participants and 33.3% of those who got primary education versus 13.3% of those who got secondary education and 27.9% of

those who got university education thought that physical exercises "sometimes" helped them to control their blood pressure (p=0.01).

Similarly, 64.8% of the none educated participants and 55.1% of those who got primary education and 63.3% of those who got elementary education versus 53.4% of those who got secondary education and 74.4% of those who got university education believed that hypertension drugs "always or often" helped them to control their blood pressure, whereas 7.6% of the none educated participants and 10.1% of those who got primary education and 10.2% of those who got elementary education versus 13.3% of those who got secondary education and 9.3% of those who got university education indicated that the drugs "rarely or never' helped them to control their blood pressure (p=0.04).

For the duration of illness related questions, two questions (q1 & q2) had statistically significant relationship with the participants' level of education (See table 25, appendix D). For example, 56.2% of the none educated participants and 48.9% of those who got elementary education and 48.9% of those who got elementary education versus 46.7% of those who got secondary education and 32.5% of those who got university education reported that the long duration of their illness "always or often" affected their desire to take their hypertension drugs whereas 17.1% of the none educated participants and 7.6% of those who got primary education and 12.3% of those who got elementary education versus 20% of those who got secondary education and 27.9% of those who got university education stated it as "rarely or never" (p=0.03).

Finally, 19.9% of the none educated participants, 18.8% of those who got primary education participants and 12.3% of those who got elementary education versus 26.6% of those who got secondary education and 9.3% of those who got university education reported that because of the chronic nature of hypertension they "always or often" did not take their hypertension drugs continuously (p=0.05).

In addition, only one question related to drugs' regimen (q4) had statistically significant relationship with the level of education (See table 26, appendix D). For example, 34.3% of the

none educated participants and 33.7% of those who got primary education and 46.6% of those who got secondary education versus more than half 51.1% of those who got university education said that the frequent change of their drugs regimen "rarely or never" decreased their desire to take them (p=0.03).

The cross tabulation between the participants' responses to questions related to their relationship with the medical staff and their level of education showed statistically significant relationship for four questions (q1, q2, q3, q11) (See table 27, appendix D). For example, 48.6% of the none educated participants, 45% of those who got primary education and 53% of those who got elementary education versus 53.3% of those who got secondary education 79.1% of those who got university education indicated that they were "always or often" seen by the same doctor in every visit they did to the clinic while 22.8% of the none educated participants and 25% of those who got primary education versus 26.7% of those who got secondary education and 9.3% of those who got university education indicated it as "rarely or never" (p=0.00).

Also, 62.8% of the none educated participants, 61.2% of those who got elementary education versus 40% of those who got secondary education and 74.5% of those who got university education stated that the doctor "always or often" treated them with respect when they visited the clinic whereas 26.7% of the none educated participants and 40% of those who got primary education versus 53.3% of those who got secondary education and 23.2% of those who got university education stated it as "sometimes" (p=0.00).

Four questions (q1, q3, q6, q8) related to the clarity of drugs' usage instructions had statistically significant relationship with the participants' level of education (See table 28, appendix D). For example, the majority of the none educated participants (76.2%) and 66.2% of those who got primary education and 73.5% of those who got elementary education versus 66.7% of those who got secondary education and 76.8% of those who got university education indicated that the drugs usage instructions written by the doctor were "always or often" clear to them. Whereas, 17.1% of the none educated participants and 28.8% of those

who got primary education versus 20% of those who got secondary education and 14% of those who got university education stated it as "sometimes" (p=0.02).

Further, 21.9% of the none educated participants, 23.7% of those who got primary education, and 30.6% of those who got elementary education versus 46.6% of those who got secondary education and 39.5% of those who got university education indicated that the medical staff "always or often" trained them to do self measurement of their blood pressure whereas 57.1% of the none educated participants, 50% of those who got primary education and 63.3% of those who got elementary education versus 26.6% of those who got secondary education and 46.5% of those who got university education reported that as "rarely or never" (p=0.04).

For the family support, three questions (q1, q4, q7) had statistically significant relationship with the participants' level of education (See table 29, appendix D). For example, 71.4% of the none educated participants and 65% of those who got primary education versus 60% of those who got secondary education and 83.7% of those who got university education reported that their families "always or often" reminded them about their drugs while 13.4% of the none educated participants and 16.3% of those who got primary education versus 6.7% of those who got secondary education and 11.9% of those who got university education and responded by "rarely or never" (p=0.03).

Also, 47.6% of the none educated participants, 41.2% of those who got primary education, and 46.9% of those who got elementary education versus 40% of those who got secondary education and 81.4% of those who got university education indicated that their families "always or often" helped them in measuring their blood pressure whereas 39.1% of the none educated participants, 36.3% of those who got primary education and 22.5% of those who got elementary education versus 46.7% of those who got secondary education stated it as "rarely or never" (p=0.00).

In accordance with previous results, participants' responses to the questions related to their regularity on doctor's appointments and treatment plan showed statistically significant relationship with level of education in four questions (q2, q5, q8, q10) (See table 30, appendix D). For example, 25.7% of the none educated participants,42.4% of those who got primary

education and 49% of those who got elementary education versus 66.6% of those who got secondary education and 60.5% of those who got university education indicated that they "always or often" measured their blood pressure on regular basis whereas 41% of the none educated participants, 23.9% of those who got primary education, and 14.3% of those who got elementary education versus 13.4% of those who got secondary education and 2.3% of those who got university education and responded by "rarely or never" (p=0.00).

Moreover, 55.2% of the none educated participants, 46.3% of those who got primary education, and 44.9% of those who got elementary education versus 26.6% of those who got secondary education and 48.8% of those who got university education reported that they "always or often" managed to eat healthy food as advised by their doctor whereas 10.5% of the none educated participants, 20% of those who got primary education and 22.4% of those who got elementary education versus 33.3% of those who got secondary education and 18.6% of those who got university education and said that they "rarely or never" managed to do that (p=0.01).

Also, 20% of the none educated participants and 10.2% of those who got elementary education versus 40% of those who got secondary education and 11.5% of those who got university education stated that they "always or often" stopped taking their medications when they felt better whereas 59.1% of the none educated participants and 62.5% of those who got primary education and 51% of those who got elementary education versus 60% of those who got secondary education and 60.6% of those who got university education said that they "rarely or never" did that (p=0.00).

Finally, only one question (q1) related to the treatment costs revealed a statistically significant relationship with the participants' level of education (See table 31, appendix D). For example, 26.6% of the none educated participants, 33.7% of those who got primary education and 10.2% of those who got elementary education versus 20% of those who got secondary education and 32.6% of those who got university education indicated that they "always or often" had to pay for their medical costs more than what they could afford. Whereas 48.6% of the none educated participants, 45.1% of those who got primary education and 49% of those who got elementary education versus 60% of those who got secondary education and 41.8% of those who got university education indicated that as "rarely or never" (p=0.00).

5.4.6. Cross tabulation of the participants' responses to the questionnaire items related to the duration of their illness:

Cross tabulation was done between the participants' responses to the questions related to their knowledge and perception of hypertension and the duration of their illness, only one question (q1) showed a statistically significant relationship (See table 32, appendix D). For example, 64% of those who were diseased for less than ten years and 45.8% of those who were diseased for ten to twenty years versus 70.6% of those who were diseased for twenty years or more indicated that they "always or often" considered themselves to be in good health. Whereas, 28.6% of those who were diseased for less than ten years and 42.2% of those who were diseased for ten to twenty years versus 11.8% of those who were diseased for twenty years or more stated it as "sometimes" (p=0.02).

Also, cross tabulation between the duration of the disease and participants' responses to questions related to the effect of hypertension as a chronic disease on their compliance revealed statistically significant relationship for one question only (See table 33, appendix D). For example, 13.1% of those who were diseased for less than ten years and 21.7% of those who were diseased for ten to twenty years versus 29.4% of those who were diseased for twenty years or more indicated that they "always or often" did not follow their diet regimen or the necessary life style changes due to the chronic nature of hypertension. Whereas, 57.7% of those who were diseased for less than ten years and 51.8% of those who were diseased for ten to twenty years versus 35.3% of those who were diseased for twenty years or more reported that as "rarely or never" (p=0.04).

In addition, no significant relationship was found between duration of hypertension disease and the daily drugs' regimen, the participants' relationship with the medical staff or the clarity of the drugs' usage instructions given to them by the medical staff.

For family support related items, only two questions (q3 & q6) had statistically significant relationship with the duration period of their disease (See table 34, appendix D). For example, 68.2% of participants who were diseased for less than ten years and 54.3% of those who were diseased for ten to twenty years versus 35.3% of those who were diseased for twenty years or

more stated that their families "always or often" helped them financially to get their medications when they needed (p=0.00).

Also, 63.1% of participants who were diseased for less than ten years and 50.6% of those who were diseased for ten to twenty years versus 64.7% of those who were diseased for twenty years or more reported that their families "always or often" helped them to accomplish the life style changes as required by their treating doctor. Further, 11.4% of those who were diseased for less than ten years and 20.5% of those who were diseased for ten to twenty years versus 11.8% of those who were diseased for twenty years or more stated it as "rarely or never" (p=0.04).

Moreover, cross-tabulation between the participants' responses to the thirteen questions related to their regularity on doctor's appointments and the duration of their illness revealed statistically significant relationship for three questions only (q1, q4, q13) (See table 35, appendix D). For example, 81.3% of those who were diseased for less than ten years and 69.9% of those who were diseased for ten to twenty years versus 76.4% of those who were diseased for twenty years or more indicated that they were 'always or often" regular at their doctor appointments (p=0.05).

Also, 28.7% of those who were diseased for less than ten years and 31.3% of those who were diseased for ten to twenty years versus 52.9% of those who were diseased for twenty years or more stated that they "always or often" managed to maintain healthy weight as advised by their doctor. Whereas, 34.8% of those who were diseased for less than ten years and 45.8% of those who were diseased for ten to twenty years versus 35.3% of those who were diseased for twenty years or more reported that as "rarely or never" (p=0.00).

Finally, 46.3% of those who were diseased for less than ten years and 56.6% of those who were diseased for ten to twenty years versus 41.2% of those who were diseased for twenty years or more stated that they would "always or often" use their drugs even if they knew that these drugs would affect their sex life. Whereas, 13.6% of those who were diseased for less than ten years and 26.5% of those who were diseased for ten to twenty years versus 29.4% of those who were diseased for twenty years or more answered this "rarely or never". (p=0.00)

Lastly, three questions (q2, q4, q5) related to the treatment costs showed statistically significant relationship with the duration of illness (See table 36, appendix D). For example, only 10.4% of those who were diseased for less than ten years and 28.9% of those who were diseased for ten to twenty years versus 17.6% of those who were diseased for twenty years or more indicated that the expenses "always or often" prevented them from following their drugs regimen or forced them to go without the medical care they needed. While, 42.7% of those who were diseased for less than ten years and 32.6% of those who were diseased for ten to twenty years versus 47.1% of those who were diseased for twenty years or more indicated that as "rarely or never" (p=0.01).

Moreover, only 21.9% of those who were diseased for less than ten years and 27.7% of those who were diseased for ten to twenty years versus 41.2% of those who were diseased for twenty years or more stated that they "always or often" worried about having to pay large medical pills. Whereas, 35.9% of those who were diseased for less than ten years and 36.2% of those who were diseased for ten to twenty years versus 41.2% of those who were diseased for twenty years or more stated that as "rarely or never" (p=0.00).

Finally, 38% of those who were diseased for less than ten years and half (50.6%) of those who were diseased for ten to twenty years versus 41.1% of those who were diseased for twenty years or more reported that the amounts they pay to cover their medical needs were "always or often" reasonable. 27.6% of those who were diseased for less than ten years and only 22.9% of those who were diseased for ten to twenty years versus 47.1% of those who were diseased for twenty years or more answered this question as "rarely or never" (p=0.03).

5.5. Binary logistic regression

The logistic regression analysis was used to evaluate the association between the patient's compliance expressed as the level of blood pressure control and some other independent variables of the questionnaire as shown in table (5.12) below. The model with non-compliance as the dependent variable included the following independent variables (the reference categories are mentioned first): gender (female, male), body mass index (normal, obese, overweight), duration of illness (<10years, ≥10<20 years, ≥20 years), the presence of diabetes as co-morbidity (no, yes), the number of anti-hypertensive drugs prescribed (one, two, three or more), the frequency of doctor visits (once a month, once every three months, once every six months, more than six months), the clarity of medical instructions (always/ often, sometimes, rarely/never), the family and social support and encouragement (always/ often, sometimes, rarely/never), stoppage of the anti-hypertensive medications due to their adverse effects (always/often, sometimes, rarely/never), the perception of hypertension as a serious disease (always/often, sometimes, rarely/never). P-values of ≤ 0.05 were considered statistically significant in all analysis.

The logistic regression analysis of the study population revealed that the covariates gender, body mass index, the duration of illness, being diabetic, the number of drugs, the frequency of doctor visits, the clarity of medical instructions, the family support, the drugs' side effects, the belief that hypertension is serious health problem and the cost of the treatment plan significantly influence the compliance rate of the patients which is expressed as the blood pressure control outcome (<140/90 mmHg).

For example, the analysis revealed that the male participants were 1.591 (95% CI, 1.992-2.551) times non-compliant (have BP≥140/90mmHg) than females with a significance p=0.05. Also the body mass index appeared to have an overall significant relationship (p=0.00) with the BP level and those who were overweight were 1.941 (95% CI, 1.047-3.599: p=0.03) times less compliant than those with normal BMI and those with obese BMI were 3.078 (95%CI, 1.509-6.279: p=0.00) times less compliant than those with normal BMI.

The effect of the duration of illness was highly significant (p=.02) and those who were diseased for ≥10<20 years were 1.477 (95%CI, .878-2.487: p=0.14) times less compliant than

those who were diseased for less than ten years, while those who were diseased for twenty years or more were four times (95%CI, 1.345-11.819) less compliant than those who were diseased for less than ten years with a significant p-value = 0.01.

Further, the effect of having diabetes as another chronic diseases was examined and the results showed that those participants who were suffering from diabetes in addition to hypertension were 1.825 (95%CI, 1.825-1.110: p=0.01) times less compliant than those who were non-diabetic. Also, the number of drugs taken to treat hypertension revealed an overall statistically significant (p=0.00) effect on the level of blood pressure and those who were taking two drugs were 3.623 (95%CI, 1.833-7.161: p=0.00) times less compliant than those who were taking only one drug and those who were taking three drugs to treat their hypertension were 3.380 (95%CI, 1.537-7.434: p=0.002) times less compliant than those taking only one drug.

Furthermore, the frequency of the doctor visits for the follow up and the drugs prescription revealed statistically significant (p=0.02) association with the blood pressure level, and those who visited their doctor only once in every three months were 2.886 (95%CI, 1.434-5.807: p=0.00) times less compliant when compared to those who visited the doctor regularly every month, as well those who visited their doctor every six months were 2.389 (95%CI, 0.936-6.164: p=0.06) times less compliant than the monthly-visit regulars and those who visited their doctor less frequently than that were 1.962 (95% CI, 0.269-14.322: p=0.5) times less compliant. The last two findings were not statistically significant.

The participants perception of hypertension as a serious problem revealed an overall statistically significant effect on the BP level (p=0.03) and those who considered HTN is "sometimes" a serious condition were 2.680 (95%CI, 1.430-5.023: p=0.02) times less compliant when compared to those who considered it to be "always or often" a serious problem. Those who considered it to be "rarely or never" serious condition were 2.345 (95%CI, 1.845-6.510: p=0.00) times less compliant than those who considered it to be "sometimes" a serious problem.

As regard to the clarity of the drugs usage instructions, it appeared to have a statistically significant relationship with the BP level (p=.01). For example, those who reported that the

instructions were only "sometimes" clear were 2.436 (95% CI, 1.248-4.755: p=0.00) times less compliant than those who reported that the instruction were "always or often" clear and those who indicated that the instructions were "rarely or never" clear were 5.720 (95% CI, 1.096-12.607: p=0.00) times less compliant than those who responded "sometimes".

Also, the family encouragement revealed statistically significant association with blood pressure (p=.01) and those who said that they "sometimes" got family encouragement were 2.082 (95%CI, 1.441-1.721: p=0.02) times less compliant than those who "always or often" received encouragement and those who reported that they "rarely of never" got family encouragement were 2.940 (95%CI, 1.155-7.481: p=0.02) times less compliant than those who "sometimes" got family encouragement to be more compliant with their treatment plans.

As well, the side effects of the drugs taken for the treatment of hypertension and the stoppage of treatment due to these side effects revealed a statistically significant relationship with the blood pressure level (p=0.00) but the internal differences between the participants were not statistically significant.

Finally, the cost of the treatment plan showed statistically significant relationship with the compliance rate with treatment and those who reported that the cost was "sometimes" reasonable to them were 2.235 (95%CI, 1.256-5.044: p=0.02) times less compliant than those who said the cost was "always or often" reasonable, and those who stated that the cost was "rarely or never" reasonable were 4.260 (95%CI, 1.856-11.502: p=0.00) times less compliant.

On the contrary, logistic regression analysis revealed that the patients age group, education level, work status, smoking status, marital status, family history, daily dosing, and regimen interruptions did not affect the compliance of the participants with their treatment regimen.

Table (5.12): Binary logistic regression with BP level

Variable	B	S.E.	Wald	Df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
Sex: Ref: female				1		1		
(male)	.464	.241	3.714	1	.05	1.591	1.992	2.551
BMI. (ref=normal)			9.584	2	.00	1		
(overweight)	.663	.315	4.437	1	.03	1.941	1.047	3.599
(obese)	1.124	.364	9.553	1	.00	3.078	1.509	6.279
Age group (ref=age≤55years)				1		1	.	
(>55 years)	.373	.252	2.191	1	.13	1.453	886	2.382
Education (ref=non educated)			8.171	4	.08	1		
(primary)	.388	.298	1.689	1	.19	1.474	.821	2.645
(elementary)	-.345	.359	.922	1	.33	.708	.350	1.432
(secondary)	.154	.554	.077	1	.78	1.167	.394	3.454
(university)	-.661	.393	2.832	1	.09	.516	.239	1.115
Work (ref=employed)			8.099	4	.08	1		
(unemployed)	.956	.438	4.765	1	.02	2.603	1.103	6.143
(retired)	.596	.611	.952	1	.32	1.815	.548	6.008
(house wife)	.340	.386	.776	1	.37	1.405	.659	2.997
(own business)	1.030	.491	4.394	1	.03	2.800	1.069	7.333
Smoking (ref= never smoke)			8.323	4	.08	1		
(Smoke<10 cigarettes)	-1.139	.515	4.889	1	.02	.320	.117	.879
(Smoke10-20 cigarettes)	-1.088	.635	2.932	1	.08	.337	.097	1.170
(Smoke >20 cigarettes)	-1.447	.771	3.521	1	.06	.235	.052	1.066
(Ex-smoker)	-1.355	.477	8.059	1	.00	.258	.101	.657
Marital status (ref=single)			.587	3	.89	1		
(married)	-.302	.648	.217	1	.64	.739	.208	2.633
(divorced)	-.693	.949	.534	1	.46	.500	.078	3.210
(widowed)	-.368	.680	.292	1	.58	.692	.183	2.626
Illness duration (ref=<10years)			7.504	2	**.02**	1		
(>=10<20yrs)	.390	.266	2.157	1	.02	1.477	1.878	2.487
(>=20years)	1.386	.553	6.290	1	.01	4.000	1.354	11.819
Presence of diabetes(ref=no)				1		1		
(yes)	.601	.253	5.632	1	.01	1.825	1.110	2.998
Number of drugs(ref=one)			14.116	2	**.00**	1		
(Two drugs)	1.287	.348	13.704	1	.00	3.623	1.833	7.161
(Three drugs or more)	1.218	.402	9.172	1	.00	3.380	1.537	7.434

	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Family history (ref=no)				1		1		
(yes)	.292	.241	1.472	1	.22	1.339	.835	2.147
Daily drugs regimen (ref=once)			2.510	2	.28	1		
(twice a day)	.406	.262	2.395	1	.12	1.501	.897	2.510
(3 times or more per day)	.367	.386	.908	1	.34	1.444	.678	3.074
Regimen interruptions (ref=none)			3.320	3	.34	1		
once	.758	.466	2.645	1	.10	2.133	.856	5.317
twice	.814	.487	2.798	1	.09	2.256	.870	5.855
Three times or more	.693	.425	2.661	1	.10	2.000	.870	4.600
Frequency of doctor visits (ref=once a month)			11.160	3	.02	1		
Once every three months	1.060	.357	8.822	1	.00	2.886	1.434	5.807
Once every 6 months	.875	.480	3.320	1	.06	2.389	.936	6.146
More than 6 months	.674	1.014	.442	1	.50	1.962	.269	14.322
Consider HTN serious problem: (ref=always or often)			10.435	2	.03	1		
sometimes	.986	.321	9.456	1	.02	2.680	1.430	5.023
rarely or never	.85 2	.521	2.676	1	.00	2.345	1.845	6.510
Instructions are clear (ref=always or often)			13.134	2	**.01**	1		
sometimes	.890	.341	6.805	1	.00	2.436	1.248	4.755
rarely or never	1.744	.570	9.347	1	.00	5.720	1.096	12.607
Family encouragement (ref=always or often)			13.200	2	**.01**	1		
sometimes	.734	.318	5.336	1	.02	2.082	1.441	1.721
rarely or never	1.078	.477	5.122	1	.02	2.940	1.155	7.481
Stoppage due to side effects (ref= always or often)			16.157	2	**.00**	1		
sometimes	.434	.509	.727	1	.03	1.543	1.569	4.183
rarely or never	.888	.529	2.819	1	.04	2.412	1.146	1.160
The amount you pay to cover your share of cost is reasonable (ref= always or often)			12.135	2	**.01**	1		
Sometimes	.886	.320	8.449	1	.02	2.235	1.256	5.044
Rarely or never	.863	.544	2.556	1	.00	4.260	1.856	11.502

5.6. Summary

- Two hundred ninety two hypertensive patients participated in the current study. According to the PHC clinic they attend, 37.3% (n=109) attended Karanteena clinic, 28.4% (n=83) attended Dora clinic and 34.2% (n= 100) attended Yatta clinic.

- Out of 292 participants, 169 (57.9%) had controlled blood pressure level (<140/90 mm Hg) and were considered to be compliant with their treatment plan, whereas 123 (42.1%) had a blood pressure measurement of ≥140/90 mmHg and were considered non-compliant with their treatment regimen.

- Regarding their gender, 41.4% were males and 58.6% were female patients. Their ages ranged from thirty seven to eighty seven years and 65.1% of them were over 55 years of age.

- The majority were house wives (48.3%), only (13.7%) were employed, (18.8%) were unemployed, (5.5%) were retired from their jobs and (11.3%) had their own business.

- Only 23.6% of the participants had normal body mass index (18.5-24.99kg/m^2), 53.1% were overweight (25-29.99 kg/m^2) and 23.3% were obese (>30kg/m^2).

- 47.6% of the participants were diagnosed as hypertensive by chance while performing a routine check up and 52.4% of them were diagnosed after they complained from the symptoms of hypertension.

- 65.75% of the participants suffered from hypertension for less than 10 years, 28.08% had the diseases for ≥10<20 years, and 6.17% of them were diseased for twenty years or more.

- The logistic regression analysis revealed that the following variables had statistically significant relationship with the compliance rate: gender, BMI, duration of illness,

being diabetic, number of drugs, frequency of doctor visits, clarity of instructions, family support, side effects of the drugs, the perception of hypertension as a serious problem, and the cost.

- The logistic regression analysis revealed that the participants' age group, education level, work status, smoking status, marital status, family history with hypertension, daily dosing, and regimen interruptions did not have statistically significant relationship with compliance.

Chapter Six

Discussion

6.1. Introduction

This chapter discusses the major findings of the present study and the interpretation of its findings in relation to previously conducted studies found in literature review. The participants' characteristics and their responses to the questionnaire items are discussed. Also, the relationship between some selected dependent and independent variables are highlighted by using many statistical analyses tests. For example, frequency and percentages were calculated for each variable and question and cross tabulation was done between some independent variables such as age, gender, education level, marital status…..etc and both their compliance rate and their answers to all research questions. To test the relationships, further logistic regression analysis was utilized. The results of these statistical tests are discussed in each of the following sections:

- Section one: The characteristics of the participants.

- Section two: Compliance rate.

- Section three: The participants' responses to the questionnaire items.

- Section four: Limitations and recommendations

6.2. Section one: The characteristics of the current study's participants:

The majority of the participants were females (58.6%) whereas (41.4%) were males. Regarding the ages of the participants, they were middle-aged to elderly and their ages ranged between 37-87 years of which 65.1% were above 55 years.

Most of the subjects were from low socioeconomic status as 13.0% of them reported earning ≤1000 NIS, 35.1% earned 1001-2000 NIS, 25.3% earned 2001-3000 NIS and 9.6% indicated that their monthly income was more than 3000 NIS, whereas 16.8% were without income at all. These findings may indicate that nearly two third of the participants (61%) of the participants were under the Palestinian poverty line which is defined by the Palestinian

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Central Bureau of Statistics (PCBS) as a monthly income of less than 2375 NIS (PCBS, 2010). Further, the majority of the participants were house wives (48.3%), only 13.7% were employed, 18.8% were unemployed, 5.5% were retired and 11.3% had their own business. These findings supported the Palestinian statistics' findings which showed that the unemployment in Palestine reached 33.3% for those aged 15 years and older (PCBS, 2010).

Regarding their place of residence, 37.3% were from Hebron, 34.2% were from Yatta, and 28.5% were from Dora city. This might be because of the proportional sampling that was utilized in the current study to select the participants from the three different primary care clinics in Hebron area. Also, the majority of the participants (76.4%) were either overweight (BMI=25-29.9 kg/m²) or obese (BMI=30 kg/m² or more) while only (23.6%) had normal body mass index (BMI=18.5-24.9 kg/m²).

Furthermore, the vast majority of the participants (70.5%) were married, (3.4%) were single, (3.1%) were divorced, and (22.6%) were widowed. This finding may reflect the normal distribution of the participants' age as 90.8% of the Palestinian elderly males (>60 years) are married, versus 42.8% of the elderly females, and 8.4% of the elderly males were widowed versus 49.7% of the elderly females (PCBS, 2010).

As well, one third (34.9%) of the participants were illiterate, (26.7%) reported receiving primary education (1-6 years), (16.8%) got elementary education (7-9 years), (5.2%) reached the secondary school and (14.7%) had a college or university degree. These results are similar to the data shown by the Palestinian Central Bureau of Statistics which revealed that 44.8% of the old people (>60 years) in Palestine were illiterate in 2010 and those who got diploma or higher were not more than 8.2% of this age group (PCBS, 2010).

Finally, more than half of the participants (55.1%) reported that they never smoke cigarettes and (37%) were smokers at the study time while (3.8%) were ex-smokers. This could be partially explained by the fact that (58.6%) of the study participants were females and smoking is unfamiliar habit among women in the conservative community of Hebron. Also, the data from PCBS showed that only 30.3% of old males versus only 2.7% of old females in Palestine were regular smokers in 2010.

The binary logistic regression analysis was utilized to reveal the relationship between the socio-demographic characteristics of the participants and other independent factors and their compliance with their treatment plans. This could be beneficial in the treatment of hypertensive patients in order to identify whether these variables are risk or protective factors. The findings revealed that only participants' gender and body mass index had a statistically significant effect on their compliance. For example, males were 1.591 (OR: 1.591: 95%CI, 1.992-2.551: p=0.05) times less compliant than females. This was similar to the results of a meta-analysis of several studies conducted by Jokisalo et al.(2002) which reported a slight difference as 14% of males and 13% of females were non-compliant with their antihypertensive medication. Also, Boris & Wijk (2009) and Bloom (1998) found that males were less compliant with their anti-hypertension treatment plans than females. Whereas Aguado et al. (2009); Al-Sowielem & Elzubair (1998) and Bovet (2002) reported no statistically significant differences between males and females which were supported by Jin et al. (2008) who stated that gender is not a good predictor of non-compliance. On the contrary, Munger et al. (2007) indicated that women exhibited more non-adherence than men.

Also, regarding the participants body mass index, the logistic regression revealed that those who were overweight were 1.941 (95%CI, 1.047-3.599: p=0.03) times less compliant than those with normal BMI and the obese patients were 3.078 (95%CI, 1.509-6.279: p=0.00) times less compliant than those with normal body mass index. This suggests the body mass index as a risk factor for non-compliance and an obstacle in the controlling of blood pressure level as the majority of the overweight (57.8%) and obese (69.1%) were females. This may require more attention for increasing the motivation for the healthy life style among the patients who attend PHC. These results were in line with other previous observations. For example, the American Obesity Association stated that the prevalence of hypertension was 5-6 times greater among obese compared to non-obese American individuals aged 20-45 years (AOA, 2010). Also, Ham & Yang (2011) found that overweight patients had lower rates of blood pressure control and suggested to reduce uncontrolled BP, that public health efforts should target these patients. Moore et al (2006) who conducted a screening in the public schools of Oklahoma, USA found that being overweight as an adult is associated with elevated blood pressure and that relative risk (RR) for those with BMI at or above the 85th percentile for their age group and getting persisted high blood pressure after three readings

was (RR=6.70; 95% CI, 1.99–22.55). Similarly, Karlberg et al. (2000) stated that among children, both systolic blood pressure (SBP) and diastolic blood pressure (DBP) were significantly (*P*=0.05) and positively related to body mass index (BMI) values in obese and non-obese groups after adjustment for age, gender, and height. Finally, Lioyd-Jones et al. (2000) reported that obesity was significantly associated with lack of blood pressure control (OR for BMI≥30 versus <25 kg/m^2, 1.49, 95% CI 1.08 to 2.06, P<0.05).

On the other hand, the logistic analysis of the current study revealed no statistically significant relationship between compliance rate and the participants age group (p=0.13), their marital status (p=0.89), their level of education (p=0.08), their work status (p=0.08), and their smoking status (p=0.08). This was in line with some of the previous studies in literature while other studies revealed different results. For example, Alba Aguado et al. (2009) and Bovet et al. (2002) reported no statistically significant differences between old and young patient regarding their compliance rates, whereas Al-Swielem & Elzubair (1998); Bloom (1998); and Jin et al. (2008) found that elderly people were more likely to be compliant than the young. On the contrary, Eugenia et al. (2005) found that the compliance was more common among those aged <60 years (22.3% vs. 3.8% of those over 60, p=0.005). Another study showed that only 20% of the old patient (≥65years) exhibit good compliance (Munger et al. 2007). Furthermore, Boris & Wijk (2009) who analyzed and compared data from three different countries (Pennsylvania, USA; British Columbia, Canada; and Netherlands) on the compliance of hypertensive patients to their treatment found that older age was associated with lower rate of compliance in the three populations (Boris & Wijk, 2009).

Also and in contrary to the current findings, Jin et al. (2008) found that the status of being married was positively associated with patient's medication compliance and Morgado et al. (2010) revealed that married participants were more likely to be compliant with their treatment (OR, 5.3; 95% CI, 1.7-16.4; P<0.004).

Finally, similar to the current study findings, Bovet (2002) indicated that there was no statistically significant association between the education level of the hypertensive patients and their compliance rate. While some studies such as Jokisalo et al. (2002) and Jin et al. (2008) and Eugenia et al. (2005) found that compliance was higher in those with better level of education (17.6% lyceum or university graduates versus 9% in those with lower education,

p<0.05). On other hand, Al-Sowielem and Elzubair (1998) showed that the compliance rate was significantly higher among illiterate participants than the educated ones (Al-Sowielem & Elzubair 1998).

6.3. Section two: Compliance rate

The management of hypertension and other chronic diseases is widely practiced in the primary healthcare centers in Palestine. This study tried to explore the factors that affect the compliance of hypertensive patients with their treatment plan and regimen in the primary health care clinics. Although some factors that affect compliance are complex, several factors with consistent impact on compliance have been identified. In general, the results of the current study are similar to the findings of many other previous studies which appear in the literature. These showed that there is a low rate of compliance with the treatment plan of hypertension and that non-compliance is an important factor that prevents patients from achieving the desired healthcare outcomes (Elzubair et al., 2000; Sigrid et al., 2001; Al-Soweilem & Elzubair, 1998; Hajjar, 2003; Bovet et al. 1994).

Many methods for measuring the compliance rate have been reported in the literature, but none of them was claimed to be optimal or gold standard. Some of these methods are subjective in their nature such as asking the patients themselves to rate their compliance with their treatment or by using a standardized, patient-administered questionnaire. Other methods are objective approaches such as the tablets count method, the use of medication events monitoring devices, revision of pharmacy records, the therapeutic outcome method and the biochemical markers analysis.

In the current study, a combination of both subjective and objective methods for measuring the patients' compliance rate were utilized. For the objective assessment of compliance the therapeutic outcome that is the patient's blood pressure as an indicator of compliance was used because it is an easy, fast and convenient for both of the patients and the researcher. For the subjective assessment of compliance the participants were asked many subjective questions regarding their compliance with the different aspects of the treatment plan. For example, the participants were asked about their regularity on the doctor's appointments, their

compliance with the doctor advices regarding their diet and physical activity and finally their regularity on taking their medications as prescribed to them.

The findings revealed that only 57.9% of the participants were complaint with their treatment plan and had their blood pressure level <140/90 mm Hg. However, 77.8% of the participants reported that they were always / often regular at their doctor appointments, and only 62% of them indicated that they always / often take their antihypertensive drugs on regular basis as prescribed. Further, only 41.4% of them reported that they "always / often" measured their BP on regular basis, 30.8% "always / often" managed to maintain a healthy weight as advised, and 48.6% "always / often" ate healthy foods as advised by their doctor.

Also, the participants' compliance was assessed by six subjective questions that are related to important aspects of hypertension treatment. In general, the majority of those participants who obeyed the doctor's recommendations had controlled (<140/90 mmHg) blood pressure and were considered compliant. Three out of six questions showed statistically significant differences between the participants. For example, those who measured their BP on regular basis, those who managed to do physical exercise and those who managed to eat healthy foods as advised by their doctor had significant lower BP levels than others who did not obey the doctors' advices. The participants' compliance according to their statistically significant answers to these subjective questions was little bit more than their compliance which was assessed by objective measurement of their blood pressure (i.e.57.9%), this difference might be due to the exaggerated positive self-reported answers of the participants to these questions (See table 5.2).

These results indicate that the participants' obediance of the doctor's advices increases their ability to control their blood pressure significantly. This is in line with the findings from a cross-sectional study conducted by Elzubair et al., (2000) which reported that only 59.6% of the hypertensive patients were compliant with their treatment plans (Elzubair et al., 2000) and similar to the findings of the study conducted by Sigrid et al., (2001) which reported that 58% of the participants had their blood pressure controlled and were compliant with their treatment plans (Sigrid et al., 2001). Likewise, Cramer et al. (2008), who defined compliance as the patient's possession of medications for more than 80% of their days on therapy, found that

only 59% of patients were compliant to their treatment in a follow up for one year (Cramer et al. 2008).

These findings were higher than those reported by other studies. For example, in Saudi Arabia, Al-Soweilem & Elzubair (1998) indicated that only 34.2% of the participants had controlled blood pressure and were compliant with their treatment plans (Al-Soweilem & Elzubair, 1998). Also, Bovet et al. (1994) found that in the first month of follow up, only 46% of the patients achieved good compliance, and only 26% achieved this level at the twelfth month of follow up (Bovet et al., 1994). As well, Eugenia et al. (2005) reported lower compliance to antihypertensive treatment and found only 15% while Morgado et al. (2010) reported that 48.2% of the participants were highly compliant with their medications and only 33.0% of them attained controlled blood pressure levels (Morgado et al. 2010).

On other hand, some studies in the literature reported higher compliance rates than the current study. For example, Jokisalo et al. (2002) in Finland found that 86% of the hypertensive patients were compliant with their treatment plans (Jokisalo et al.2002) while Cathrene et al. (1995) in the United Kingdom revealed that 95% of the participants were compliant with their treatment plans (Cathrene et al.1995). These findings of high rates of compliance might be due to the high-quality of the healthcare services that are available in these developed countries or because they have adopted different mechanisms in measuring the compliance rate as Jokisalo used self-reported non-compliance method and Cathrene used the tablet-count method.

Further, as mentioned previously, cross tabulation was done between the participants' compliance rate and some independent variables (table 5.1). Findings showed that only gender, BMI, and smoking status had statistically significant relationship, while the age, the clinic they attended, the marital status, the education level, the work status, and the monthly income did not. For example, females were more compliant than males (62.6% vs. 51.2%, p=0.05) and those with normal body mass index were more compliant than others with higher BMI (72.5% of normal, 56.8% of over weight, 45.6% of obese, p=0.00). Also, smokers were (55-57%) less compliant than non or ex-smokers (61-64%).

In Palestine, improving the compliance rate of the chronically diseases patients and particularly hypertension would be very necessary for the patients and the health care system because of the high morbidity and mortality of cardiovascular diseases. For example, the 2011 bi-annual report of the Palestinian Ministry of Health showed that cardiovascular diseases were accounted for 20.44% (n=727) of the total deaths and were considered the main leading cause of death in Palestine, whereas cerebra vascular diseases caused 11.3% (n= 402) of the total deaths and were the second cause. It also revealed that hypertension alone had caused 3.59% (n=128) of the total deaths. Also, as hypertension is a well recognized risk factor for the cardiovascular and cerebra vascular diseases such as stroke, heart attack ..etc, patients' compliance with their treatment plan and the control of their blood pressure levels could reduce these dangerous complication, saving large amounts of money spent on the treatment and rehabilitation of such complications and reduce the rate of admissions in the Palestinian hospitals. So the compliance rate of 57.9% may not considered high from the public health point of view as the findings showed that 65.75% (n=192) of the participants were diseased for less than ten years and the logistic regression revealed that their compliance rate will decrease if the duration of their disease increases. Further, this percentage (57.9%) may not reflect the actual percentage of the patients who are compliant with their hypertensive treatment plan because the data collection depends on self reported questionnaire so the patients may exaggerate their answers. This conclusion is supported by the results which showed that as high percentages of the participants (53.4%) were readmitted to the hospitals once or more because of their disease and 46.6% were never admitted. So the high admission rate may reflect the non compliance of these patients with their treatment plan. In order to overcome this discrepancy between the findings of the self reported questionnaire and their actual compliance rate, further quantitative studies are required to assess the relapse rate among the hypertensive patients in Palestine by using other methods such as checking the number of their readmission to the hospitals as recorded in their files or performing blood test

In summary, these findings may require appropriate management and monitoring of hypertension by the health team in primary care, the patients and their families.

6.4. Section two: The participants' responses to the questionnaire's items

This section discusses the other 9 variables that may affect the compliance rate of the hypertensive patients with their treatment plan as the follows:

6.4.1. Medical history

A medical history is a record of health information about a person and his or her close relatives. These factors can give clues to medical conditions that they have and help the healthcare professionals to determine whether an individual is at an increased risk of developing a particular condition or not. Knowing one's medical history allows the health care provider to take steps to reduce his or her risk of developing the disease or its complications and to form a suitable treatment plan such as recommending more frequent screening or by encouraging regular checkups and adopting healthier lifestyle (Louise, 2011).

In the current study, slightly less than half (47.6%) of the study participant were diagnosed by chance while doing a routine check of their blood pressure. This could be justified by the asymptomatic nature of hypertension which necessitates the developing of an effective screening strategy for hypertension as otherwise such big percentage (47.6%) will go unrecognized and untreated. Bovet et al. (2002) found that the mean compliance rate for the participants who knew their blood pressure before diagnosis was significantly higher than those who did not know (84% vs. 50%, p=0.028) (Bovet et al. 2002). Whereas, Al-Sowielem & Elzubair (1998) did not find any significant effect of the way of diagnosis of hypertension on the patients compliance rates (Al-Sowielem & Elzubair, 1998).

Also, the majority of the participants (69.5%) reported suffering from different co-morbidities such as diabetes, asthma and arthritis. For example, 32.2% of them were diabetic, and as a consequence, they had to take other drugs to treat these co-morbidities. This might increase the total number of drugs they have to take every day, add more pressure on them, increase their costs and may compromise their compliance with their treatment plans. The logistic regression showed that being diabetic and hypertensive at the same time significantly decreases the patient's compliance rate as diabetic patients were 1.825 times less likely to have their blood pressure controlled than those non-diabetic hypertensive patients (OR, 1.825; 95%CI, 1.110-2.998; P=0.01). This finding was in line with those reported by Sigrid et al.

(2011) who found that the hypertensive patients who suffered from diabetes as a co-morbidity were significantly less likely to be compliant and less to reach the BP control level than those without diabetes (26% vs. 64%, p < 0.001) (Sigrid et al. 2011). Similarly, Morgado et al. (2010) found that diabetes hypertensive patients were less likely to have controlled blood pressure (OR, 4.4; 95% CI, 1.4-13.5; P<0.011) than those with hypertension alone (Morgado et al. 2010). As well, Munger et al. (2007) stated that the patient's adherence with the antihypertensive agents was consistently lower in patients with other chronic conditions. On the contrary, Al-Sowielem & Elzubair (1998) claimed that the presence of other chronic disease did not significantly affect the compliance rate (Al-Sowielem & Elzubair, 1998).

Further, more than half of them (56.8%) reported a family history of hypertension. Many previous studies (Al-Sowielem & Elzubair 1998; and Nuesch 2001) found that the family history had no effect on the patient's compliance rate. Similarly, in the current study, the logistic regression of the family history was not statistically significant (OR, 1.339; 95%CI, 0.835-2.147; p=0.22). However, as more than half of the participants reported a family history of hypertension, this might be taken into account as a risk factor in any screening program that might be implemented in the future for early detection and treatment of hypertension.

Regarding medication, findings showed that there are problems with frequent changing of drugs by the treating doctors and patients' interruption of their schedule. For example, frequent changing of antihypertensive drugs or drugs' regimen make it difficult for the patient to adhere strictly to the treatment plan as they need time to get acquainted to the new regimen (Eugenia et al. 2005). Eugenia et al. (2005) found that the compliance rate was better among those participants who had never changed their antihypertensive drugs or regimen (95.1% versus 25.5% among those with at least one change, p<0.005) (Eugenia et al. 2005). In the current study, only 26.7% of the participants reported that they had never changed their drugs' regimen while the majority (73.3%) had changed their drugs' regimen once or more. So it is important that the primary care doctors consider the effect of changing drugs on the compliance of the patients with their treatment plan.

Also taking antihypertensive drugs regularly as prescribed is an important factor to keep blood pressure under control and within the recommended level. In this study, only 11% (n=32) of the participants stated that they had never interrupted their drugs' regimen, 50%

(n=145) did that once or more and 39.4% (n=115) said that they did not 't remember. The logistic regression revealed that it had no statistically significant (p= 0.34) relationship with their compliance rate.

Finally, self and regular measurement of blood pressure is useful for the assessment of the treatment effects by the doctor and is valuable for the patients in improving the management of their high blood pressure. The patient gains a strong sense of responsibility for his/her health and become more motivated to control hypertension by improved diet, physical activity and proper use of medication which can reduce the complications of hypertension and minimize the frequency of patient's hospitalization (Morgado et al. 2010). Checking blood pressure at a home setting where the patients spend most of their time is an important aspect of managing hypertension in order to help the patients and their treating doctor to detect any possible complication at early stages and it is highly recommended by the American Heart Association (AHA, 2010). A significant percentage of the patients (67.2%) of the current study reported that they did not have a sphygmomanometer at homes. One possible explanation is that most of the participants were poor and unemployed so they can not buy a blood pressure measuring machine or they may not consider it as an important device to have at home. Further, they may depend on health professionals to measure it during their visit to the clinic because they are not trained to measure it by themselves.

In addition to the previous problem of the lack or the unavailability of blood pressure devices, the findings supported the lack of blood pressure measurement training of the patients by the health professionals which affected the patients' frequency of measuring their blood pressure. For example, only 5.1% of them reported that they measured their blood pressure every day and more than half (53.1%) of them reported that they were "rarely or never" trained to measure their blood pressure by health professionals. Morgado et al.(2010) indicated that the lack of blood pressure regular monitoring was associated with higher rates of non-compliance and uncontrolled blood pressure (OR, 2.5; 95%CI, 1.2-5.2; P=0.015) and similar results were reported by Coyne et al. (2000). Home monitoring is an easy step that the patient can perform to improve his/her condition and blood pressure monitors are available widely in the market and in different models (manual and digital devices) and prices. So it's important to know the right method of blood pressure measurement to avoid mistakes. This

could only be achieved by training the patients by qualified professionals such as nurses and doctors (ESH, 2008). There is a need to increase the awareness of nurses and medical staff about the importance of self management by the patients themselves in primary care because this action may help in decreasing the work load on the staff and encouraging the client to monitor any complication early.

6.4.2. Participants' knowledge and perceptions

The participants' knowledge and perceptions about hypertension were explored and the results revealed a variation in their knowledge. For example, the participants' answers revealed poor knowledge regarding the possibility of preventing hypertension by modifying its risk factors, the differences in hypertension's risk between males and females, the effect of physical exercise on controlling blood pressure and the role of heredity in developing the disease.

For example, only 17.1% of the studied patients believed that the risk of hypertension could "always or often" be prevented and less than one third (27.8%) believed that the susceptibility of getting hypertension differs according to gender. Also 42.6% of them believed that physical exercise could "always or often" help them to control their hypertension. As well, despite the high percentage of positive family history of hypertension (56.8%), only 32.5% of the patients were aware about the role of hereditary in the etiology of the disease and there were slight differences between the none educated and educated patients regarding this statement. For instance, 36.2% of the non-educated and 34.7% of those who got elementary education versus 34.9% of those who got university education stated that they "always or often" thought that hypertension has hereditary basis. Further less than half of the participants (42.6% (n=124)) believed that physical activity "always or often" helped them in controlling their blood pressure.

The lack of knowledge among hypertensive patients is also supported by Jin et al. (2008) who found that the patients' knowledge about their hypertension diseases and treatment aspects is not always adequate, as some patients lack understanding of the role their therapies play in the treatment while others lack knowledge about the disease itself and the consequences of poor

compliance. He concluded that the patient's education and counseling about the disease and its treatment are very important to enhance compliance (Jin et al. 2008).

On contrary, the current results revealed better knowledge in other aspects of the disease such as the effect of old age on the risk of developing the disease, the effect of salt intake on blood pressure levels, the effect of stress and anger on hypertension control and their perception of hypertension as a serious problem. For example, more than two thirds (67.1%) of the participants thought that hypertension is "always or often" a serious problem and 60.9% of them believed that it could "always or often" lead to other serious problems such as stroke, heart attack and renal failure. This influenced the participants' compliance to their treatment as those who "sometimes" considered it to be serious were 2.680 (95%CI, 1.430-5.023; p=0.02) times less compliant when compared to those who considered it to so "always or often". As well, those who answered by "rarely or never" were 2.345 (95%CI, 1.845-6.510; p=0.00) times less compliant than those who responded "always or often" to the related question. This was in consistency with the results of Morgado et al. (2010) who reported that the patient's unawareness of the hypertension risks double-folds (OR=2.1, P=0.026) their non-adherence. Also, Bovet et al. (2002) stated that those patients who had good health awareness in general were better compliers with their treatment plans and patients who were knowledgeable about the risks of hypertension were more compliant to treatment than others (OR, 2.1; 95%CI, 1.1-4.2; P<0.026) (Morgado et al. 2010). Similar findings were reported by Coyne et al. (2000).

In addition, 66.7% of them believed that the risk of the disease increases by age, two thirds (66.8%) reported that regulating salt intake could always or often help to control their blood pressure, and finally, 73.6% of the participants believed that stress and anger "always or often" affects blood pressure level. This might be gained through their experience with the disease or through the advices frequently given to them by the treating doctor or medical staff such as being relax and staying away from nervousness. Finally, 54.8% (n=160) of them reported that their adherence to the diet regimen and the life style changes recommended to them by their treating doctors were "rarely or never" affected by the chronic nature of their hypertension.

Moreover, the comparison between the different clinics revealed a variation regarding their knowledge. For example, those from Yatta clinic showed poor knowledge regarding the complications of high blood pressure (55% of Yatta versus 59% of Dora and 67.9% of Karanteena clinic participants), and gender risk in comparison with other clinics (33% of Yatta versus 24.1% of Dora and 25.7% of Karanteena) (p=0.01).

Finally, some questions were answered positively by low percentage of clients but their answers may indicate further risk in future from the point view of public health. For example 19.8 of the participants reported that they "always or often" felt safe or not necessary to take their medications and 16.8% of them thought it was "always or often" safe to increase or decrease their dose without consulting the treating doctor. These findings emphasize the important role of the primary healthcare providers in educating the patients during their clinic visits about the risk of stopping or changing the dose of their medication without consulting their doctors

The knowledge about the disease and its treatment is an important factor in achieving the targets of the therapy and affect the insight and attitude of the patients toward their treatment plan and disease (Jokisalo et al. 2001). Some researchers suggested awareness campaigns and mass screening programs to successfully carry out public health interventions, by addressing the existing gaps in the prevention and the control of hypertension and other cardiovascular diseases (Gupta, 2009). For example, it was found that the participants who thought that the current life style was important for future health achieved better (81%) compliance rate versus (51%) for other participants (Bovet et al. 2002). As well, it was found that the participants who were aware of the target blood pressure for their cases were more compliant to their treatment plans than those who were not aware of that (OR, 3.7; 95% CI, 1.9-7.4; P<0.001), and the patients who knew the exact indications of their drugs were more compliant to treatment plans (OR, 2.4; 95%CI, 1.1-5.2; P<0.021) (Morgado et al. 2010).

Therefore more effort should be dedicated to educate the patients in primary health care clinics about their disease and to correct their misconceptions by conducting seminars or workshops and devoting more of the staff time to the patients' education.

6.4.3. Duration of the disease and treatment period

The long duration of the disease and treatment period may make the patients feel bored and affect their desire to take their drugs regularly as prescribed by their doctor (Chapman et al. 2005). The results of this study revealed that the majority of the participants (65.75%) suffered from hypertension for less than ten years, 28.08% of them were having the disease for ≥10<20 years, and 5.82% were diseased for twenty years or more. This long duration affected their desires to take their medications as about half of the participants (50.7%) indicated that the long duration of their disease "always or often" affected their desire to take their antihypertensive medications. The logistic regression analysis of the current study revealed that the patients' compliance was inversely and significantly related to the life span of the disease and those who had a long duration of the disease were less compliant than those who had short duration. For example, those who were ill for ≥10<20 years were less compliant than those who were ill for less than 10 years (OR,1.477; 95%CI, 1.878-2.487; p=0.02) and those who were diseased for 20 years or more were four times less compliant when compared with those who were diseased for less than 10 years (OR, 4.0; 95%CI, 1.354-11.819; p=0.01). This result was on contrary with Nuesch et al. (2001) who found that there were no differences between compliant and non-compliant patients depending on the duration and extent of the treatment of their hypertension but similar to Bovet et al. (2002) study which found that fewer than half (46%) of the new hypertension patients followed the achieved satisfactory compliance rate in the first month, and only about one-quarter (26%) achieved this level by the twelfth month. Likewise, Jin et al. (2008) stated that the duration of treatment period adversely affected the compliance and that acute illnesses are associated with higher compliance than chronic diseases (Jin et al. 2008). Also, Chapman et al. (2005), who defined compliance as at least 80% of days potentially covered with medications, found that the compliance rate of the patients decreases as the duration of the treatment increases dropping from 45% at 3 months to 36% at 12 months after initiation of therapy (Chapman et al. 2005). Therefore the healthcare provider should consider this problem and continuously encourage the patient to adhere to the treatment plan.

6.4.4. Treatment schedule

The treatment schedule or the daily drug's regimen is a very important factor that may affect the patient's compliance. The simpler the treatments' schedule, the more the patient's compliance. In order for the antihypertensive medications to be effective, the patient should take them exactly as they are prescribed. This is called compliance or adherence. It means taking the correct doses of the prescribed medication(s) by the correct way and at specific time intervals as they are supposed to take them. It's the responsibility of the treating doctor to choose the most simple and effective treatment schedule for his/her patients after discussing that with them (Nuesch et al., 2001).

In the current study, the findings revealed that slightly more than one third (35.29%) of the study participants were having single daily dose, 51.36% were on twice daily dosing (BID) and 13.35% were on three doses a day (TID) or more. This affected their desire to take their medications as nearly half of the participants (51.4%) indicated that the frequent dosing of their drugs "always or often" affected their desire to take them. However, the logistic regression analysis showed that the frequency of daily dosing did not have a statistically significant effect on the compliance rate or on the blood pressure control level (OR,1.5; 95% CI, 0.897-2.510; P=0.28). It was in contrary to the findings of many previous studies which showed that simplifying the medication regimen significantly affected the compliance with the treatment plans. For example, Nuesch et al. (2001) found that the patient's compliance dropped significantly from 93% (SD 16%) with a once daily dosing regimen to 77% for twice daily dosing regimen (Nuesch et al. 2001). Also, Eugenia et al. (2005) reported that compliance was more common among those taking one tablet per day than those taking more than one tablet (37.8% vs. 8.2%, p<0.005) (Eugenia et al. 2005) and Iskedjian et al. (2002) found that the mean compliance of those on once-daily dosing was 91.4% and exceeded the compliance among those with multiple daily doses (83.2%); OR=4.46, P< 0.001 (Iskedjian et al. 2002). Similar results were also reported by Dunbar-Jacob et al.(2003); Dulmen et al.(2007); Thrail et al.(2004); and Boris & Wijk (2009), Eisten et al.(1990), Lee et al. (1996), Schroeder et al.(2004), Jing Jin et al. (2008), Coyne et al. (2000) and Jokisalo et al. (2002).

Further, in addition to the frequent dosing, the majority of the participants were taking more than one drug as (57.2%) used two drugs for their hypertension, (21.6%) of them had a single

antihypertensive drug, and 21.2% took three drugs or more. The logistic analysis of the study findings revealed that the patient's compliance rate was more with mono-therapy than with those taking two, three drugs or more (p=0.00). For example, those patients who were taking two drugs were (OR, 3.623; 95%CI, 1.833-7.161; p=0.00) less compliant than those who were taking only one drug and those who were taking three drugs or more were (OR, 3.380; 95%CI, 1.537-7.434; p=0.00) less compliant. This coincides with results from previous studies of Ingrersoll & Cohen (2008), Dulmen et al. (2007), Bloom (1998), Sigrid et al. (2011) and Munger et al. (2007) which also showed that mono-therapy significantly improved compliance whereas the literature review conducted by Jin et al. (2008) and the study conducted in Saudi Arabia by Al-Sowielem & Elzubair (1998) concluded that compliance did not correlate with the number of drugs prescribed. Interestingly, other studies found that the higher number of medications predicted better compliance (George & Shalansky, 2007). For example, Jokisalo et al. (2002) reported that compliance was more prevalent in the hypertensive group with two drugs than in that with one drug (OR: 0.47, 95% CI: 0.23-0.97) (Jokisalo et al.2002).

Furthermore, because of the occurrence of the side effects of the drugs taken for the treatment of hypertension the patients may hesitate to take them which may affect their compliance negatively. The findings of the current study revealed that 23.3% of the participants reported that their drugs "always or often" had side effects which affected their health, and 32.2% indicated that as "sometimes". The logistic regression analysis revealed a statistically significant (p=0.00) relationship between the side effects and the patients non-compliance with their treatment plans. For example, those who said they "sometimes" had drugs' side effect were (OR, 1.543; 95%CI, 1.569-4.183; p=0.03) more complaints than those who "always or often" experienced the side effects and those patients who indicated that they "rarely or never" had side effects were (OR, 2.412; 95%CI, 1.146-1.160, p=0.04) more compliant than others.

Also Jokisalo et al. (2002) found an association between non-compliance and the experience of adverse drug effects, and the patients who had experienced adverse drug effects were significantly more likely to be non-compliant (17%) than those without adverse drug effects (11%) (OR, 1.41; 95% CI, 1.03, 1.94; p<0.05). As well, Morgado et al. (2010) concluded that

those patients who reported drugs side effects were less likely (OR=3.7, 95% CI, 1.6-8.3; P<0.002) to be compliant with their medications. Similar results were reported by Guo et al, (2001); Thrail et al. (2004); Bloom (1998); Coyne et al. (2000); and Munger et al. (2007). Therefore, one suggested strategy to overcome this problem is that the treating doctor may titrate the drug's dose to every patient individually, so that he/she can determine the minimum effective dose of each drugs. Also, he/she can prescribe combination pills which contain more than one drug but in less amounts. Further, close monitoring of drugs' side effects and their affects on patients' compliance in primary care can be done by increasing doctors' awareness about their effect on patients' compliance.

6.4.5. The patient- prescriber relationship

The patient-prescriber relationship is another crucial factor that may affect the patient's compliance, and a healthy relationship based on trust, support, empathy, and respect could improve the compliance rate (Jin et al. 2008; Coyne et al. 2000; and Thrail et al. 2004). Dulmen et al. (2007) reported that good communication between the doctors and the patients increases compliance as it increases the patients' knowledge about the disease and its treatment and correct the misconceptions that they may have about their disease. As well, it improves the trust and the good relationship between the patient and the physician (Dulmen et al. 2007).

In general, the findings revealed positive relationship between the patients and their treating doctors as the majority of them (61.6%) reported that the doctor "always or often" treated them with respect during the visit. Also, 53.1% of the participants indicated that they were "always or often" seen by the same doctor in every visit they did to the clinic, whereas 20.2% of them stated that they were seen by different doctor in every visit. Being followed by the same doctor is very critical for building trust between the patient and his/her treating doctor, Eugenia et al. (2005) found that the compliance rate among those patients who never changed their doctor was better than others who had changed doctors (33.8% versus 6.9%, p<0.005). Further, they also found that the compliance was more common among patients being followed by the private doctor (25% versus 10% of those followed by a doctor on duty, p<0.005). This difference was attributed to the effect of counseling, which was more

frequently provided by the private doctors (59.3% versus 9.3% of doctors on governmental duty, p< 0.001) (Eugenia et al. 2005).

When comparing between the different clinics, the weak relationship between the patient and the medical staff was reported by the participants in Yatta clinic and the strongest was reported in Dora clinic. For example, 47% of Yatta versus 78.3% of Dora and 62.4% of Karanteena participants reported that they were "always or often" treated with respect by the doctor (p=0.00). Also, 23% of Yatta versus 14.4% of Dora and 17.4% of Karanteena participants said they were "sometimes" made feel foolish by the treating doctor (p=0.03). As well, 35% of Yatta versus 16.9% of Dora and 27.5% of Karanteena participants indicated that they were "always or often" ignored by their doctors (p=0.04). Further, only 49% of Yatta versus 69.8% of Dora and 68.8% of Karanteena participants said they were "always or often" treated with respect by the medical staff (p=0.03).

On other hand, the findings revealed deficits in some of the communication skills such as the lack of listening and the hurries to treat the patients. For example only 36.6% of the participants stated that the doctor "always or often" listened carefully to them, and about half of them (50.7%) reported that the doctor "always or often" hurried too much in order to finish the visit quickly, while 28.4% responded as "sometimes". One possible explanation for these findings is the work load and the large number of patients who attend these clinics as there are 5000 patients who regularly attend Karanteena clinic for the health services (448 of them are hypertensive), 3700 patients attend Dora clinic (342 of them are hypertensive), and 4500 patients attend Yatta clinic (410 of them are hypertensive). As a consequence, there is may be no enough time for counseling or communication between the doctors and the patients rather than prescribing medications. These findings may emphasize the need to improve the relationship between the patients and the medical staff by improving their communication skills. Further, it may be advisable that the administrations of these clinics do the necessary amendments to lower the work load of the staff or to arrange the case loads over the working days in order to spare some time for the communication and the education of patients in order to answer their questions. As good communication is one of the best ways to build trust and to start a good relationship between the doctor and his/her patients (Cooper et al 2009), it has been found that communication skills programs for the doctors treating hypertensive patients

were positively associated with the patients' compliance and hence improve their health outcomes by increasing patient's engagement, activation, and motivation to comply with the treatment plan of their disease (Cooper et al 2009).

6.4.6. Clarity of instructions

The clarity of the instruction given to the patients regarding the drugs usage and the necessary life style modifications is another factor that may motivate the patients to follow their treatment plans. Also the medical recommendations should be simple and clear for them. The findings of the current study did not reveal a complain regarding this issue as the majority of the participants (72.6%) reported that the drugs-usage instructions were "always or often" clear and simple, 20.2% reported that the instructions were "sometimes" clear and 7.2% said they were rarely if at all clear to them.

The logistic regression analysis revealed that the clarity of the medical instructions directly and positively affects the rate of compliance of the hypertensive patients. For example, the participants who reported that the instructions were "sometimes" clear to them were (OR, 2.436; 95%CI, 1.248-4.755; p=0.00) less compliant than those who indicated that they were "always or often" clear whereas those who reported that the instructions were "rarely or never" clear for them were less compliant with their treatment plans (OR, 4.260; 95%CI, 1.856-11.502; p=0.00).

This is in consistency with the finding of Jokisalo (2002) who found that patients with system-oriented problems such as lack of clear instructions and information were four times more likely to be non-compliant with their treatment plans. As well, Mahender et al. (1978) and Torrey (2009) stated that the clarity of written instructions for taking medications positively influenced the patients' compliance with treatment.

6.4.7. Family support

The social and family support affect positively e patient's attitudes towards their diseases and its treatment, and their motivation to comply with their treatment plan and to implement it as prescribed by their treating doctors (Dulmen et al. 2007).

For example, Jin et al. (2008) stated that the patients who had an emotional support and help from the family members, the friends or the healthcare providers were more likely to be compliant with their treatment plan. In addition, Schroeder et al. (2004) reported that the motivational strategies applied on the patients were successful and they increased their adherence by 23%. Also, Dulmen et al. (2007) found that the practical social and family support yielded significantly high effect on patients' compliance and there was a 0.65 SD difference in compliance between the patients receiving the practical social support for their treatment regimens and those did not receiving this support.

The current study findings showed that most of the participants received a good support from their family members including financial aids, taking medication, seeking medical services and encouragement to follow up their treatment. For example, 71.8% of them reported that they "always or often" were reminded about their medications by their family members, 64.8% indicated that they "always or often" got help from their family members in taking their medications, and 62.3% stated that they "always or often" had financial support whenever they needed. Further, 69.5% of them reported that their family members "always or often" helped them to reach the medical facility when they were ill, and 52% of them said they were "always or often" encouraged by their family members to comply with their treatment plans. One possible explanation of the high percentage of family support is the nature of the Hebron community and its social values which emphasize the role of the extended family in protecting its members and providing a help and a support particularly for sick people.

Also, the logistic regression of the current study revealed that family encouragement had statistically significant (p=0.01) effect on the patients' compliance as those who reported that they "sometimes" received family encouragement were (OR, 2.082; 95%CI, 1.441-1.721; p=0.02) less compliant than those who "always or often" received such support and those who said that they "rarely or never" got family encouragement were (OR, 2.940; 95%CI, 1.155-7.481; p=0.02) less compliant with their treatment plans.

Moreover, the participants of Karanteena reported receiving better family support than those of Dora and Yatta clinics. For example, 24% of Yatta versus 26.5% of Dora and 44% of Karanteena participants reported that they "always" got financial help from their family to buy

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their medications when they needed (p=0.04). As well, 59% of Yatta versus 71.1% of Dora and 77.9% of Karanteena participants stated that their families "always or often" helped them to reach the medical facility (clinic or hospital) when they were tired or sick (p=0.00). So, the patients' families in Yatta clinic could be included in an education programs that target patients' support to ensure their support and participation in the treatment plans of their relatives.

Furthermore, when family support was compared between patients according to the duration of their disease, the newly diseased patients (<10years) reported more family support and encouragement that other patients who were diseased for longer periods. This could be justified by the fact that the long duration of disease may affect the patients as well as their families and may decrease their desire to follow up their treatment plan.

6.4.8. Regularity on the follow ups and the treatment plan

In addition to the previous variables, the study explored some behavioral aspects of the patients' non-compliance such as the frequency of doctor visits and their regularity on the follow ups. Regular contact between the patient and the treating doctor has been shown to improve the patients' regularity on their treatment plan and to reduce the possible complication of hypertension that evolve from a poor drug compliance (Burnier, 2007).

The findings of the current study revealed high rate of follow up as the majority of the participants (77.8%) reported that they were "always or often" regular at their doctor's appointments. Also 53.8% of them were visiting their doctor regularly every month, 21.9% did that more than once a month, 14.4% every three months, and only 8.2% of them were visiting their doctor less frequently. One possible explanation of the high commitment of the patients to their appointment is their easily access to the medical services in their place of residence and their need to receive their freely drugs monthly. Another possible explanation is that as these patients consider or perceive their disease as a "serious" as mentioned previously, this may motivate them to follow up their medical visits with their doctors. Further the majority of the participants had a family history of hypertension, so they may learn this behavior from their family members in addition to the family support. Finally, the

data collection of this study depends on self reported questionnaire so the participants may exaggerate their answers

The logistic regression of the findings of the current study revealed that the frequency of doctor visit significantly improved the patients' compliance as those who were visiting their doctor every three months were (OR, 2.886; 95%CI, 1.434-5.807; p=0.00) less compliant when compared to those who visited their doctor regularly every month.

Also Bovet et al. (2002) reported that among the participants who attended follow up regularly, satisfactory compliance was found initially in a large proportion of the participants (73.9%), which decreased to 52.2% by the sixth month and 54.5% by the twelfth month. Also, the participants who attending follow up irregularly, satisfactory compliance was found only among 29.4% of the patients by the first month and 5.9% by the twelfth month (Bovet et al. 2002). Likewise, Al-Sowielem & Elzubair (1998) stated that the patients who were regular on follow-up had higher compliance rate than those who were irregular (37.8% vs. 17.6%, p<0.02) (Al-Sowielem & Elzubair 1998).

6.4.9. The costs

The cost of the treatment is the final factor that this study explored because the chronic diseases and particularly hypertension are costly and the therapy may constitute a large portion of patients' income. In this study, despite the fact that more than 95.8% of the participants pay only small amounts of money for their treatment plan as a co-payment, the logistic regression analysis revealed that the cost was an important factor that affected their compliance significantly. However, the participants' answers varied regarding this issue. For example, 41.7% of the participants said that the amounts they paid to cover their medical needs were "always or often" reasonable, 30.8% stated that as "sometimes" and only 14.7% of them said their compliance was "always or often" affected by the high cost of their treatment plan. This was not a surprise because the participants were selected from the primary health care clinics which belong to the Palestinian Ministry of Health in which drugs are free and the patients may pay only very small amount of co-payment. It was reported that 19.56% of the population of the West Bank (105223 families = 491887 individuals) were covered by one form of different types of health insurance whereas Gaza Strip's population were 100%

covered by free health insurance (Palestine MoH 2010). However, one possible reason for the complaining of the participants regarding the cost is the low rate of employment rate among them as 16.8% of them were without income at all and more than 65.1% of them were poor according the criteria of the Palestinian Central Bureau of Statistics as shown in section one of this chapter.

This was supported by the findings of the logistic regression which revealed a significant relationship as those participants who stated that the amounts they pay to cover their share of the treatment plan were "sometimes" reasonable were (OR, 2.235; 95%CI, 1.256-5.044; p= 0.02) less compliant that those participants who said that the amount was "always or often" reasonable, and those who indicated that the amounts were "rarely or never" reasonable were (OR, 4.260; 95%CI, 1.856-11.502, p=0.00) less compliant with their treatment plan.

When participants were compared according to their level of education, those with high level of education were the least to have problems with the cost. For example, 44.1% of those who got university degree versus 30.5% of the none educated participants stated that they "rarely or never" had a problem to cover their share of the costs. One possible explanation is that 65% of those holding university degree were earning more than 2001 NIS a month versus 20.20% of the none educated and 30.3% of the none educated were without income at all versus 00% of those with university degree (p=0.00). When comparing the participants according to the clinic they attended, the results showed that 66.68% of Yatta participants were poor (earning ≤2000 NIS) or without income at all in comparison with 62.21% of Dora participants and 62.04% of Karanteena participants (p=0.043). This may indicate the need to revise the co-payment policy in PHC in poor areas such as Yatta by the Palestinian Ministry of Health.

Previous studies such as Elzubair et al. (2000) revealed that the only variable that was positively and significantly associated with non-compliance was being unable to buy the drugs (p<0.001) (Elzubair et al. 2000). Similarly, Guo et al (2001); Sigrid et al. (2011); Munger et al.(2007); Coyne et al. (2000); and Jing Jin et al. (2008) showed that the financial problems of the patients or their inability to purchase their drugs, specially those who had no insurance cover or had low income, significantly and adversely affects their compliance with their treatment plans.

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6.5. Conclusion

This might be the first study in Palestine assessing the compliance rate of the hypertensive patients with their treatment plan and regimen. In general, the findings indicated low level of compliance (57.9%) with the treatment plans among the hypertensive patients who attended the PHC clinics in Hebron area. However, 77.8% of the participants reported that they were always / often regular at their doctor appointments, but only 62% of them indicated that they always / often take their antihypertensive drugs on regular basis as prescribed. Therefore, there was a discrepancy between compliance rate as reported by the participants and the high rate relapse or readmission to the hospitals because of their disease.

Also the findings of this study revealed many strength factors as reported by the participants such as the availability of the participants' family support, the clarity of the drugs-usage instructions, the good relationship between the patients and the medical staff and their regularity on appointment and follow up. On the other hand, it showed weaknesses in some aspects such as their knowledge about their disease, their communication skills with the treating doctor such as listening, the effect of the duration of illness on their desire to take their medication and frequent dosing.

Further, the logistic regression of the study findings revealed statistically significant relationship between the participants' compliance rate and their gender, BMI, the duration of their illness, having diabetes as a co-morbidity, the number of drugs they are taking, the frequency of doctor visits, their family support, the clarity of the medical instructions, the side effects of their drugs, their perception of hypertension disease and the cost of their treatment plan.

On the contrary, the logistic regression showed that the participants' age, education level, work status, smoking status, marital status, family history, daily dosing, and regimen interruptions did not affect their compliance with their treatment plans.

6.6. Section four: limitations and recommendations

6.6.1. Limitations:

There are some limitations in the current study. For example, this study utilized a cross-sectional design, due to the limitation of the available time and scarcity of resources. This makes it difficult to assess accurately the magnitude of effect exerted by each factor or to differentiate precisely whether the interaction between these factors would be additive or antagonistic. Also, this type of design may have limitations in the generalization of the results to a wider population since it measures both the prevalence of the outcomes and the determinants in a population at a point in time or over a short period of time (Horn et al. 2008). Nevertheless, the cross sectional studies are highly useful for descriptive purposes and it is relatively quick, cheap and easy to undertake (Grove & Burns, 2005; Monsen & Horn, 2008).

The data collection for this study was done using a self-reported questionnaire. So, the reliability of the results may be affected, since the participants may hesitate to express their points of view or they may describe their own thought, feelings or behaviors in spurious way to please the researcher (Mitchell, 2000). Further, the sample included the users of the governmental primary healthcare services and only in Hebron district which may add limitation on the generalization of the results to other areas of Palestine or to the users of the private healthcare sector.

6.6.2. Recommendations:

According to the findings of the current study the following recommendations are suggested for the medical staff, the Palestinian Ministry of Health, the research in addition to specific recommendations for each factor that may affect the compliance rate of the patients with their hypertension treatment plan.

Recommendations for the treating medical staff:

• Educate and increase the patients' awareness about the importance of their compliance with their treatment plan and the factors that may affect them in addition to the risk of non compliance.

- Train the patients on self management such as measuring their blood pressure by themselves.

- Observe and monitor patients' regularity and commitment to their follow-ups and appointment.

- Involve the patients and their family members in the treatment plan to enhance their cooperation and adherence to it.

- Allocate more of the medical staff's time for the counseling and education of the hypertensive patients.

- Pay more attention to hypertensive patients with other co-morbidity and particularly diabetes mellitus as they are less compliant than others in addition to overweight and obese patients.

- Educate the hypertensive patients about their disease, risk factors, life style modification, exercise, etiology and treatment to decrease the relapse rate and the complications of hypertension.

Recommendations for the Palestinian Ministry of Health:

- Increase the staffing per clinic to decrease the current load of work on the staffs.

- Conduct training workshops or seminars for all health care staff members in primacy care clinics to increase their awareness about the factors that may affect the compliance of the hypertensive patients and particularly clinics that serve poor or disadvantage people.

- Conduct communication workshops for the medical staff to improve their communication and counseling skills.

- Revise and amend the co-payment and the insurance fees' strategies regularly and particularly for poor people.

- As possible avoid frequent changing of the treating doctors in the primary health care clinics.

Recommendations for research:

- Further research is required involving patients from other cities in West Bank and Gaza Strip, as well as patients from a variety of different settings such as governmental, UNRWA, NGOs, and private sector.

- Further research is needed to assess the factors that affect patient's compliance from the perspective of the doctors and other health care providers.

- Further qualitative studies are required to explore in depth the factors that may contribute to patients non-compliance with their treatment plans and regimen.

Recommendations for medical history factor:

- The treating doctor should check and evaluate his/her patients' compliance with their treatment plans in every visit or at regular intervals.

- Encourage the clients to have their own blood pressure devices at home.

- Train the clients how to measure their blood pressure by the medical staff.

- Emphasize to the patients the importance of not interrupting their drugs' regimen and not to change the doses without discussing it prior with their treating doctor.

- To focus more on hypertensive patients with co-morbidity such diabetic mellitus.

- To decrease the frequency of changing medication by the treating doctors and increase doctors' awareness about this issue.

Recommendations for participants' knowledge and perception component:

• Patients should be educated about their disease, its risk factors, etiology and treatment.

• Patients should be informed about the possible complications of their disease and the best ways to stop or delay such complications.

• Patient's misconceptions about hypertension should be thoroughly assessed and corrected.

• Patients should be encouraged to keep their regularity on their medication and adherence to the prescribed doses.

• Patients' education can be achieved by various methods such as counseling, seminars, posters, brochures …etc.

Recommendations for the disease duration component:

• Patients who had the disease for long period should be assessed more frequently for their compliance with the treatment plan and regimen**.**

• Patients who are diseased for long period should be screened more frequently for the possible complications of hypertension.

Recommendation for the treatment schedule component:

• The medical staff should provide the patients with the simplest treatment schedule as possible.

• It is better to treat the hypertensive patients with mono-therapy than other multiple therapies and as possible with the least number of dosing .

• Combination pills may be recommended to be used more frequently in primary health care clinics to reduce the number of drugs and to minimize the occurrence of the side effects**.**

Recommendation for the patient-prescriber relationship component:

• The treating doctors and medical teams in general should keep a good relationship with their patients and to deal with them respectfully and particularly in poor areas.

• The treating doctors have to spend sometime to listen to their patients and answer their questions.

• There is a need to decrease the work load of the medical staff or increasing their number in primary care clinics for better treatment and outcomes

Recommendations for the clarity of instructions component:

• The treating doctors should continue giving his/her patients clear and simple instructions about their medication; their use, dose and timing.

• The pharmacist should also write down the instructions about the drugs usage in clear and understandable language and he should emphasize these instructions verbally to the patient.

• The medical staff in general have to continue using simple language when talking to the patients and avoid the medical terminology.

Recommendation for the family support component:

In general the findings showed good family support. This good support should be maintained and increased and this might be achieved by:

• Incorporating the family members in the treatment plan and the counseling sessions with their relatives on patient's consent.

• Family members could be invited to the education workshops or lectures about hypertension disease.

• **Recommendations for the regularity on appointment and follow ups components:**

• There is a need to keep and increase patients' motivation to follow up their appointment and visits to the primary clinic by:

• Scheduling patients' appointments according to their convenience.

• Discussing the importance of keeping and following their appointment with their treating doctors and possible risks of not doing that.

Recommendations for the cost of treatment component:

• The co-payments should be reviewed regularly and the strategy of the insurance and the co-payments should be re-evaluated from time to time taking into account the poverty and unemployment rates in the Palestinian territories.

• More effort should be dedicated to improve the insurance coverage rate in the Palestinian territories to reduce the costs of treatment of the chronically diseased patients as cost of treatment plan was significantly associated with the patients' compliance.

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Appendix B.

Greetings,

Mohammad Wridat is a student conducting a study "Compliance with antihypertensive treatment among the patients who attend the PHC clinics in Hebron" as a requirement for a master's degree in Public Health from Al-Quds University- Abu Deis.

I ask for your help to complete this questionnaire, with emphasis that all information will be treated in full confidentiality and will only be used for the purpose of scientific research. Your participation in this study is voluntary and you don't need to write your name on the questionnaire.

The undersigned agrees to participate in this questionnaire.

Signature:

Appendix C. (Questionnaire).

<u>**Section one: Socioeconomic-demographic data**</u>

No.	Questions
1.	Sex: a- Male b-Female
2.	Age (years): . . . .
3.	Place of residency: ……………………….
4.	Marital status: b-Single a- Married c-Divorced d- Widow
5.	Education level you have completed: a-None b- Primary c- Elementary d-Secondary e-University degree
6.	Work status: a- Employed b- Unemployed c- Retired d- House wife e- Own business
7.	Income status: a- ≤1000 NIS b- 1001-2000 NIS c- 2001-3000 NIS d- >3000 NIS e- None
8.	Weight in kg: …………… BMI: ……………
9.	Height in meters: ………
10	Smoking status: a-Smoke<10 cigarettes per day b- Smoke 10-20 cigarettes per day c- Smoke >20 cigarettes per day d- Ex-smoker (when did you quit) e- Never smoked

Section two: Medical history

No.	Questions
11	When you were diagnosed as hypertensive:. . . . .
12	How were you diagnosed as hypertensive: a-Accidentally(screening during routine visit) b-By symptoms (after complaining of HTN symptoms such as headache, fatigue and dizziness).
13	When were you prescribed an antihypertensive medication for the first time?...
14	In addition to HTN, please indicate below which chronic condition(s) you have: a-diabetes b- asthma c- heart diseases d-arthritis e- cancer f-other conditions (specify): . . . .
15	Do you take drugs for other diseases than HTN? a-yes b-no
16	If yes, how many drugs? a-one b- two c- 3 or more
17	How many drugs do you take to treat your HTN (including diuretics): a- One drug b- Two drugs c- Three drugs or more
18	Where you get your HTN medications from: a- Primary Health Care Centers b- I get some from UN clinics c-I buy some from the private sector d-Others (specify)…………….
19	How do you get your HTN medications: a- Free b- I pay the co-payments only b- Not free (I pay full price of the drugs)

20	Does any of your family members have HTN? a-Yes b- No
21	If yes, what is his/her relation to you? a-Brother b- Sister c-Mother d-Father e- son f- daughter g-Other(specify)……………
22	How many times do you take your drug(s) per day? a-once a day b- twice a day c- three times a day d- more than three times a day
23	How many times did you stop taking your medications in the last month (against what is prescribed for you by the doctor) ? a- once only b- twice c- three times or more d- none c- don't remember
24	How many times did your doctor change your drug-regimen since you started taking HTN medications? a- once b- twice c- three times or more d-never e- I cannot remember
25	Do you have a sphygmomanometer at home? a- yes b- no
26	How often do you measure your BP.? a- I don't measure it at all b- once a day c- once a week d- once a month e- once every three months f- others (specify)…….
27	How often do you visit your treating doctor (the clinic)? a-once a month b-more than once a month c-at least once every three months d- once every six months. e- others(specify)………….
28	How often does your doctor do complete examinations to you (e.g. checking heart beats, chest, eyes, blood tests etc.): a-every visit b- every month c- every 3 months d- every 6 months e- other (specify): ………….

29	Apart from prescribing pills, what other tasks does your doctor perform during the visit?
	a- Give you information about HTN.
	b- Do physical examination such as: the eye, the pulse, the heart….etc
	c- Provide instructions about the life style such as: exercise, less fat in food…etc
	d- Explain the importance of BP control such as: it decreases the risk of heart diseases and other HTN complications.
	e- Nothing of the above
30	How many times were you hospitalized because of your HTN or its complications (such as stroke and chest pain) or the side effects of its medications (such as insomnia, headache and swollen legs) since you were diagnosed with HTN:
	a-once b- twice c- 3 times or more d- never

Section three: Patient's perception and knowledge

No	Paragraph	Always	Often	Some-times	Rarely	Never
31	In general I consider myself in good health					
32	My BP is well controlled					
33	I consider HTN as a serious problem					
34	I think that HTN leads to other serious conditions (e.g. stroke, heart attack and renal failure etc.)					
35	I think that HTN has hereditary basis					
36	I think that being male or female will affect the risk of getting HTN					
37	I think that HTN risk increases with age					
38	I think that decreasing tension and anger will help me in controlling my BP					
39	I think that dietary changes (e.g. less sodium intake) will help me in controlling my BP.					
40	I think that physical exercise will help me in controlling my BP.					
41	I think that it is necessary to take HTN medications all the time					
42	I think that HTN medications help me to control my HTN					
43	sometimes feel it is safe or not necessary to take your medications					
44	I feel it is safe to increase or decrease your medication dose without consulting your doctor					
45	I think that my HTN medications have serious side effects that may affect my health					
46	I think that HTN is a disease that can be prevented					

Section four: Duration of illness

No	Paragraph	Always	Often	Some-times	Rarely	Never
47	The long duration of my illness affect my desire to take my medication					
48	Because hypertension is a chronic disease, I do not take my medication regularly					
49	Because hypertension is a chronic disease, I do not follow the diet regimen or change my lifestyle according to my doctor advice					
50	Because hypertension is a chronic disease, it makes me feel sad and depressed.					

Section five: Treatment schedule

No	Paragraph	Always	Often	Some-times	Rarely	Never
51	Because I have to take my drug(s) many times a day, it decreases my desire to take them every day					
52	Because I have to take my drug(s) many times a day, it is difficult for me to remember this all the time					
53	The drugs I take for chronic conditions other than HTN, decreases my desire to take HTN medications and follow lifestyle regimen					
54	Changing my drugs-regimen by my doctors frequently decreases my desire to take these drugs					
55	If you find all your drugs in one pill, this will increase your regularity in taking them.					

Section six: Patient-physician relationship

No	Paragraph	Always	Often	Some-times	Rarely	Never
56	The same doctor sees me in every visit I do to the clinic					
57	The doctor treats you with respect when you visit him in the clinic					
58	You are satisfied with the medical care you receive					
59	The doctor allows you to say everything you think is important for you during the visit					
60	The doctor makes you feel foolish sometimes during the visit					
61	The doctor acts too serious/formal and impersonal toward you					
62	The doctor during your examination or visit sometimes hurry too much to finish it quickly					
63	The doctor sometimes ignores what you tell him/her					
64	If you have a medical question, you can reach the doctor for help without a problem					
65	The doctor listens carefully to what you have to tell him/her					
66	Your doctor spends plenty of time with you during the visit					
67	When you visit the clinic, the medical staff (nurses/pharmacist etc) deals with you friendly and with respect					

Section seven: Clarity of instruction of treatment

No	Paragraph	Always	Often	Some-times	Rarely	Never
68	The drug- use instructions written by the doctor are clear to you					
69	The medical staff (nurse/doctor) explain and give you clear information about the necessary life style modifications for your condition					
70	The medical staff (nurse/doctor) show and train you how to perform self measurement of your BP					
71	The medical staff (nurse/doctor) explain to you or give you information about the importance of BP control					
72	The medical staff (doctor, nurse) use clear and simple language when they give you instructions about your disease's control and medication					
73	Your doctor explains the reasons for performing the medical tests such as cholesterol level and lipid profile for you					
74	When your doctor changes your drugs, he explains to you the reason for that					
75	The doctor uses difficult medical terms without explaining to you what they mean					
76	The doctor gives you advices and information about different ways to avoid illness and maintain health					

Section eight: Family support

No	Paragraph	Always	Often	Some-times	Rarely	Never
77	Your family members remind you about your medications					
78	Your family members help you in taking your medications					
79	Your family members help you financially to get your medications when you need					
80	Your family members help you in measuring your BP					
81	Your family members help you in reaching the medical facility (e.g. the clinic or hospital) if you are tired or sick					
82	Your family members help you to accomplish the life style modifications (such as getting you less fatty foods, less salty foods, or performing exercises etc.) if it is required by your doctor					
83	Your family members encourage you to be compliance with your medication and treatment plan					

Section nine: Regularity & treatment follow up

No	Paragraph	Always	Often	Some-times	Rarely	Never
84	You are always regular at your doctor's appointments					
85	You measure your BP on regular basis					
86	You manage to do physical exercises as advised by your doctor					
87	You manage to maintain a healthy weight as advised by your doctor					
88	You manage to eat healthy food (e.g. less salt) as advised by your doctor					
89	You manage to use your HTN drugs on regular basis as prescribed to you					
90	You forget taking your medication because you have busy life					
91	When you feel better, you stop taking your medication					
92	If you feel worse because of the side effects of your medicine (such as insomnia, headache and swollen ankles) you stop taking it without consulting your doctor					
93	You always visit your doctor personally for drug prescription					
94	You are kept waiting for a long time in reception area when you are at the doctor's office					
95	If you know that your medication will increase your weight, you will continue taking them					
96	If you know that your medication will affect your sex life, you will continue taking them.					

Section ten: Cost of treatment

No	Paragraph	Always	Often	Some-times	Rarely	Never
97	You have to pay for your medical care more than what you can afford					
98	The amount you have to pay to cover your medical needs is reasonable					
99	Some times it is a problem to cover your share of the cost for a medical care					
100	Sometimes you worry about having to pay large medical bills					
101	Sometimes you do not follow your drug regimen or you go without the medical care you need because you can not afford the expenses					
102	High cost of your medication and treatment plan such as diet make you less compliance with your treatment regimen					

THANKS………….

Table (1):Cross-tabulation of the participants' responses to the questions related to their drugs regimen by gender.

Variable	sex	Always		Often		Some-		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Having to take your drug(s) many times a day decreases your desire to take them every day	M	18	14.9	48	39.7	38	31.3	7	5.8	10	8.3	.70
	F	28	16.4	56	32.7	61	35.7	14	8.2	12	7	
Because you have to take your drug(s) many times a day, it is difficult to remember this all the time	M	6	5	30	25	59	48.5	15	12.4	11	9.1	.82
	F	10	5.8	51	29.8	72	42.1	23	13.5	15	8.8	
The drugs you take for chronic conditions other than HTN, decreases your desire to take HTN drugs and follow lifestyle changes.	M	10	8.3	32	26.4	44	36.4	16	13.2	19	15.7	.38
	F	14	8.2	50	29.3	66	38.6	27	15.8	14	8.1	
Changing your drugs regimen by your doctors frequently decreases your desire to take these drugs	M	8	6.6	25	20.7	36	29.7	27	22.3	25	20.7	**.04**
	F	14	8.2	29	17	71	41.4	41	24	16	9.4	
If you find all your drugs in one pill ,this will increase your regularity in taking them	M	59	48.7	25	20.7	22	18.2	7	5.8	8	6.6	.52
	F	75	43.8	51	29.8	28	16.4	8	4.7	9	5.3	

All p-values were derived using the chi-squared test.

Table (2):Cross-tabulation of the participants' responses to the questions related to the drugs-usage instructions by their gender

Variable		Always		Often		Some-time		Rarely		Never		
		F.	%	F.	%	F.	%	F.	%	F.	%	P.
The drug usage instructions written by the doctor clear to you	M	37	30.6	45	37.2	28	23.1	9	7.4	2	1.7	.57
	F	59	34.5	71	41.5	31	18.1	9	5.3	1	0.6	
The medical staff explains and gives you clear information about the necessary life style changes for your condition	M	24	19.8	19	15.7	45	37.2	30	24.8	3	2.5	**.01**
	F	24	14	38	22.2	51	29.9	38	22.2	20	11.7	
The medical staff shows and trains you to perform self measurement of BP.	M	17	14	16	13.2	22	18.2	20	16.5	46	38.1	.74
	F	24	14	24	14	34	19.9	36	21	53	31.1	
The medical staff explains to you the importance of BP. Control	M	32	26.4	40	33.1	40	33.1	8	6.6	1	0.8	.15
	F	34	19.9	51	29.8	58	33.9	21	12.3	7	4.1	
The medical staff uses clear and simple language when they give you instructions about your disease's control and medication	M	23	19	63	52.1	32	26.4	3	2.5	0	0	.50
	F	32	18.7	76	44.4	55	32.2	6	3.5	2	1.2	
Your doctor explains the reasons for performing the medical tests for you	M	20	16.6	19	15.7	57	47	15	12.4	10	8.3	.12
	F	16	9.4	38	22.2	73	42.7	33	19.3	11	6.4	
When your doctor changes your drugs, he explains to you the reason for that	M	16	13.2	31	25.6	35	28.9	25	20.7	14	11.6	**.00**
	F	23	13.5	26	15.2	77	45	38	22.2	7	4.1	
The doctor uses difficult medical terms without explaining what they mean	M	9	7.4	15	12.4	30	24.8	38	31.4	29	24	.23
	F	11	6.4	26	15.2	49	28.7	34	19.9	51	29.8	
The doctor gives you advices and information about different ways to avoid illness and maintain health	M	21	17.4	28	23.1	42	34.7	22	18.2	8	6.6	.06
	F	14	8.2	34	19.9	78	45.6	27	15.8	18	10.5	

Table (3):Cross-tabulation of the participants' responses to the questions related to knowledge and perception about hypertension disease by the clinic they attend.

Variable	Clinic	Always		Often		Sometimes		Rarely		Never		P.
		F.	%	F.	%	F.	%	F.	%	F.	%	
In general do you consider yourself to be in good health.	Y	30	30	34	34	27	27	8	8	1	1	.27
	D	15	18.1	29	34.9	29	34.9	10	12.1	0	0	
	K	19	17.4	46	42.2	36	33	8	7.4	0	0	
Do you consider your BP to be well controlled.	Y	9	9	42	42	41	41	6	6	2	2	.47
	D	6	7.2	44	53	27	32.6	6	7.22	0	0	
	K	13	11.9	46	42.2	42	38.5	8	7.3	0	0	
Do you consider HTN as a serious problem	Y	34	34	28	28	27	27	8	8	3	3	.18
	D	28	33.7	29	34.9	19	22.9	7	8.5	0	0	
	K	35	32.1	42	38.5	29	26.6	3	2.8	0	0	
HTN leads to other serious conditions	Y	26	26	29	29	33	33	6	6	6	6	**.04**
	D	28	33.7	21	25.3	24	28.9	10	12.1	0	0	
	K	28	25.7	46	42.2	25	22.9	7	6.4	3	2.8	
HTN has hereditary basis	Y	18	18	18	18	27	27	20	20	17	17	.63
	D	11	13.2	16	19.3	24	28.9	12	14.5	20	24.1	
	K	15	13.8	17	15.6	39	35.8	22	20.2	16	14.6	
The risk of getting HTN is affected by gender	Y	19	19	14	14	32	32	17	17	18	18	**.01**
	D	8	9.6	12	14.5	15	18.1	18	21.7	30	36.1	
	K	10	9.2	18	16.5	27	24.8	32	29.4	22	20.1	
HTN risk increases with age	Y	23	23	38	38	20	20	10	10	9	9	.19
	D	19	22.9	35	42.2	21	25.3	7	8.4	1	1.2	
	K	32	29.4	48	44	18	16.5	8	7.3	3	2.8	
Decreasing tension and anger will help you in controlling your BP.	Y	24	24	36	36	29	29	5	5	6	6	**.00**
	D	44	53	29	34.9	7	8.4	2	2.4	1	1.3	
	K	48	44	34	31.2	21	19.3	4	3.7	2	1.8	
That dietary changes will help you in controlling your BP.	Y	20	20	36	36	32	32	5	5	7	7	**.04**
	D	34	41	27	32.5	15	18.1	4	4.8	3	3.6	
	K	31	28.4	47	43.1	21	19.3	7	6.4	3	2.8	
Physical activity will help you in controlling your BP	Y	17	17	22	22	24	24	20	20	17	17	**.01**
	D	19	22.9	17	20.5	28	33.7	15	18.1	3	4.8	
	K	19	17.4	30	27.5	37	33.9	19	17.4	4	3.8	
You think that it is necessary to take HTN medications regularly.	Y	39	39	26	26	19	19	9	9	7	7	**.00**
	D	46	55.4	22	26.5	12	14.5	2	2.4	1	1.2	
	K	36	33	46	42.2	19	17.4	5	4.6	3	2.8	
You think that HTN medications help you to control your BP.	Y	23	23	30	30	32	32	11	11	4	4	**.00**
	D	37	44.6	25	30.1	15	18.1	3	3.6	2	2.4	
	K	22	20.2	46	42.2	34	31.2	4	3.8	3	2.8	
Do you feel it is safe or not necessary to take your medication	Y	7	7	16	16	36	36	24	24	17	14	**.00**
	D	4	4.8	9	10.8	7	8.4	23	27.7	40	48.2	
	K	9	8.3	13	11.9	27	24.8	29	26.6	31	28.4	

	clinic	F.	%	F.	%	F.	%	F.	%	F.	%	P
It is safe to increase or decrease your medication dose without consulting your doctor.	Y	7	7	15	15	26	26	27	27	25	25	**.00**
	D	1	1.2	9	10.8	10	12	17	20.5	46	55.5	
	K	14	3.7	13	11.9	31	28.4	24	22	37	34	
HTN medications have serious side effects that may affect your health	Y	10	10	17	17	29	29	28	28	16	16	.06
	D	8	9.6	7	8.4	26	31.3	18	21.7	24	29	
	K	5	4.6	21	19.3	39	35.8	30	27.5	14	12.8	
HTN is a disease that can be prevented	Y	3	3	17	17	40	40	25	25	15	15	**.00**
	D	4	4.8	7	8.4	13	15.7	23	27.7	36	43.4	
	K	8	7.3	11	10.1	32	29.4	27	24.8	31	28.4	

All p-values were derived using the chi-squared test.

Y: Yatta clinic, D: Dora clinic, K: Karanteena clinic

Table (4):Cross-tabulation of the participants' responses to the questions related to their drugs regimen by the clinic they attend

Variable	clinic	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
you have to take your drug(s) many times a day, it decreases your desire to take them every day	Y	21	21	35	35	29	29	5	5	10	10	.06
	D	8	9.7	23	27.7	38	45.8	7	8.4	7	8.4	
	K	17	15.6	46	42.2	32	29.4	9	8.3	5	4.5	
Because you have to take your drug(s) many times a day, it is difficult to remember this all the time	Y	10	10	30	30	46	46	9	9	5	5	**.02**
	D	1	1.2	19	22.9	40	48.2	10	12	13	15.7	
	K	5	4.5	32	29.4	45	41.3	19	17.4	8	7.4	
The drugs you take for chronic conditions other than HTN decreases your desire to take the HTN medications and follow lifestyle changes	Y	12	12	32	32	32	32	17	17	7	7	.17
	D	5	6	25	30.1	30	36.1	9	10.8	14	17	
	K	7	6.4	25	22.9	48	44	17	15.6	12	11.1	
Changing your drugs regimen by your doctors frequently decreases your desire to take these drugs	Y	15	15	24	24	26	26	25	25	10	10	**.00**
	D	2	2.4	7	8.4	38	45.8	22	26.5	14	16.9	
	K	5	4.6	23	21.1	43	39.4	21	19.3	17	15.6	
If you find all your drugs in one pill, this will increase your regularity in taking them	Y	45	45	20	20	23	23	6	6	6	6	.46
	D	38	45.8	24	28.9	13	15.7	2	2.4	6	7.2	
	K	51	46.8	32	29.4	14	12.8	7	6.4	5	4.6	

All p-values were derived using the chi-squared test.

Y: Yatta clinic, D: Dora clinic, K: Karanteena clinic

Table (5):Cross-tabulation of the participants' responses to the questions related to their relationship with the medical staff by the clinic they attend

Variable	clini	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Same doctor sees you in every visit you do to the clinic	Y	20	20	31	31	21	21	16	16	12	12	.49
	D	16	19.3	28	33.7	24	28.9	8	9.6	7	8.5	
	K	20	18.3	40	36.7	33	30.3	9	8.3	7	6.4	
The doctor treats you with respect when you visit him in the clinic	Y	13	13	34	34	44	44	8	8	1	1	**.00**
	D	28	33.7	37	44.6	17	20.5	1	1.2	0	0	
	K	16	14.7	52	47.7	34	31.2	6	5.5	1	.9	
You are satisfied with the medical care you receive	Y	15	15	31	31	37	37	8	8	9	9	.32
	D	17	20.5	28	33.7	31	37.3	6	7.2	1	1.3	
	K	16	14.7	37	33.9	47	43.1	5	4.6	4	3.7	
The doctor allows you to say everything you think is important for you during the visit	Y	11	11	30	30	31	31	13	13	15	15	.12
	D	16	19.3	20	24.1	32	38.6	10	12	5	6	
	K	10	9.2	31	28.4	41	37.6	20	18.4	7	6.4	
The doctor makes you feel foolish sometimes during the visit	Y	10	10	5	5	23	23	29	29	33	33	**.03**
	D	0	0	9	10.8	12	14.4	25	30.1	37	44.7	
	K	4	3.7	12	11	19	17.4	28	25.7	46	42.2	
The doctor during your examination or visit sometimes hurry too much to finish it quickly	Y	23	23	20	20	32	32	17	17	8	8	.27
	D	13	15.7	33	39.8	23	27.7	9	10.8	5	6	
	K	25	22.9	34	31.2	28	25.7	14	12.8	8	7.4	
The doctor ignores what you tell him/her	Y	9	9	26	26	31	31	20	20	14	14	**.04**
	D	2	2.4	12	14.5	44	53	13	15.7	12	14.4	
	K	12	11	18	16.5	50	45.9	19	17.4	10	9.2	
If you have a medical question, you can reach the doctor for help without a problem	Y	14	14	28	28	33	33	13	13	12	12	**.00**
	D	6	7.2	15	18.1	41	49.4	20	24.1	1	1.2	
	K	12	11	24	22	50	45.9	12	11	11	10.1	
The doctor listens carefully to what you have to tell him/her	Y	12	12	22	22	34	34	17	17	15	15	**.01**
	D	14	16.9	18	21.7	36	43.4	14	16.8	1	1.2	
	K	8	7.3	36	33	35	32.1	19	17.4	11	10.2	
Your doctor spends plenty of time with you during the visit	Y	9	9	24	24	27	27	23	23	17	17	.09
	D	6	7.2	10	12	30	36.1	29	34.9	8	9.8	
	K	6	5.5	28	25.7	30	27.5	24	22	21	19.3	
When you visit the clinic, the medical staff deals with you friendly and with respect	Y	20	20	29	29	32	32	14	14	5	5	**.03**
	D	28	33.7	30	36.1	21	25.3	3	3.7	1	1.2	
	K	33	30.3	42	38.5	19	17.4	10	9.2	5	4.6	

All p-values were derived using the chi-squared test.

Y: Yatta clinic, D: Dora clinic, K: Karanteena clinic

Table (6):Cross-tabulation of the participants' responses to the questions related to the clarity of drugs –usage instructions by the clinic they attend

Variable	clinic	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The drug- use instructions written by the doctor are clear to you.	Y	36	36	37	37	18	18	8	8	2	2	.53
	D	31	37.3	34	41	16	19.3	2	2.4	0	0	
	K	30	27.5	45	41.3	25	22.9	8	7.1	1	1.2	
The medical staff explain and give you clear information about the necessary life style changes for your condition	Y	20	20	26	26	32	32	17	17	5	5	**.02**
	D	19	22.9	11	13.3	29	34.9	17	20.5	7	8.4	
	K	9	8.3	20	18.4	35	32.1	34	31.2	11	10	
The medical staff shows and trains you how to perform self measurement of your BP.	Y	20	20	15	15	21	21	8	8	36	36	**.00**
	D	8	9.6	9	10.8	20	24	16	19.3	30	36.3	
	K	13	11.9	16	14.7	15	13.8	32	29.4	33	30.2	
The medical staff explains to you or give you information about the importance of BP. control	Y	31	31	37	37	19	19	9	9	4	4	**.00**
	D	13	15.7	18	21.7	40	84.1	11	13.3	1	1.2	
	K	22	20.2	36	33	39	35.7	9	8.3	3	2.8	
The medical staff uses clear and simple language when they give you instructions about your disease's control and medication	Y	19	19	46	46	30	30	3	3	2	2	.20
	D	22	26.5	33	39.8	25	30.1	3	3.6	0	0	
	K	14	12.8	60	55	32	29.4	3	2.8	0	0	
Your doctor explains the reasons for performing the medical tests for you	Y	15	15	17	17	39	39	16	16	13	13	**.00**
	D	17	20.5	16	19.3	30	36.1	17	20.5	3	3.6	
	K	4	3.7	24	22	61	55.9	15	13.8	5	4.6	
When your doctor changes your drugs, he explains to you the reason for that	Y	16	16	20	20	37	37	15	15	12	12	.26
	D	11	13.3	15	18.1	31	37.3	23	27.7	3	3.6	
	K	12	11	22	20.2	44	40.4	25	22.9	6	5.5	
The doctor uses difficult medical terms without explaining to you what they mean	Y	9	9	17	17	26	26	28	28	20	20	.54
	D	5	6	9	10.8	22	26.5	18	21.7	29	35	
	K	6	5.5	15	13.8	31	28.4	26	23.9	31	28.4	
The doctor gives you advices about different ways to avoid illness and maintain health	Y	15	15	24	24	38	38	11	11	12	12	.17
	D	5	6	19	22.9	39	47	16	19.3	4	4.8	
	K	15	13.8	19	17.4	43	39.4	22	20.2	10	9.2	

All p-values were derived using the chi-squared test.

Y: Yatta clinic, D: Dora clinic, K: Karanteena clinic.

Table (7):Cross-tabulation of the participants' responses to the questions related to their family support by the clinic they attend

Variable	clinic	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Your family members remind you about your medications	Y	36	36	35	35	14	14	11	11	5	5	.54
	D	32	38.6	26	31.3	17	20.5	6	8.4	1	1.2	
	K	37	33.9	44	40.4	15	13.8	7	6.4	6	5.5	
Your family members help you in taking your medications	Y	21	21	40	40	30	30	5	5	4	4	.57
	D	24	28.9	27	32.5	24	29	4	4.8	4	4.8	
	K	34	31.2	43	39.4	21	19.3	4	3.7	7	6.4	
Your family members help you financially to get your medic-ations when you need	Y	24	24	36	36	28	28	5	5	7	7	**.04**
	D	22	26.5	25	30.1	23	27.8	9	10.8	4	4.8	
	K	48	44	27	24.8	20	18.4	6	5.5	8	7.3	
Your family helps you in measuring your BP	Y	25	25	25	25	16	16	14	14	20	20	.60
	D	21	25.3	17	20.5	21	25.3	10	12	14	16.9	
	K	35	32.1	24	22	17	15.6	18	16.5	15	13.8	
Your family helps you in reaching the medical facility if you are tired or sick	Y	33	33	26	26	29	29	7	7	5	5	**.00**
	D	48	57.8	11	13.3	13	15.7	2	2.4	9	10.8	
	K	60	55	25	22.9	20	18.4	3	2.8	1	.9	
Your family helps you to accomplish the life style changes if it is required by your doctor	Y	20	20	38	38	25	25	13	13	4	4	.82
	D	20	24	30	36.1	24	29.1	5	6	4	4.8	
	K	19	17.4	47	43.1	28	25.7	10	9.2	5	4.6	
Your family encourage you to be compliance with your medication and treatment plan	Y	23	23	28	28	35	35	7	7	7	7	.22
	D	25	30.1	20	24	25	30.1	12	14.6	1	1.2	
	K	26	23.9	30	27.5	39	35.8	6	5.5	8	7.3	

All p-values were derived using the chi-squared test.

Y: Yatta clinic, D: Dora clinic, K: Karanteena clinic

Table (8):Cross-tabulation of the participants' responses to the questions related to their regularity on doctor appointments and treatment plan by the clinic they attended

Variable	Clinic	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
You are always regular at your doctor appointments	Y	47	47	21	21	22	22	4	4	6	6	**.00**
	D	28	33.7	39	47	12	14.5	2	2.4	2	2.4	
	K	47	43.1	45	41.3	8	7.3	3	2.8	6	5.5	
You measure your BP on regular basis	Y	10	10	30	30	38	38	11	11	11	11	**.00**
	D	17	20.5	16	19.3	21	25.2	12	14.5	17	20.5	
	K	14	12.8	34	31.2	40	36.7	16	14.7	5	4.6	
You manage to do physical exercises as advised by your doctor	Y	4	4	16	16	37	37	18	18	25	25	.38
	D	3	3.6	9	10.8	23	27.7	18	21.7	30	36.2	
	K	6	5.5	20	18.3	41	37.6	19	17.4	23	21.3	
You manage to maintain a healthy weight as advised by your doctor	Y	9	9	22	22	30	30	18	18	21	21	.29
	D	7	8.4	17	20.5	21	25.3	24	28.9	14	16.9	
	K	6	5.5	29	26.6	40	36.7	16	14.7	18	16.5	
You manage to eat healthy food as advised by your doctor	Y	17	17	32	32	30	30	11	11	10	10	.82
	D	14	16.9	25	30.1	33	39.8	6	7.2	5	6	
	K	17	15.6	37	33.9	36	33.1	13	11.9	6	5.5	
You manage to use your HTN drugs on regular basis as prescribed to you	Y	24	24	33	33	37	37	3	3	3	3	.13
	D	28	33.7	31	37.3	21	25.4	1	1.2	2	2.4	
	K	25	22.9	40	36.7	31	28.4	10	9.2	3	2.8	
You forget taking your medication because you have busy life	Y	7	7	18	18	26	26	32	32	17	17	**.04**
	D	5	6	11	13.3	30	36.1	18	21.7	19	22.9	
	K	2	1.8	10	9.2	37	33.9	45	41.3	15	13.8	
When you feel better, you stop taking your medication	Y	6	6	19	19	27	27	23	23	25	25	**.00**
	D	0	0	3	3.6	24	28.9	17	20.5	39	47	
	K	4	3.7	9	8.3	28	25.7	32	29.4	36	32.9	
You always visit your doctor personally for drug prescription	Y	46	46	33	33	16	16	3	3	2	2	.39
	D	34	40.9	29	35	12	14.5	5	6	3	3.6	
	K	37	33.9	52	47.7	15	13.8	2	1.8	3	2.8	
You are kept waiting for a long time in reception area when you are at the doctor's office	Y	30	30	40	40	20	20	4	4	6	6	.48
	D	28	33.7	31	37.3	22	26.6	1	1.2	1	1.2	
	K	33	30.3	43	39.5	29	26.6	2	1.8	2	1.8	

Variable	Clinic	Always F.	Always %	Often F.	Often %	Sometime F.	Sometime %	Rarely F.	Rarely %	Never F.	Never %	P
If you know that your medication will increase your weight , you will continue taking them	Y	13	13	40	40	35	35	4	4	8	8	**.02**
	D	19	22.9	26	31.3	33	39.8	4	4.8	1	1.2	
	K	16	14.7	43	39.4	46	42.2	4	3.7	0	0	
If you know that your medication will affect your sex life, you will continue taking them	Y	13	13	32	32	31	31	17	17	7	7	**.00**
	D	24	28.9	18	21.7	23	27.8	10	12	8	9.6	
	K	15	13.8	41	37.6	42	38.5	7	6.4	4	3.7	

All p-values were derived using the chi-squared test.

Y: Yatta clinic, D: Dora clinic, K: Karanteena clinic

Table (9):Cross-tabulation of the participants' responses to the questions related to the cost of their treatment by the clinic they attended

Variable	Clinic	Always F.	Always %	Often F.	Often %	Sometime F.	Sometime %	Rarely F.	Rarely %	Never F.	Never %	P
You have to pay for your medical care more than what you can afford	Y	15	15	21	21	28	28	23	23	13	13	.20
	D	9	10.8	11	13.3	22	26.5	28	25.7	13	15.7	
	K	9	8.3	12	11	27	24.8	43	39.4	18	16.5	
You do not follow your drug regimen or you go without the medical care you need because you cannot afford the expenses	Y	5	5	18	18	48	48	20	20	9	9	**.05**
	D	5	6	9	10.8	32	38.6	19	22.9	18	21.7	
	K	3	2.8	7	6.4	48	44	32	29.4	19	17.4	
It is a problem to cover your share of the cost for a medical care	Y	13	13	23	23	26	26	24	24	14	14	**.00**
	D	9	10.8	12	14.5	40	48.2	15	18.1	7	8.4	
	K	3	2.8	12	11	50	45.9	31	28.4	13	11.9	
You worry about having to pay large medical bills	Y	8	8	26	26	30	30	22	22	14	14	.07
	D	7	8.4	11	13.3	36	43.4	13	15.6	16	19.3	
	K	2	1.8	18	16.5	48	44	24	22.1	17	15.6	
The amount you have to pay to cover your medical needs is reasonable	Y	9	9	31	31	35	35	15	15	10	10	.32
	D	12	14.5	18	21.7	30	36.1	14	16.9	9	10.8	
	K	20	18.3	32	29.4	25	22.9	17	15.6	15	13.8	
High cost of your drugs and the treatment plan in general makes me less compliant with my treatment regimen	Y	7	7	14	14	26	26	25	25	28	28	**.01**
	D	2	1.8	11	13.3	22	26.5	25	30.1	23	28.3	
	K	3	2.8	6	5.5	20	18.3	54	49.5	26	23.9	

All p-values were derived using the chi-squared test.

Table (10):Cross-tabulation of the participants' responses to the questions related to their knowledge and perception of hypertension by their age group.

Variable	Age	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
In general you consider yourself to be in good health	≤55	24	23.5	41	40.2	31	30.4	6	5.9	0	0	.60
	> 55	40	21.1	68	35.8	61	32.1	20	10.5	1	0.5	
You consider your BP to be well controlled.	≤55	13	12.7	46	45.1	40	39.3	3	2.9	0	0	.17
	> 55	15	7.9	86	45.3	70	36.9	17	8.9	2	1	
You consider HTN as a serious problem	≤55	36	41.4	38	37.3	19	18.6	7	0.7	2	2	.26
	>55	61	32.1	61	32.1	56	29.5	11	5.8	1	0.5	
You think that HT leads to other serious conditions.	≤55	37	36.2	28	27.5	27	26.5	4	3.9	6	5.9	**.01**
	>55	45	33.6	68	35.8	55	28.9	19	0.1	3	1.6	
You think that HTN has hereditary basis.	≤55	18	17.6	21	20.6	31	30.4	13	12.7	19	18.7	.65
	>55	26	13.7	30	15.8	59	31.5	41	21.6	34	17.4	
You think that being male or female will affect the risk of getting HTN.	≤55	14	13.8	14	13.8	27	26.5	23	22.5	24	23.4	.98
	>55	23	12.1	30	15.8	47	24.7	44	23.2	46	24.2	
You think that HTN risk increases with age.	≤55	28	27.5	45	44.1	19	18.6	6	5.9	4	3.9	.70
	>55	46	24.1	76	40	40	21.1	19	10	9	4.8	
Decreasing tension and anger will help you in controlling your BP.	≤55	43	42.2	36	35.3	17	16.7	5	4.5	1	1	.44
	>55	73	38.4	63	33.2	40	21.1	6	3.2	8	4.1	
You think that dietary changes will help you in controlling your BP.	≤55	32	31.4	44	43.1	21	20.6	4	3.9	1	1	.13
	>55	53	27.9	66	34.7	47	24.8	12	6.3	12	6.3	
You think that physical activity will help you in controlling your BP.	≤55	21	20.6	31	30.4	33	32.4	11	10.7	6	5.9	**.04**
	>55	34	17.9	38	20	56	29.5	43	22.6	18	10	
You think that it is necessary to take HTN medications regularly.	≤55	49	48	34	33.3	13	12.7	4	3.9	2	2.1	.23
	>55	72	37.9	60	31.6	37	19.5	12	6.3	9	4.7	
You think that HTN medications help you to control your BP.	≤55	33	32.4	38	37.2	21	20.6	9	8.8	1	1	.08
	>55	49	26.3	63	33.2	60	31.6	9	4.7	8	4.2	
You feel it is safe or not necessary to take your medication.	≤55	5	4.9	10	9.8	28	27.5	24	23.5	35	34.3	.38
	>55	15	7.9	28	14.7	42	22.1	52	27.4	53	27.5	
It is safe to increase or decrease your drugs dose without consulting your doctor	≤55	2	2	15	14.7	20	19.6	30	29.4	35	34.3	.21
	>55	10	5.3	22	11.6	47	24.7	38	20	73	38.4	
You think that your HTN medications have serious side effects that may affect your health	≤55	9	8.8	14	13.7	27	26.5	37	36.3	15	14.7	**.04**
	>55	14	7.4	31	16.3	67	35.3	39	20.5	39	20.5	
You think that HTN is a disease that can be prevented	≤55	5	4.9	13	12.7	35	34.3	21	22.4	28	25.7	.53
	>55	10	5.3	22	11.6	50	26.3	54	28.4	54	28.4	

All p-values were derived using the chi-squared test.

Table (11):Cross-tabulation of the participants' responses to the questions related to the duration of illness by their age group.

Variable	age	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The long duration of your illness affect your desire to take your medication	≤55	10	9.8	39	38.2	33	32.4	7	6.9	13	12.7	.30
	>55	29	15.3	70	36.8	66	34.7	13	6.8	12	6.4	
Because HTN is a chronic disease, you do not take your drugs continuously.	≤55	1	1	16	15.7	37	36.3	22	21.6	26	25.4	.08
	>55	9	4.7	24	12.6	73	38.4	55	29	29	15.3	
Because HTN is a chronic disease, you do not follow the diet regimen or change your lifestyle according to your doctor advice	≤55	2	1.9	6	5.9	33	32.4	34	33.3	27	26.5	**.04**
	>55	11	5.8	29	15.3	51	26.8	64	33.7	35	18.4	
Because HTN is a chronic disease, it makes you feel sad and depressed	≤55	6	5.5	25	24.5	32	31.8	19	18.6	20	19.6	.23
	>55	13	6.8	41	21.6	81	42.6	33	17.4	22	11.6	

Table (12):Cross-tabulation of the participants' responses to the questions related to the drugs' regimen by their age group.

Variable	age	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Because you have to take your drug(s) many times a day, it decreases your desire to take them every day	≤55	14	13.7	29	28.4	36	35.3	11	10.8	12	11.8	**.05**
	>55	32	16.8	75	39.5	63	33.1	10	5.3	10	5.3	
Because you have to take your drug(s) many times a day, it is difficult to remember that all the time	≤55	4	3.9	29	28.4	37	36.3	14	13.8	18	17.6	**.00**
	>55	12	6.3	52	27.4	94	49.5	24	12.6	8	4.2	
The drugs you take for chronic conditions other than HTN, decrease your desire to take HTN medications and follow lifestyle regimen	≤55	3	2.9	26	25.5	36	35.3	19	18.7	18	17.6	**.01**
	>55	21	11	56	29.5	74	38.9	24	12.6	15	8	
Changing your drugs regimen by your doctor frequently decreases your desire to take them	≤55	8	7.8	18	17.6	33	32.4	27	26.5	16	15.7	.76
	>55	14	7.4	36	18.9	74	38.9	41	21.6	25	13.2	
If you find all my drugs in one pill, this will increase your regularity in taking them	≤55	48	47	23	22.5	18	17.7	5	4.9	8	7.9	.75
	>55	86	45.3	53	27.9	32	16.8	10	5.3	9	4.7	

Table (13):Cross-tabulation of the participants' responses to the questions related to the participants relationship with the medical staff by their age group.

Variable	Age	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The same doctor sees you in every visit you do to the clinic	≤55	22	21.6	32	31.4	29	28.4	7	6.9	12	11.7	.27
	>55	34	17.9	67	35.3	49	25.8	26	13.7	14	7.3	
The doctor treats you with respect when you visit him in the clinic	≤55	21	20.6	42	41.2	36	35.3	2	1.9	1	1	.43
	>55	36	18.9	81	42.6	59	31	13	7	1	0.5	
You are satisfied with the medical care you receive	≤55	14	13.7	33	32.4	45	44.1	6	5.9	4	3.9	.74
	>55	34	17.9	63	33.2	70	36.8	13	6.8	10	5.3	
The doctor allows you to say everything you think is important for you during the visit	≤55	16	15.7	26	25.5	36	35.3	17	16.7	7	6.8	.59
	>55	21	11	55	28.9	68	35.8	26	13.7	20	10.6	
The doctor makes you feel foolish sometimes during the visit	≤55	6	5.9	9	8.8	17	16.7	29	28.4	41	40.2	.95
	>55	8	4.2	17	8.9	37	19.5	53	27.9	75	39.5	
The doctor acts too serious/formal and impersonal toward you	≤55	12	11.8	33	32.4	40	39.2	8	7.8	9	8.8	**.05**
	>55	18	9.5	40	21.2	81	42.6	36	18.9	15	7.8	
The doctor during your examination or visit hurries too much to finish it quickly.	≤55	24	23.5	27	26.5	29	28.5	19	18.6	3	2.9	.09
	>55	37	19.5	60	31.6	54	28.4	21	11	18	9.5	
The doctor ignores what you tell him/her	≤55	8	7.8	19	18.6	47	46.2	20	19.6	8	7.8	.51
	>55	15	7.9	37	19.5	78	41	32	16.8	28	14.8	
If you have a medical question, you can reach the doctor for help without a problem	≤55	12	11.8	28	27.5	40	39.2	13	12.7	9	8.8	.61
	>55	20	10.5	39	20.5	84	44.2	32	16.8	15	8	
The doctor listens carefully to what you have to tell him/her	≤55	8	7.8	33	32.4	37	36.3	18	17.6	6	5.9	.17
	>55	26	13.7	43	22.6	68	35.8	32	16.8	21	11.1	
Your doctor spends plenty of time with you during the visit	≤55	7	6.9	27	26.5	24	23.5	27	26.5	17	16.6	.37
	>55	14	7.4	35	18.4	63	33.2	49	25.8	29	15.2	
When you visit the clinic, the medical staff deals with you friendly and with respect	≤55	29	28.4	32	31.4	26	25.5	11	10.8	4	3.9	.91
	>55	52	27.4	69	36.3	46	24.2	16	8.4	7	3.7	

All p-values were derived using the chi-squared test.

Table (14):Cross-tabulation of the participants' responses to the questions related to the clarity of drugs usage instructions by their age group.

Variable	age	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The drug- usage instructions written by the doctor are clear to you	≤55	29	28.4	45	44.1	17	16.6	9	9	2	1.9	.21
	>55	67	35.3	71	37.4	42	22.1	9	4.7	1	0.5	
The medical staff explains and gives you clear information about the necessary life style modifications for you.	≤55	17	16.6	20	19.6	32	31.4	27	26.5	6	5.9	.81
	>55	31	16.3	37	19.5	64	33.7	41	21.6	17	8.9	
The medical staff trains you how to perform self measurement of your BP.	≤55	17	16.6	18	17.6	13	12.7	25	24.7	29	28.4	**.04**
	>55	24	12.6	22	11.6	43	22.6	31	16.3	70	36.9	
The medical staff explains to you or gives you information about the importance of BP. control	≤55	28	27.5	30	29.4	32	31.4	8	7.8	4	3.9	.47
	>55	38	20	61	32.1	66	34.7	21	11.1	4	2.1	
The medical staff uses clear language when they give you instructions about your disease's control and medication	≤55	20	19.6	45	44.1	32	31.4	5	4.9	0	0	.50
	>55	35	18.4	94	49.5	55	28.9	4	2.1	2	1.1	
Your doctor explains the reasons for performing the medical tests for you	≤55	13	12.7	20	19.6	47	46.1	14	13.7	8	7.9	.92
	>55	23	12.1	37	19.5	83	43.7	34	17.9	13	6.8	
When your doctor changes your drugs, he explains to you the reason for that	≤55	15	14.7	25	24.5	37	36.3	15	14.7	10	9.8	.12
	>55	24	12.6	32	16.8	75	39.5	48	25.3	11	5.8	
The doctor uses difficult medical terms without explaining what they mean	≤55	10	9.8	14	13.7	23	22.5	32	31.5	23	22.5	.11
	>55	10	5.3	27	14.2	56	29.5	40	21	57	30	
The doctor gives you advices and information about different ways to avoid illness and maintain health	≤55	14	13.7	21	20.6	41	40.2	14	13.7	12	11.8	.59
	>55	21	11	41	21.6	79	41.6	35	18.4	14	7.4	

All p-values were derived using the chi-squared test.

Table (15):Cross-tabulation of the participants' responses to the questions related to their regularity on doctor appointments and treatment plan by their age group.

Variable	Age	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
you are always regular at your doctor appointments	≤55	49	48	32	31.4	14	13.7	4	3.9	3	3	.41
	>55	73	38.4	73	38.4	28	14.7	5	2.6	11	5.9	
You measure your BP on regular basis	≤55	16	15.7	37	36.3	34	33.3	10	9.8	5	4.9	**.01**
	>55	25	13.2	43	22.6	65	34.2	29	15.3	28	14.7	
You manage to do physical exercises as advised by your doctor	≤55	5	4.9	18	17.6	40	39.2	18	17.6	21	20.7	.42
	>55	8	4.2	27	14.2	61	32.1	37	19.5	57	30	
You manage to maintain a healthy weight as advised by your doctor	≤55	6	5.9	27	26.5	31	30.4	18	17.6	20	19.6	.76
	>55	16	8.4	41	21.6	60	31.6	40	21	33	17.4	
You manage to eat healthy food as advised by your doctor	≤55	18	17.6	26	25.5	41	40.2	12	11.8	5	4.9	.22
	>55	30	15.8	68	35.8	58	30.5	18	9.5	16	8.4	
You manage to use your HTN drugs on regular basis as prescribed to you	≤55	24	23.5	32	31.8	36	35.3	7	6.8	3	2.6	.42
	>55	53	27.9	72	37.9	53	27.9	7	3.7	5	2.6	
You forget taking your medications because you have a busy life	≤55	5	4.9	14	13.7	28	27.5	40	39.2	15	14.7	.43
	>55	9	4.7	25	13.2	65	34.2	55	28.9	36	19	
When you feel better, you stop taking your drugs.	≤55	5	4.9	14	13.7	24	23.5	22	21.6	37	36.3	.41
	>55	5	2.6	17	8.9	55	28.9	50	26.3	63	33.3	
If you feel worse because of the side effects of your drugs, you stop taking it without consulting your doctor	≤55	10	9.8	12	11.8	29	28.4	23	22.5	28	27.5	.19
	>55	9	4.7	12	6.3	57	30	51	26.8	61	32.2	
You always visit your doctor personally for drug prescription	≤55	44	43.1	36	35.3	18	17.7	3	2.9	1	1	.44
	>55	73	38.4	78	41	25	13.2	7	3.7	7	3.7	
You are kept waiting for a long time in reception area when you are at the doctor's office.	≤55	36	35.3	34	33.3	23	22.6	5	4.9	4	3.9	.14
	>55	55	28.9	80	42.1	48	25.4	2	1	5	2.6	
if you know that your medication will increase your weight, you will continue taking them	≤55	9	8.8	36	35.3	47	46.1	6	5.9	4	3.9	**.05**
	>55	39	20.5	73	38.4	67	35.3	6	3.2	5	2.6	
if you know that your medication will affect your sex life, you will continue taking them	≤55	10	9.8	29	28.4	44	43.1	12	11.8	7	6.9	**.02**
	>55	42	22.1	62	32.6	52	27.4	22	11.6	12	6.3	

All p-values were derived using the chi-squared test.

Table (16):Cross-tabulation of the participants' responses to the questions related to knowledge and perception of hypertension by their marital status.

Variable	Marital status	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
In general, do you consider yourself to be in good health?	Single	3	30	4	40	2	20	1	10	0	0	.42
	Married	42	20.3	83	40.1	66	31.9	15	7.2	1	.5	
	Divorce	3	33.3	2	22.3	1	11.1	3	33.3	0	0	
	Widow.	16	24.3	20	30.3	23	34.8	7	10.6	0	0	
Do you consider your BP to be well controlled ?	Single	3	30	3	30	4	40	0	0	0	0	.09
	Married	24	11.6	92	44.4	77	37.2	12	5.8	2	1	
	Divorce	0	0	2	22.3	6	66.6	1	11.1	0	0	
	Widow.	1	1.5	35	53.1	23	34.8	7	10.6	0	0	
Do you consider HTN as a serious problem?	Single	5	50	3	30	2	20	0	0	0	0	**.01**
	Married	75	36.2	66	31.9	50	24.2	14	6.7	2	1	
	Divorce	0	0	7	77.8	1	11.1	0	0	1	11.1	
	Widow.	17	25.8	23	34.8	22	33.3	4	6.1	0	0	
Do you think that HTN leads to other serious conditions?	Single	3	30	3	30	3	30	1	10	0	0	.58
	Married	65	31.4	70	33.8	51	24.6	14	6.8	7	3.4	
	Divorce	1	11.1	3	33.3	3	33.3	2	22.3	0	0	
	Widow.	13	19.7	20	30.3	25	37.9	6	9.1	2	3	
Do you think that HTN has hereditary basis?	Single	1	10	1	10	4	40	1	10	3	30	**.00**
	Married	38	18.4	33	15.9	76	36.7	27	13.1	33	15.9	
	Divorce	0	0	1	11.1	0	0	4	44.4	4	44.5	
	Widow.	5	7.6	16	24.2	10	15.2	22	33.3	13	19.7	
Do you think that being male or female will affect the risk of getting HTN?	Single	1	10	1	10	4	40	1	10	3	30	.37
	Married	25	12.1	30	14.5	59	28.5	44	21.3	49	23.6	
	Divorce	2	22.3	0	0	1	11.1	2	22.3	4	44.3	
	Widow.	9	13.6	13	19.7	10	15.2	20	30.3	14	21.2	
Do you think that HTN risk increases with age?	Single	4	40	3	30	2	20	0	0	1	10	.41
	Married	50	24.2	84	40.6	45	21.7	22	10.6	6	2.9	
	Divorce	2	22.3	5	55.4	2	22.3	0	0	0	0	
	Widow.	18	27.3	29	43.9	10	15.2	3	4.5	6	9.1	
Do you think that decreasing tension and anger will help you in controlling your BP?	Single	5	50	0	0	4	40	1	10	0	0	.07
	Married	82	39.6	73	35.3	42	20.3	7	3.4	3	1.4	
	Divorce	4	44.5	3	33.3	1	11.1	1	11.1	0	0	
	Widow.	25	37.9	23	34.8	10	15.2	2	3	6	9.1	
Do you think that dietary changes will help you in controlling your BP?	Single	2	20	4	40	3	30	0	0	1	10	.82
	Married	60	29	82	39.6	47	22.7	11	5.3	7	3.4	
	Divorce	4	44.5	2	22.3	3	33.3	0	0	0	0	
	Widow.	19	28.8	22	33.3	15	22.7	5	7.6	5	7.6	
Do you think that physical activity will help you in controlling your BP?	Single	2	20	5	50	0	0	1	10	2	20	.30
	Married	41	19.8	44	21.3	68	32.9	36	17.4	17	8.6	
	Divorce	2	22.2	4	44.4	1	11.1	2	22.3	0	0	
	Widow.	10	15.2	16	24.2	20	30.3	15	22.7	5	7.6	
Do you think that it is necessary to take HTN medications regularly?	Single	9	90	0	0	0	0	1	10	0	0	.07
	Married	84	40.6	69	33.3	33	15.9	13	6.3	8	3.9	
	Divorce	4	44.5	1	11.1	4	44.4	0	0	0	0	
	Widow	24	36.4	24	36.4	13	19.7	2	3	3	4.5	

	Marital status	Always F.	%	Often F.	%	Sometime F.	%	Rarely F.	%	Never F.	%	P
Do you think that HTN medications help you to control your BP?	Single	2	20	2	20	5	50	1	10	0	0	.14
	Married	62	30	74	35.7	51	24.6	10	4.8	9	4.9	
	Divorce	4	44.4	2	22.2	1	11.1	2	22.3	0	0	
	Widow	14	21.2	23	34.8	24	36.4	5	7.6	0	0	
Do you feel it is safe or not necessary to take your medication?	Single	1	10	1	10	2	20	3	30	3	30	.45
	Married	14	6.8	26	12.6	46	22.2	58	28	63	30.4	
	Divorce	2	22.3	2	22.2	0	0	1	11.1	4	44.4	
	Widow	3	4.5	9	13.6	22	33.3	14	21.2	18	27.4	
You feel it is safe to increase or decrease your medication dose without consulting your doctor?	Single	0	0	2	20	3	30	2	20	3	30	.87
	Married	9	4.3	26	12.6	42	20.3	53	25.6	77	37.2	
	Divorce	0	0	0	0	3	33.3	2	22.3	4	44.4	
	Widow	3	4.5	9	13.6	19	28.5	11	16.7	24	36.4	
Do you think that your HTN medications have serious side effects that may affect your health?	Single	0	0	3	30	3	30	3	30	1	10	.91
	Married	18	8.7	30	14.5	66	31.9	55	26.6	38	18.3	
	Divorce	0	0	1	11.1	4	44.5	1	11.1	3	33.3	
	Widow	5	7.6	11	16.7	21	31.8	17	25.8	12	18.1	
Do you think that HTN is a disease that can be prevented?	Single	0	0	1	10	5	50	4	40	0	0	.56
	Married	12	5.8	27	13	59	28.5	51	24.7	58	28	
	Divorce	0	0	2	22.3	1	11.1	2	22.2	4	44.4	
	Widow	3	4.5	5	7.6	20	30.3	18	27.3	20	30.3	

All p-values were derived using the chi-squared test.

Table (17):Cross-tabulation of the participants' responses to the questions related to the duration of their illness by their marital status.

Variable	Marital status	Always F.	%	Often F.	%	Sometime F.	%	Rarely F.	%	Never F.	%	P
The long duration of your illness affect your desire to take your medication.	Single	4	40	4	40	0	0	0	0	2	20	**.00**
	Married	21	10.1	72	34.8	80	38.6	13	6.4	21	10.1	
	Divorce	2	22.3	2	22.3	2	22.3	1	11.1	2	22.3	
	Widow.	12	18.2	31	47	17	25.7	6	9.1	0	0	
Because HTN is a chronic disease, you do not take your medication continuously	Single	0	0	2	20	7	70	0	0	1	10	.34
	Married	6	2.9	25	12.1	74	35.7	61	29.5	41	19.8	
	Divorce	0	0	2	22.3	3	33.3	1	11.1	3	33.3	
	Widow.	4	6.1	11	16.7	26	39.4	15	22.6	10	15.2	
Because HTN. is a chronic disease, you do not follow the diet regimen or change your lifestyle according to your doctor advice	Single	1	10	1	10	5	50	0	0	3	30	.23
	Married	7	3.4	24	11.6	55	26.6	78	37.7	43	20.7	
	Divorce	1	11.1	0	0	2	22.3	2	22.2	4	44.4	
	Widow.	4	6.1	10	15.2	22	33.3	18	27.3	12	18.1	
Because HTN. is a chronic disease, it makes you feel sad and depressed	Single	1	10	2	20	2	20	4	40	1	10	.84
	Married	14	6.8	47	22.7	79	38.2	34	16.4	33	15.9	
	Divorce	1	11.1	2	22.3	4	44.4	2	22.2	0	0	
	Widow	3	4.5	15	22.6	28	42.7	12	18.1	8	12.1	

All p-values were derived using the chi-squared test.

Table (18):Cross-tabulation of the participants' responses to the questions related to the drugs' regimen by their marital status.

Variable	Marital status	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Because you have to take your drug(s) many times a day, it decreases your desire to take them every day	Single	5	50	1	10	1	10	3	30	0	0	**.01**
	Married	28	13.4	73	35.3	73	35.3	14	6.8	19	9.2	
	Divorce	1	11.1	3	33.3	4	44.5	0	0	1	11.1	
	Widow.	12	18.2	27	40.9	21	31.8	4	6.1	2	3	
Because you have to take your drug(s) many times a day, it is difficult for you to remember this all the time	Single	0	0	5	50	4	40	1	10	0	0	**.02**
	Married	8	3.9	53	25.6	91	44	31	14.9	24	11.6	
	Divorce	0	0	3	33.3	3	33.3	3	33.4	0	0	
	Widow.	8	12	20	30.3	33	50	3	4.5	2	3	
The drugs you take for chronic conditions other than HTN, decreases your desire to take antihypertensive medications and follow lifestyle changes.	Single	0	0	3	30	6	60	1	10	0	0	**.05**
	Married	12	5.8	56	27	78	37.7	32	15.5	29	14	
	Divorce	3	33.3	3	33.3	1	11.1	2	22.3	0	0	
	Widow.	9	13.6	20	30.3	25	37.9	8	12.1	4	6.1	
Changing your drugs regimen by your doctors frequently decreases your desire to take these drugs	Single	3	30	1	10	5	50	1	10	0	0	.13
	Married	11	5.3	40	19.3	78	37.7	49	23.7	29	14	
	Divorce	1	11.1	0	0	2	22.3	3	33.3	3	33.3	
	widow	7	10.6	13	19.7	22	33.3	15	22.8	9	13.6	
If you find all your drugs in one pill, this will increase your regularity in taking them.	Single	7	70	1	10	0	0	1	10	1	10	.40
	Married	91	44	56	27	39	18.8	9	4.4	12	5.8	
	Divorce	3	33.3	2	22.3	2	22.3	2	22.3	0	0	
	widow	33	50	17	25.8	9	13.6	3	4.5	4	6.1	

All p-values were derived using the chi-squared test.

Table (19):Cross-tabulation of the participants' responses to the questions related to their relationship with the medical staff by their marital status.

Variable	Marital status.	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The same doctor sees you in every visit you do to the clinic	Single	4	40	3	30	2	20	0	0	1	10	.28
	Married	37	17.9	71	34.3	56	27	25	12.1	18	8.7	
	Divorce	5	55.5	0	0	2	22.3	1	11.1	1	11.1	
	Widow.	10	15.2	25	37.9	18	27.2	7	10.6	6	9.1	
The doctor treats you with respect when you visit him in the clinic	Single	2	20	5	50	3	30	0	0	0	0	**.01**
	Married	46	22.2	82	39.6	70	33.8	9	4.4	0	0	
	Divorce	2	22.3	4	44.4	1	11.1	1	11.1	1	11.1	
	Widow	7	10.5	32	48.5	21	31.8	5	7.6	1	1.5	
You are satisfied with the medical care you receive	Single	1	10	4	40	4	40	0	0	1	10	.75
	Married	37	17.9	66	31.9	80	38.6	15	7.2	9	4.4	
	Divorce	3	33.3	1	11.1	4	44.5	0	0	1	11.1	
	Widow	7	10.5	25	37.9	27	41	4	6.1	3	4.5	
The doctor allows you to say everything you think is important for you during the visit	Single	0	0	2	20	6	60	1	10	1	10	.66
	Married	31	15	58	28	72	34.8	27	13	19	9.2	
	Divorce	0	0	4	44.5	3	33.3	1	11.1	1	11.1	
	Widow	6	9.1	17	25.8	23	34.8	14	21.2	6	9.1	
The doctor makes you feel foolish sometimes during the visit	Single	1	10	1	10	2	20	3	30	3	30	.98
	Married	9	4.4	18	8.7	39	18.8	57	27.5	84	40.6	
	Divorce	0	0	2	22.3	1	11.1	3	33.3	3	33.3	
	Widow	4	6.1	5	7.6	12	18.1	19	28.8	26	39.4	
The doctor acts too serious / formal and impersonal toward you	Single	0	0	0	0	8	80	1	10	1	10	.16
	Married	20	9.7	58	28	83	40.1	33	15.9	13	6.3	
	Divorce	1	11.1	1	11.1	6	66.7	0	0	1	11.1	
	Widow	9	13.6	14	21.2	24	36.4	10	15.2	9	13.6	
The doctor during your examination or visit sometimes hurry too much to finish it quickly	Single	3	30	5	50	1	10	0	0	1	10	.44
	Married	43	20.8	53	25.6	66	31.9	30	14.5	15	7.2	
	Divorce	3	33.3	4	44.5	1	11.1	1	11.1	0	0	
	Widow	12	18.2	25	37.9	15	22.7	9	13.6	5	7.6	
The doctor sometimes ignores what you tell him / her.	Single	3	30	0	0	5	50	2	20	0	0	.17
	Married	12	5.8	40	19.3	87	42	41	19.9	27	13	
	Divorce	1	11.1	3	33.3	3	33.3	2	22.3	0	0	
	Widow	7	10.6	13	19.7	30	45.5	7	10.6	9	13.6	
If you have a medical question, you can reach the doctor for help without a problem.	Single	2	20	0	0	7	70	1	10	0	0	.38
	Married	21	10.1	55	26.6	84	40.6	31	15	16	7.7	
	Divorce	0	0	1	11.1	6	66.7	1	11.1	1	11.1	
	Widow	9	13.6	11	16.7	27	40.9	12	18.2	7	10.6	
The doctor listens carefully to what you have to tell him / her.	Single	0	0	4	40	4	40	0	0	2	20	.44
	Married	27	13	53	25.7	76	36.7	33	15.9	18	8.7	
	Divorce	0	0	2	22.3	3	33.3	4	44.4	0	0	
	Widow	7	10.6	17	25.8	22	33.3	13	19.7	7	10.6	
Your doctor spends plenty of time with you during the visit	Single	1	10	1	10	4	40	1	10	3	30	.51
	Married	12	5.8	46	22.2	65	31.4	51	24.7	33	15.9	
	Divorce	2	22.3	1	11.1	1	11.1	3	33.3	2	22.2	
	Widow	6	9.1	14	21.2	17	25.8	21	31.8	8	12.1	
When you visit the clinic, the medical staff deals with you friendly and with respect	Single	0	0	4	40	3	30	1	10	2	20	.14
	Married	65	31.4	68	32.8	50	24.2	18	8.7	6	2.9	
	Divorce	0	0	4	44.5	3	33.3	2	22.2	0	0	
	Widow	16	24.2	25	38	16	24.2	6	9.1	3	4.5	

*All p-values were derived using the chi-squared test.

Table (20):Cross-tabulation of the participants' responses to the questions related to the drugs-usage instructions by their marital status.

Variable	Marital status	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The drug-use instructions written by the doctor are clear to you.	Single	5	50	3	30	1	10	0	00	1	10	.28
	Married	64	30.9	88	42.5	40	19.3	13	6.3	2	1	
	Divorce	3	33.3	2	22.3	3	33.3	1	11.1	0	00	
	Widow.	24	36.4	23	34.8	15	22.7	4	6.1	0	00	
The medical staff explains and gives you clear information about the necessary life style modifications for your condition.	Single	0	00	4	40	5	50	1	10	0	00	.21
	Married	30	14.5	39	18.8	68	32.9	52	25.1	18	8.7	
	Divorce	4	44.5	2	22.3	3	33.3	0	00	0	00	
	Widow.	14	21.2	12	18.2	20	30.3	15	22.7	5	7.6	
The medical staff shows and trains you how to perform self measurement of BP.	Single	1	10	2	20	2	20	2	20	3	30	.14
	Married	27	13	25	12.1	40	19.3	40	19.3	75	36.3	
	Divorce	5	55.5	2	22.3	1	11.1	1	11.1	0	00	
	Widow.	8	12.1	11	16.7	13	19.7	13	19.7	21	31.8	
The medical staff explains to you or give you information about the importance of BP. control	Single	3	30	4	40	1	10	1	10	1	10	.80
	Married	44	21.3	64	30.9	70	33.8	24	11.6	5	2.4	
	Divorce	3	33.3	3	33.3	3	33.3	0	00	0	00	
	Widow	16	24.2	20	30.3	24	36.4	4	6.1	2	3	
The medical staff uses clear and simple language when they give you instructions about your disease's control and medication	Single	3	30	3	30	4	40	0	00	0	00	**.01**
	Married	39	18.8	10	48.8	59	28.5	8	3.9	0	00	
	Divorce	2	22.3	1	44.4	1	11.1	1	11.1	1	11.1	
	Widow	11	16.7	4 31	47	23	34.8	0	00	1	1.5	
Your doctor explains the reasons for performing the medical tests for you.	Single	2	20	4	40	4	40	0	00	0	00	**.03**
	Married	32	15.5	31	15	95	45.9	34	16.4	15	7.2	
	Divorce	1	11.1	2	22.3	2	22.3	3	33.3	1	11.1	
	Widow	1	1.5	20	30.3	29	43.9	11	16.7	5	7.6	
When your doctor changes your drugs, he explains to you the reason for that.	Single	3	30	1	10	4	40	1	10	1	10	.48
	Married	31	15	42	20.3	77	37.2	43	20.8	14	6.7	
	Divorce	1	11.1	1	11.1	4	44.5	1	11.1	2	22.2	
	Widow	4	6.1	13	19.7	27	40.9	18	27.2	4	6.1	
The doctor uses difficult medical terms without explaining to you what they mean.	Single	0	00	6	60	3	30	0	00	1	10	**.01**
	Married	17	8.2	22	10.6	54	26.1	56	27.1	58	28	
	Divorce	1	11.1	2	22.3	3	33.3	1	11.1	2	22.3	
	Widow	2	3	11	16.7	19	28.8	15	22.7	19	28.8	
The doctor gives you advices and information about different ways to avoid illness and maintain health.	Single	2	20	1	10	7	70	0	00	0	00	.17
	Married	30	14.5	38	18.4	83	40	37	17.9	19	9.2	
	Divorce	0	00	2	22.3	5	55.5	1	11.1	1	11.1	
	Widow	3	4.5	21	31.8	25	37.9	11	16.7	6	9.1	

All p-values were derived using the chi-squared test.

Table (21):Cross-tabulation of the participants' responses to the questions related to family support by their marital status.

Variable	Marital status	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Your family reminds you about your medications	Single	4	40	4	40	0	00	2	20	0	00	.61
	Married	77	37.2	73	35.3	34	16.4	15	7.2	7	3.9	
	Divorce	2	22.3	2	22.2	2	22.2	2	22.2	1	11.1	
	widow	21	31.8	26	39.4	10	15.2	5	7.6	4	6	
Your family helps you in taking your medications	Single	1	10	4	40	5	50	0	00	0	00	.26
	Married	63	30.4	77	37.2	49	23.7	10	4.8	8	3.9	
	Divorce	1	11.1	3	33.3	3	33.3	0	00	2	22.3	
	Widow	14	21.2	26	39.4	18	28.3	3	3.5	5	7.6	
Your family helps you financially to get your medication when you need	Single	2	20	2	20	2	20	4	40	0	00	**.03**
	Married	68	32.9	64	30.9	51	24.6	12	5.8	12	5.8	
	Divorce	1	11.1	4	44.5	2	22.2	1	11.1	1	11.1	
	Widow	23	34.8	18	27.3	16	25.3	3	3.5	6	9.1	
Your family helps you in measuring your BP.	Single	2	20	1	10	5	50	1	10	1	10	**.05**
	Married	61	29.5	47	22.7	38	18.4	33	15.9	28	13.5	
	Divorce	1	11.1	3	33.3	1	11.1	3	33.3	1	11.1	
	Widow	17	25.8	15	22.7	10	15.2	5	7.6	19	28.7	
Your family helps you in reaching the medical facility if you are tired or sick	Single	3	30	2	20	2	20	2	20	1	10	.48
	Married	100	48.3	47	22.7	44	21.3	6	2.9	10	4.8	
	Divorce	0	00	1	11.1	3	33.3	0	00	1	11.1	
	Widow	34	51.5	12	18.2	13	20.7	4	6.1	3	3.5	
Your family helps you to accomplish the required life style changes.	Single	0	00	3	30	4	40	2	20	1	10	.45
	Married	43	20.8	87	42	50	24.2	20	9.6	7	3.4	
	Divorce	1	11.1	2	22.2	3	33.3	2	22.3	1	11.1	
	Widow	15	22.7	23	34.8	20	30.3	4	6.1	4	6.1	
Your family encourages you to be compliant with your medication and treatment plan	Single	0	00	2	20	5	50	2	20	1	10	**.00**
	Married	58	28	55	26.6	70	33.8	18	8.7	6	2.9	
	Divorce	0	00	0	00	5	55.6	0	00	4	44.4	
	Widow	16	24.2	21	31.8	19	28.8	5	7.6	5	7.6	

All p-values were derived using the chi-squared test.

Table (22):Cross-tabulation of the participants' responses to the questions related to their regularity on appointments and the treatment plan by their marital status.

Variable	Marital status	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
you are always regular at your doctor appointments	Single	3	30	3	30	4	40	0	00	0	00	**.05**
	Married	85	41.1	74	35.7	32	15.5	4	1.9	12	5.8	
	Divorce	6	66.7	0	00	2	22.2	1	11.1	0	00	
	Widow.	28	42.4	28	42.4	4	6.1	4	6.1	2	3	
You measure your BP on regular basis	Single	1	10	3	30	5	50	0	00	1	10	.75
	Married	31	15	60	29	67	32.4	30	14.5	19	9.1	
	Divorce	1	11.1	3	33.3	2	22.2	1	11.1	2	22.3	
	Widow.	8	12.1	14	21.2	25	37.9	8	12.1	11	16.7	
You manage to do physical exercises as advised by your doctor	Single	2	20	2	20	3	30	0	00	3	30	.16
	Married	8	3.9	36	17.4	75	36.2	40	19.3	48	23.2	
	Divorce	0	00	1	11.1	2	22.2	1	11.1	5	55.6	
	Widow.	3	3.5	6	9.1	21	31.8	14	21.2	22	33.3	
You manage to maintain a healthy weight as advised by your doctor	Single	3	30	1	10	0	00	4	40	2	20	**.02**
	Married	14	6.8	55	26.6	70	33.8	37	17.9	31	14.9	
	Divorce	0	00	0	00	3	33.3	3	33.3	3	33.4	
	Widow.	5	7.6	12	18.2	18	27.3	14	21.2	17	25.7	
You manage to eat healthy food as advised by your doctor	Single	1	10	1	10	6	60	0	00	2	20	.52
	Married	35	16.9	69	33.3	65	31.4	24	11.6	14	6.8	
	Divorce	1	11.1	3	33.3	5	55.6	0	00	0	00	
	Widow.	11	16.7	21	31.8	23	34.8	6	9.1	5	7.6	
You manage to use your HTN drugs on regular basis as prescribed to you	Single	0	00	2	20	6	60	1	10	1	10	.26
	Married	59	28.5	74	35.7	61	29.6	10	4.8	3	1.4	
	Divorce	3	33.3	4	44.5	2	22.2	0	00	0	00	
	Widow.	15	23.7	24	36.4	20	30.3	3	3.5	4	6.1	
Sometimes you forget taking your medication because you have busy life	Single	1	10	3	30	2	20	2	20	2	20	.57
	Married	9	4.3	31	14.9	63	30.1	66	31.9	38	18.8	
	Divorce	0	00	0	00	3	33.3	5	55.6	1	11.1	
	Widow.	4	6.1	5	7.6	25	37.8	22	33.3	10	15.2	
When you feel better, you stop taking your medication	Single	1	10	1	10	4	40	4	40	0	00	.25
	Married	7	3.4	21	10.1	58	28	47	22.8	74	35.7	
	Divorce	0	00	2	22.2	0	00	5	55.6	2	22.2	
	Widow.	2	3	7	10.6	17	25.7	16	24.3	24	36.4	
If you feel worse because of the side effects of your medicine you stop taking it without consulting your doctor	Single	1	10	5	50	0	00	2	20	2	20	**.00**
	Married	14	6.8	15	7.2	66	31.9	49	23.7	63	30.4	
	Divorce	0	00	0	00	4	44.5	2	22.2	3	33.3	
	Widow.	4	6.1	4	6.1	16	24.2	21	31.8	21	31.8	
You always visit your doctor personally for drug prescription	Single	4	40	4	40	1	10	1	10	0	00	.15
	Married	94	45.4	72	34.8	31	15	6	2.9	4	1.9	
	Divorce	1	11.1	5	55.6	1	11.1	1	11.1	1	11.1	
	Widow.	18	27.3	33	50	10	15.2	2	3	3	4.5	

Variable	Marital status	Always F.	Always %	Often F.	Often %	Sometimes F.	Sometimes %	Rarely F.	Rarely %	Never F.	Never %	P
You are kept waiting for a long time in reception area when you are at the doctor's office	Single	3	30	1	10	6	60	0	00	0	00	.09
	Married	68	32.9	78	37.7	49	23.7	5	2.3	7	3.4	
	Divorce	4	44.5	2	22.2	1	11.1	1	11.1	1	11.1	
	Widow	16	24.2	33	50	15	22.8	1	1.5	1	1.5	
if you know that your medication will increase your weight , you will continue taking them	Single	2	20	3	30	4	40	1	10	0	00	.85
	Married	35	16.9	76	36.7	83	40.1	8	3.9	5	2.4	
	Divorce	1	11.1	2	22.2	4	44.5	1	11.1	1	11.1	
	Widow	10	15.2	28	42.4	23	34.9	2	3	3	4.5	
if you know that your medication will affect your sex life, you will continue taking them	Single	4	40	2	20	3	30	0	00	1	10	.08
	Married	35	16.9	62	30	75	36.2	21	10.1	14	6.8	
	Divorce	2	22.2	3	33.3	0	00	4	44.5	0	00	
	Widow	11	16.7	24	36.4	18	27.3	9	13.5	4	6.1	

All p-values were derived using the chi-squared test.

Table (23):Cross-tabulation of the participants' responses to the questions related to their treatment costs by their marital status.

Variable	Marital status	Always F.	Always %	Often F.	Often %	Sometimes F.	Sometimes %	Rarely F.	Rarely %	Never F.	Never %	P
You have to pay for your medical care more than what you can afford	Single	5	50	0	00	5	50	0	00	0	00	**.00**
	Married	25	12.1	30	14.5	47	22.7	72	34.8	33	15.9	
	Divorce	0	00	2	22.3	3	33.3	1	11.1	3	33.3	
	Widow.	3	4.5	12	18.2	22	33.3	21	31.8	8	12.2	
You do not follow your drug regimen or you go without the medical care you need because you cannot afford the expenses	Single	0	00	2	20	6	60	2	20	0	00	.22
	Married	11	5.3	26	12.6	79	38.2	54	26.1	37	17.8	
	Divorce	0	00	2	22.2	4	44.5	1	11.1	2	22.2	
	Widow.	2	3	4	6.1	39	59.1	14	21.2	7	10.6	
It is a problem to cover your share of the cost for a medical care	Single	0	00	3	30	1	10	6	60	0	00	**.01**
	Married	16	7.7	35	16.9	83	40.1	47	22.7	26	12.6	
	Divorce	3	33.3	0	00	1	11.1	4	44.5	1	11.1	
	Widow.	6	9.1	9	13.6	31	47	13	19.7	7	10.6	
You worry about having to pay large medical bills.	Single	1	10	0	00	4	40	4	40	1	10	.07
	Married	11	5.3	41	19.8	83	40.1	47	22.7	25	12.1	
	Divorce	0	00	2	22.2	2	22.2	2	22.3	3	33.3	
	Widow.	5	7.6	12	18.2	25	37.9	6	9.1	18	27.2	
The amount you have to pay to cover your medical needs is reasonable	Single	0	00	1	10	6	60	1	10	2	20	.22
	Married	33	15.9	55	26.6	65	31.4	31	15	23	11.1	
	Divorce	0	00	2	22.3	3	33.3	1	11.1	3	33.3	
	Widow.	8	12.1	23	34.8	16	24.3	13	19.7	6	9.1	
High cost of your medication and the treatment plan in general makes me less compliant with my treatment regimen	Single	1	10	0	00	3	30	3	30	3	30	.90
	Married	10	4.8	25	12.1	49	23.7	72	34.8	51	24.6	
	Divorce	0	00	1	11.1	2	22.3	3	33.3	3	33.3	
	Widow.	1	1.5	5	7.6	14	21.2	26	39.4	20	30.3	

All p-values were derived using the chi-squared test.

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Table (24):Cross-tabulation of the participants' responses to the questions related to their knowledge and perception of hypertension by their level of education.

Variable	Education	Always		Often		Sometimes		Rarely		Never		P
		freq	%	freq	%	freq	%	freq	%	freq	%	
In general you consider yourself to be in good health.	None	21	20	26	24.8	40	38.1	18	17.1	0	0	**.00**
	Prim.	15	18.8	34	42.5	26	32.5	5	6.2	0	0	
	Elem.	12	24.5	26	53.1	8	16.3	2	4.1	1	2	
	Sec.	3	20	8	53.3	4	26.7	0	0	0	0	
	Univ.	13	30.2	15	34.9	14	32.6	1	2.3	0	0	
You consider your BP to be well controlled	None	7	6.7	53	50.5	35	33.3	10	9.5	0	0	.68
	Prim.	7	8.8	32	40	33	41.2	7	8.8	1	1.2	
	Elem.	6	12.2	21	42.9	20	40.9	1	2	1	2	
	Sec.	3	20	6	40	6	40	0	0	0	0	
	Univ.	5	11.6	20	46.5	16	37.2	2	4.7	0	0	
You consider HTN as a serious problem	None	40	38.1	37	35.2	23	21.9	4	3.8	1	1	.35
	Prim.	17	21.2	31	38.8	26	32.5	6	7.5	0	0	
	Elem.	16	32.8	15	30.6	11	22.4	6	12.2	1	2	
	Sec.	5	33.3	5	33.3	5	33.3	0	0	0	0	
	Univ.	19	44.2	11	25.6	10	23.3	2	4.6	1	2.3	
You think that HTN leads to other serious conditions	None	30	28.6	35	33.3	29	27.6	8	7.6	3	2.9	**.02**
	Prim.	16	20	25	31.3	27	32.5	11	13.9	1	1.3	
	Elem.	9	18.4	22	44.9	16	32.7	1	2	1	2	
	Sec.	6	40	3	20	4	26.7	1	6.7	1	6.7	
	Univ.	21	48.8	11	25.6	6	13.9	2	4.7	3	7	
You think that HTN has hereditary basis	None	19	18.1	19	18.1	28	26.7	20	19	19	18.1	**.00**
	Prim.	10	12.5	9	11.3	31	38.8	19	23.8	11	13.6	
	Elem.	9	18.4	8	16.3	20	40.8	10	20.4	2	4.1	
	Sec.	2	13.3	4	26.7	5	33.3	0	0	4	26.7	
	Univ.	4	9.3	11	25.6	6	13.9	5	11.6	17	39.6	
You think that the risk of getting HTN is affected by gender.	None	19	18.1	16	15.2	23	21.9	24	22.9	23	21.9	.10
	Prim.	5	6.3	14	17.5	23	28.8	21	26.3	17	21.1	
	Elem.	9	18.4	6	12.2	10	20.4	15	30.6	9	18.4	
	Sec.	1	6.7	1	6.7	7	46.7	2	13.3	4	26.6	
	Univ.	3	7	7	16.3	11	25.6	5	11.6	17	39.5	
You think that HTN risk increases with age	None	27	25.7	42	40	22	21	6	5.5	8	7.6	.07
	Prim.	16	20	37	46.3	12	15	12	15	3	3.7	
	Elem.	10	20.4	20	40.8	12	25.5	7	13.3	0	0	
	Sec.	5	33.3	5	33.3	5	33.3	0	0	0	0	
	Univ.	16	37.2	17	39.5	8	18.6	0	0	2	4.7	
You think that decreasing tension and anger will help you in controlling your BP.	None	47	44.8	32	30.5	19	18.1	2	1.8	5	4.8	.50
	Prim.	33	41.3	28	35	14	17.5	3	3.7	2	2.5	
	Elem.	17	34.7	17	34.7	9	18.4	5	10.2	1	2	
	Sec.	5	33.3	4	26.7	5	33.3	1	6.7	0	0	
	Univ.	14	32.6	18	41.8	10	23.3	0	0	1	2.3	

You think that dietary changes will help you in controlling your BP	None	30	28.6	35	33.3	26	24.8	6	5.7	8	7.6	.30
	Prim.	22	27.5	33	41.3	18	22.5	5	6.2	2	2.5	
	Elem.	11	22.4	20	40.8	13	26.5	5	10.3	0	0	
	Sec.	6	40	4	26.7	5	33.3	0	0	0	0	
	Univ.	16	37.2	18	41.8	6	14	0	0	3	7	
You think that physical activity will help you in controlling your BP	None	18	17.1	22	21	32	30.5	28	26.8	5	4.8	**.01**
	Prim.	13	16.3	17	21.3	26	33.3	17	21.3	6	7.5	
	Elem.	6	12.2	15	30.6	17	34.8	6	12.2	5	10.2	
	Sec.	6	40	2	13.3	2	13.3	1	6.7	4	26.7	
	Univ.	12	27.9	13	30.2	12	27.9	2	4.7	4	9.3	
You think that it is necessary to take HTN drugs regularly	None	43	41	37	35.2	18	17.1	7	6.7	0	0	**.00**
	Prim.	31	38.8	23	28.8	18	22.5	3	3.7	5	6.2	
	Elem.	15	30.6	21	42.8	8	16.3	2	4.1	3	6.2	
	Sec.	4	26.7	4	26.7	3	20	1	6.6	3	20	
	Univ.	28	65.1	9	20.9	3	7	3	7	0	0	
You think that HTN drugs help you to control your BP	None	28	26.7	40	38.1	29	27.6	8	7.6	0	0	**.04**
	Prim.	25	31.3	19	23.8	27	34.8	3	3.8	5	6.3	
	Elem.	7	14.3	24	49	13	26.5	2	4.1	3	6.1	
	Sec.	4	26.7	4	26.7	5	33.3	2	13.3	0	0	
	Univ.	18	41.8	14	32.6	7	16.3	3	7	1	2.3	
You feel it is safe or not necessary to take your drugs.	None	9	8.6	14	13.3	28	26.7	25	23.8	29	27.6	.75
	Prim.	3	3.7	8	10	20	25	21	26.3	28	35	
	Elem.	5	10.2	7	14.3	12	24.5	14	28.6	11	22.4	
	Sec.	1	6.7	3	20	4	26.7	5	33.3	2	13.3	
	Univ.	2	4.7	6	14	6	14	11	25.6	18	41.7	
You feel it is safe to increase or decrease your drug dose without consulting your doctor	None	5	4.8	12	11.4	24	22.9	22	21	42	39.9	.12
	Prim.	3	3.7	12	15	19	23.7	19	23.7	27	33.9	
	Elem.	1	2	6	12.2	16	32.8	13	26.5	13	26.5	
	Sec.	3	20	1	6.7	2	13.3	5	33.3	4	26.7	
	Univ.	0	0	6	14	6	14	9	20.9	22	51.1	
You think that your HTN drugs have serious side effects that may affect your health	None	5	4.8	16	15.2	32	30.5	20	19	32	30.5	**.00**
	Prim.	4	5	11	13.8	31	38.8	20	25	14	17.4	
	Elem.	9	18.4	8	16.3	17	34.7	12	24.5	3	6.1	
	Sec.	1	6.7	2	13.3	5	33.3	6	40	1	6.7	
	Univ.	4	9.3	8	18.7	9	20.9	18	41.8	4	9.3	
You think that HTN is a disease that can be prevented.	None	8	7.6	6	5.7	25	23.8	32	30.5	34	32.4	.07
	Prim.	1	1.3	8	10	23	28.7	24	30	24	30	
	Elem.	2	4.1	10	20.4	16	32.7	8	16.3	13	26.5	
	Sec.	1	6.7	2	13.3	7	46.7	4	26.6	1	6.7	
	Univ.	3	7	9	20.9	14	32.6	7	16.3	10	23.1	

All p-values were derived using the chi-squared test.

None= no education at all, Prim. = primary (1-6 years), Elem. =elementary education (7-9 years), Sec. = secondary education (10-12 years), Univ. =university or college education.

Table (25):Cross-tabulation of the participants' responses to the questions related to the duration of illness by their level of education.

Variable	Education	Always F.	Always %	Often F.	Often %	Sometimes F.	Sometimes %	Rarely F.	Rarely %	Never F.	Never %	P
The long duration of your illness affect your desire to take your drugs	None	16	15.2	43	41	28	26.7	11	10.5	7	6.6	**.03**
	Prim.	13	16.2	31	38.7	30	37.5	3	3.8	3	3.8	
	Elem.	6	12.2	18	36.7	19	38.8	2	4.1	4	8.2	
	Sec.	0	0	7	46.7	5	33.3	2	13.3	1	6.7	
	Univ.	4	9.3	10	23.2	17	39.6	2	4.7	10	23.2	
Because HTN is a chronic disease, you do not take your drugs continuously.	None	7	6.6	14	13.3	33	31.4	28	26.7	23	22	**.05**
	Prim.	1	1.3	14	17.5	30	37.5	22	27.5	13	16.2	
	Elem.	2	4.1	4	8.2	26	53.1	14	28.5	3	6.1	
	Sec.	0	0	4	26.6	7	46.8	2	13.3	2	13.3	
	Univ.	0	0	4	9.3	14	32.6	11	25.5	14	32.6	
Because HTN is a chronic disease, you do not follow the diet regimen or change your lifestyle according to your doctor advice	None	6	5.7	17	16.2	27	25.7	31	29.5	24	22.9	.15
	Prim.	4	5	10	12.5	22	27.5	32	40	12	15	
	Elem.	1	2	6	12.2	17	34.7	18	36.7	7	14.4	
	Sec.	0	0	1	6.7	7	46.7	5	33.3	2	13.3	
	Univ.	2	4.6	1	2.3	11	25.5	12	28	17	39.6	
Because HTN is a chronic disease, it makes you feel sad and depressed	None	9	8.6	21	20	41	39	16	15.2	18	17.2	.27
	Prim.	2	2.5	22	27.5	35	43.7	12	15	9	11.3	
	Elem.	3	6.1	12	24.5	21	42.9	10	20.4	3	6.1	
	Sec.	0	0	5	33.3	4	26.7	3	20	3	20	
	Univ.	5	11.6	6	14	12	28	11	25.5	9	20.9	

All p-values were derived using the chi-squared test.

Table (26):Cross-tabulation of the participants' responses to the questions related to their drugs' regimen by their education level

Variable	Education	Always		Often		Sometime		Rarely		Never		p.
		F.	%	F.	%	F.	%	F.	%	F.	%	
Because you have to take your drug(s) many times a day, it decreases your desire to take them every day.	None	17	16.2	36	34.3	38	36.2	4	3.8	10	9.5	.12
	Prim.	11	13.8	39	48.7	20	25	6	7.5	4	5	
	Elem.	7	14.3	18	36.7	16	32.7	6	12.2	2	4.1	
	Sec.	3	20	4	26.7	6	40	2	13.3	0	0	
	Univ.	8	18.6	7	16.3	19	44.2	3	7	6	13.9	
Because you have to take your drug(s) many times a day, it is difficult for you to remember this all the time	None	9	8.6	29	27.6	49	46.7	13	12.4	5	4.7	.17
	Prim.	4	5	25	31.3	35	43.8	7	8.8	9	11.1	
	Elem.	1	2	16	32.7	23	46.9	6	12.3	3	6.1	
	Sec.	2	13.3	3	20	6	40	3	20	1	6.7	
	Univ.	0	0	8	18.6	18	41.9	9	20.9	8	18.6	
The drugs you take for chronic conditions other than HTN decreases your desire to take HTN drugs and follow lifestyle changes	None	13	12.4	32	30.5	37	35.2	15	14.3	8	7.6	.29
	Prim.	6	7.5	18	22.5	38	47.5	9	11.25	9	11.25	
	Elem.	3	6.1	16	32.7	16	32.7	9	18.4	5	10.1	
	Sec.	1	6.7	6	40	5	33.3	2	13.3	1	6.7	
	Univ.	1	2.3	10	23.2	14	32.7	8	18.6	10	23.2	
Changing your drugs regimen by your doctors frequently decreases your desire to take these drugs	None	8	7.6	17	16.2	44	41.9	25	23.8	11	10.5	**.03**
	Prim.	5	6.3	19	23.8	29	36.2	20	25	7	8.7	
	Elem.	0	0	10	20.4	22	44.9	9	18.4	8	16.3	
	Sec.	3	20	1	6.8	4	26.6	4	26.6	3	20	
	Univ.	6	13.9	7	16.4	8	18.6	10	23.2	12	27.9	
If I find all my drugs in one pill, this will increase my regularity in taking them	None	53	50.5	30	28.6	11	10.5	5	4.8	6	5.6	.14
	Prim.	26	32.5	22	27.5	21	26.3	7	8.7	4	5	
	Elem.	22	44.9	14	28.6	8	16.3	3	6.1	2	4.1	
	Sec.	7	46.6	3	20	4	26.7	0	0	1	6.7	
	Univ.	26	60.5	7	16.4	6	13.9	0	0	4	9.2	

All p-values were derived using the chi-squared test.

None= no education at all, Prim. = primary (1-6 years), Elem. =elementary education (7-9 years), Sec. = secondary education (10-12 years), Univ. =university or college education.

Table (27):Cross-tabulation of the participants' responses to the questions related to the patient's relationship with the medical staff by their level of education.

Variable	Education	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The same doctor sees you in every visit you do to the clinic	None	17	16.2	34	32.4	30	28.6	9	8.6	15	14.2	.00
	Prim.	12	15	24	30	24	30	15	18.7	5	6.3	
	Elem.	3	6.1	23	46.9	16	32.7	6	12.2	1	2.1	
	Sec.	2	13.3	6	40	3	20	2	13.3	2	13.4	
	Univ.	22	51.2	12	27.9	5	11.6	1	2.3	3	7	
The doctor treats you with respect when you visit him in the clinic	None	18	17.1	48	45.7	28	26.7	9	8.6	2	1.9	.00
	Prim.	10	12.5	36	45	32	40	2	2.5	0	0	
	Elem.	7	14.3	23	46.9	17	34.7	2	4.1	0	0	
	Sec.	2	13.3	4	26.7	8	53.3	1	6.7	0	0	
	Univ.	20	46.5	12	28	10	23.2	1	2.3	0	0	
You are satisfied with the medical care you receive	None	17	16.2	39	37.1	40	38.1	4	3.8	5	4.8	.04
	Prim.	12	15	26	32.5	34	42.5	7	8.7	1	1.3	
	Elem.	3	6.1	18	36.7	23	47	2	4.1	3	6.1	
	Sec.	1	6.7	4	26.7	7	46.6	2	13.3	1	6.7	
	Univ.	15	34.9	9	20.9	11	25.6	4	9.3	4	9.3	
The doctor allows you to say everything you think is important for you during the visit.	None	16	15.2	32	30.5	35	33.4	18	17.1	4	3.8	.37
	Prim.	7	8.7	20	25	31	38.7	13	16.3	9	11.3	
	Elem.	3	6.1	15	30.6	18	36.7	6	12.2	7	14.4	
	Sec.	2	13.3	2	13.3	7	46.7	1	6.7	3	20	
	Univ.	9	20.9	12	27.9	13	30.2	5	11.7	4	9.3	
The doctor makes you feel foolish sometimes during the visit	None	3	2.8	9	8.6	18	17.1	28	26.7	47	44.8	.23
	Prim.	3	3.7	9	11.3	17	21.2	24	30	27	33.8	
	Elem.	4	8.2	5	10.2	8	16.3	20	40.8	12	24.5	
	Sec.	1	6.7	1	6.7	4	26.6	4	26.6	5	33.4	
	Univ.	3	7	2	4.7	7	16.3	6	14	25	58	
The doctor acts too serious/formal and impersonal toward you during the visit.	None	13	12.4	19	18.1	44	41.9	20	19	9	8.6	.49
	Prim.	8	10	21	26.2	38	47.6	10	12.5	3	3.7	
	Elem.	3	6.1	15	30.6	19	38.7	5	10.2	7	14.4	
	Sec.	1	6.7	6	40	3	20	3	20	2	13.3	
	Univ.	5	11.6	12	27.9	17	39.5	6	14	3	7	
The doctor during your examination or visit sometimes hurries too much to finish it quickly.	None	18	17.1	40	38.1	22	21	16	15.2	9	8.6	.30
	Prim.	19	23.7	18	22.5	28	35	9	11.3	6	7.5	
	Elem.	9	18.4	16	32.7	15	30.5	5	10.2	4	8.2	
	Sec.	3	20	5	33.3	2	13.3	4	26.7	1	6.7	
	Univ.	12	27.9	8	18.6	16	37.2	6	14	1	2.3	
The doctor sometimes ignores what you tell him.	None	7	6.7	23	21.9	43	41	16	15.2	16	15.2	.64
	Prim.	5	6.2	18	22.5	35	43.7	14	17.6	8	10	
	Elem.	6	12.2	7	14.3	23	47	8	16.3	5	10.2	
	Sec.	3	20	2	13.3	7	46.7	3	20	0	0	
	Univ.	2	4.7	6	14	17	39.5	11	25.5	7	16.3	
If you have a medical question, you can reach the doctor for help without a problem	None	11	10.5	21	20	47	44.7	19	18.1	7	6.7	.44
	Prim.	6	7.5	17	21.2	41	51.3	12	15	4	5	
	Elem.	6	12.2	14	28.6	14	28.6	7	14.3	8	16.3	
	Sec.	3	20	2	13.3	6	40.1	2	13.3	2	13.3	
	Univ.	6	14	13	30.2	16	37.2	5	11.6	3	7	

											p
The doctor listens carefully to what you have to tell him/her	None	7	6.7	27	25.7	41	39	18	17.1	12	11.5	.74
	Prim.	14	17.5	19	23.7	27	33.8	16	20	4	5	
	Elem.	7	14.3	17	34.7	15	30.6	5	10.2	5	10.2	
	Sec.	1	6.7	3	20	6	40	3	20	2	13.3	
	Univ.	5	11.6	10	23.2	16	37.3	8	18.6	4	9.3	
Your doctor spends plenty of time with you during the visit	None	11	10.5	19	18.1	30	28.6	28	26.7	17	16.1	**.00**
	Prim.	6	7.5	11	13.8	35	43.8	23	28.8	5	6.1	
	Elem.	0	0	17	34.7	13	26.5	11	22.4	8	16.4	
	Sec.	3	20	2	13.3	1	6.7	5	33.3	4	26.7	
	Univ.	1	2.3	13	30.2	8	18.6	9	20.9	12	28	
When you visit the clinic, the medical staff deals with you friendly and with respect	None	30	28.6	35	33.3	25	23.8	8	7.6	7	6.7	.44
	Prim.	19	23.7	29	36.3	19	23.8	12	15	1	1.2	
	Elem.	16	32.6	18	36.7	13	26.7	1	2	1	2	
	Sec.	2	13.3	4	26.7	5	33.3	3	20	1	6.7	
	Univ.	14	32.6	15	34.9	10	23.2	3	7	1	2.3	

All p-values were derived using the chi-squared test.

Table (28):Cross-tabulation of the participants' responses to the questions related to the clarity of drugs-usage instructions by their level of education.

Variable	Education	Always		Often		Sometimes		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The drug-use instructions written by the doctor are clear to you	None	44	41.9	36	34.3	18	17.1	7	6.7	0	0	**.02**
	Prim.	20	25	33	41.2	23	28.8	4	5	0	0	
	Elem.	10	20.4	26	53.1	9	18.4	3	6.1	1	2	
	Sec.	2	13.3	8	53.4	3	20	2	13.3	0	0	
	Univ.	20	46.5	13	30.3	6	14	2	4.6	2	4.6	
The medical staff explains and gives you information about the life style changes needed for you.	None	18	17.1	19	18.1	31	29.5	26	24.8	11	10.5	.41
	Prim.	14	17.5	17	21.2	27	33.8	16	20	6	7.5	
	Elem.	7	14.3	4	8.2	22	44.9	15	30.6	1	2	
	Sec.	1	6.7	4	26.6	5	33.4	4	26.6	1	6.7	
	Univ.	8	18.6	13	30.2	11	25.6	7	16.3	4	9.3	
The medical staffs shows and train you how to perform self measurement of your BP	None	13	12.4	10	9.5	22	21	16	15.2	44	41.9	**.04**
	Prim.	8	10	11	13.7	21	26.3	17	21.2	23	28.8	
	Elem.	9	18.4	6	12.2	3	6.1	15	30.6	16	32.7	
	Sec.	2	13.3	5	33.3	4	26.8	2	13.3	2	13.3	
	Univ.	9	20.9	8	18.6	6	14	6	14	14	32.5	
The medical staff explain to you or give you information about the importance of BP. control	None	22	21	28	26.7	35	33.3	16	15.2	4	3.8	.13
	Prim.	13	16.2	25	31.2	35	43.8	6	7.5	1	1.3	
	Elem.	13	26.5	15	30.6	16	32.7	4	8.2	1	2	
	Sec.	2	13.3	8	53.3	3	20	1	6.7	1	6.7	
	Univ.	16	37.2	15	34.9	9	21	2	4.6	1	2.3	
The medical staff use clear and simple language when they give you instructions about your disease's control and drugs	None	22	21	48	45.7	29	27.6	4	3.8	2	1.9	.13
	Prim.	14	17.5	35	43.7	31	38.8	0	0	0	0	
	Elem.	7	14.3	21	42.8	17	34.7	4	8.2	0	0	
	Sec.	2	13.3	9	60	3	20	1	6.7	0	0	
	Univ.	10	23.3	26	60.5	7	16.2	0	0	0	0	
Your doctor explains the reasons for performing the medical tests for you	None	11	10.5	24	22.9	41	39	24	22.9	5	4.7	**.01**
	Prim.	8	10	12	15	42	52.5	13	16.2	5	6.3	
	Elem.	2	4.1	10	20.4	23	46.9	7	14.3	7	14.3	
	Sec.	3	20	1	6.7	8	53.3	1	6.7	2	13.3	
	Univ.	12	27.9	10	23.3	16	37.2	3	7	2	4.6	
When your doctor changes your drugs, he explains to you the reason for that	None	14	13.3	17	16.2	43	40.9	28	26.7	3	2.9	.13
	Prim.	11	13.7	13	16.3	32	40	19	23.7	5	6.3	
	Elem.	3	6.1	10	20.4	21	42.8	9	18.5	6	12.2	
	Sec.	3	20	4	26.6	4	26.7	1	6.7	3	20	
	Univ.	8	18.6	13	30.2	12	27.9	6	14	4	9.3	
The doctor uses difficult medical terms without explaining to you what they mean.	None	5	4.8	20	19	26	24.8	20	19	34	32.4	**.00**
	Prim.	1	1.3	11	13.7	24	30	20	25	24	30	
	Elem.	7	14.3	8	16.3	14	28.6	11	22.4	9	18.4	
	Sec.	0	0	0	0	7	46.7	5	33.3	3	20	
	Univ.	7	16.3	2	4.6	8	18.6	16	37.2	10	23.3	
The doctor gives you advices and information about different ways to avoid illness and maintain health	None	10	9.5	20	19	44	41.9	22	21	9	8.6	.44
	Prim.	10	12.5	19	23.7	32	40	11	13.7	8	10.1	
	Elem.	2	4.1	10	20.4	21	42.9	10	20.4	6	12.2	
	Sec.	3	20	5	33.3	5	33.3	2	13.4	0	0	
	Univ.	10	23.3	8	18.6	18	41.9	4	9.3	3	6.9	

All p-values were derived using the chi-squared test.

Table (29):Cross-tabulation of the participants' responses to the questions related to the family support by their level of education.

Variable	Educat	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Your family reminds you about your drugs	None	37	35.2	38	36.2	16	15.2	10	9.5	4	3.9	**.03**
	Prim.	24	30	28	35	15	18.7	11	13.7	1	2.6	
	Elem.	18	36.7	19	38.8	8	16.3	1	2	3	6.2	
	Sec.	2	13.3	7	46.7	5	33.3	1	6.7	0	0	
	Univ.	23	53.5	13	30.2	2	4.6	1	2.3	4	9.6	
Your family helps you in taking your drugs	None	24	22.9	40	38.1	30	28.6	5	4.8	6	5.6	.58
	Prim.	23	28.7	28	35	22	27.5	3	3.8	4	5	
	Elem.	11	22.4	17	34.7	17	34.7	2	4.1	2	4.1	
	Sec.	3	20	8	53.3	2	13.3	1	6.7	1	6.7	
	Univ.	18	41.9	17	39.5	4	9.6	2	4.6	2	4.6	
Your family helps you financially to get your drug when you need.	None	36	34.3	30	28.6	23	21.9	9	8.6	7	6.6	.56
	Prim.	25	31.2	26	32.5	24	30	4	5	1	1.3	
	Elem.	13	26.5	17	34.7	10	20.4	3	6.1	6	12.3	
	Sec.	4	26.8	2	13.3	5	33.3	2	13.3	2	13.3	
	Univ.	16	37.2	13	30.2	9	20.9	2	4.6	3	7.1	
Your family helps you in measuring your BP.	None	27	25.7	23	21.9	14	13.3	11	10.5	30	28.6	**.00**
	Prim.	17	21.2	16	20	18	22.5	20	25	9	11.3	
	Elem.	13	26.5	10	20.4	15	30.6	6	12.2	5	10.3	
	Sec.	4	26.7	2	13.3	2	13.3	4	26.7	3	20	
	Univ.	20	46.5	15	34.9	5	11.6	1	2.3	2	4.6	
Your family helps you in reaching the medical facility if you are tired or sick	None	51	48.6	19	18.1	25	23.8	3	2.9	7	6.6	.33
	Prim.	43	53.7	15	18.7	15	18.7	5	6.2	2	2.7	
	Elem.	17	34.7	13	26.5	13	26.5	2	4.1	4	8.2	
	Sec.	4	26.7	5	33.3	5	33.3	1	6.7	0	0	
	Univ.	26	60.5	10	23.3	4	9.3	1	2.3	2	4.6	
Your family helps you to accomplish the life style modifications if it is required by your doctor	None	26	24.8	30	28.6	33	31.4	11	10.5	5	4.7	.31
	Prim.	10	12.5	32	40	25	31.2	9	11.1	4	5	
	Elem.	9	18.4	25	51	9	18.4	4	8.2	2	4	
	Sec.	4	26.6	5	33.3	4	26.7	1	6.7	1	6.7	
	Univ.	10	23.3	23	53.5	6	14	3	6.9	1	2.3	
Your family encourages you to be compliant with your medication and treatment plan	None	24	22.9	23	21.9	38	36.1	11	10.5	9	8.6	**.01**
	Prim.	21	26.2	18	22.5	33	41.3	6	7.5	2	2.5	
	Elem.	6	12.2	21	42.8	15	30.7	4	8.2	3	6.1	
	Sec.	2	13.3	5	33.3	6	40	1	6.7	1	6.7	
	Univ.	21	48.8	11	25.6	7	16.3	3	7	1	2.3	

All p-values were derived using the chi-squared test.

Table (30):Cross-tabulation of the participants' responses to the questions related to regularity on doctor appointments and the treatment plan by their level of education.

Variable	education	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
you are always regular at your doctor appointments	None	43	41	37	35.2	16	15.2	3	2.9	6	5.7	.87
	Prim.	29	36.2	34	42.5	11	13.7	3	3.7	3	3.9	
	Elem.	18	36.7	21	42.9	6	12.2	2	4.1	2	4.1	
	Sec.	8	53.3	4	26.7	2	13.3	0	0	1	6.7	
	Univ.	24	55.8	9	20.9	7	16.3	1	2.3	2	4.7	
You measure your BP on regular basis	None	9	8.6	18	17.1	35	33.3	19	18.1	24	22.9	.00
	Prim.	11	13.7	23	28.7	27	33.7	11	13.7	8	10.2	
	Elem.	7	14.3	17	34.7	18	36.7	6	12.2	1	2.1	
	Sec.	5	33.3	5	33.3	3	20	2	13.4	0	0	
	Univ.	9	20.9	17	39.6	16	37.2	1	2.3	0	0	
You manage to do physical exercises as advised by your doctor	None	3	2.8	15	14.3	27	25.7	21	20	39	37.2	.13
	Prim.	3	3.7	10	12.5	28	35	21	26.2	18	22.6	
	Elem.	2	4.1	8	16.3	22	44.9	7	14.3	10	20.4	
	Sec.	1	6.7	2	13.3	7	46.7	2	13.3	3	20	
	Univ.	4	9.3	10	23.2	17	39.5	4	9.4	8	18.6	
You manage to maintain a healthy weight as advised by	None	8	7.6	19	18.1	28	26.7	25	23.8	25	23.8	.15
	Prim.	2	2.5	17	21.2	32	40	17	21.2	12	15	
	Elem.	5	10.2	17	34.7	13	26.5	7	14.3	7	14.3	
	Sec.	1	6.6	3	20	3	20	4	26.7	4	26.7	
	Univ.	6	14	12	27.9	15	34.9	5	11.6	5	11.6	
You manage to eat healthy food as advised by your doctor	None	16	15.2	42	40	36	34.3	4	3.8	7	6.7	.01
	Prim.	8	10	29	36.3	27	33.7	8	10	8	10	
	Elem.	9	18.4	13	26.5	16	32.7	7	14.3	4	8.1	
	Sec.	2	13.3	2	13.3	6	40.1	5	33.3	0	0	
	Univ.	13	30.2	8	18.6	14	32.6	6	14	2	4.6	
You manage to use your HTN drugs on regular basis as prescribed to	None	31	29.5	41	39	24	22.9	5	4.8	4	3.8	.56
	Prim.	19	23.6	29	36.2	27	33.6	4	5	1	1.2	
	Elem.	13	26.5	18	36.7	17	34.7	0	0	1	2	
	Sec.	3	20	2	13.3	7	46.7	2	13.3	1	6.7	
	Univ.	11	25.6	14	32.6	14	32.6	3	6.9	1	2.3	
You forget taking your drugs because you have busy life	None	6	5.7	13	12.4	34	32.4	32	30.5	20	19	.84
	Prim.	1	1.2	12	15	28	35	27	33.6	12	15	
	Elem.	3	6.1	7	14.3	15	30.6	18	36.7	6	12.3	
	Sec.	0	0	2	13.3	6	40	3	20	4	26.7	
	Univ.	4	9.3	5	11.6	10	23.3	15	34.9	9	20.9	
When you feel better, you stop taking your medications.	None	5	4.8	16	15.2	22	20.9	23	21.9	39	37.2	.00
	Prim.	0	0	4	5	26	32.5	28	35	22	27.5	
	Elem.	1	2	4	8.2	19	38.8	13	26.5	12	24.5	
	Sec.	2	13.3	4	26.7	0	0	2	13.3	7	46.7	
	Univ.	2	4.6	3	6.9	12	27.9	6	14	20	46.6	
Because of the side effects of your medicine , you stop taking it without consulting your doctor	None	8	7.6	6	5.7	29	27.6	26	24.8	36	34.3	.32
	Prim.	4	5	5	6.2	24	30	23	28.7	24	30	
	Elem.	3	6.1	7	14.3	20	40.8	12	24.5	7	14.3	
	Sec.	0	0	3	20	3	20	4	26.7	5	33.3	
	Univ.	4	9.3	3	6.9	10	23.2	9	20.9	17	39.5	
You visit your doctor personally for drug prescription	None	37	35.2	42	40	15	14.3	6	5.7	5	4.8	.05
	Prim.	29	36.2	34	42.5	14	17.5	2	2.5	1	1.3	
	Elem.	16	32.6	24	49	5	10.2	2	4.1	2	4.1	
	Sec.	7	46.6	7	46.6	1	6.8	0	0	0	0	
	Univ.	28	65.1	7	16.3	8	18.6	0	0	0	0	

You are kept waiting for a long time in reception area when you are at the doctor's office.	None	28	26.7	48	45.7	24	22.9	3	2.9	2	1.8	.21
	Prim.	25	31.2	32	40	20	25	1	1.2	2	2.5	
	Elem.	14	28.6	17	34.7	17	34.7	0	0	1	2	
	Sec.	6	40	6	40	2	13.3	1	6.7	0	0	
	Univ.	18	41.9	11	25.6	8	18.6	2	4.7	4	9.2	
If you know that your drugs will increase your weight, you will continue taking them.	None	24	22.9	41	39	32	30.5	3	2.8	5	4.8	.22
	Prim.	11	13.7	29	36.2	36	45	3	3.9	1	1.2	
	Elem.	6	12.2	14	28.6	27	55.2	1	2	1	1	
	Sec.	1	6.7	7	46.6	6	40	1	6.7	0	0	
	Univ.	6	14	18	41.9	13	30.2	4	9.3	2	4.6	
If you know that your drugs will affect your sex life, you will continue taking them.	None	24	22.9	34	32.4	23	21.9	16	15.2	8	7.6	.08
	Prim.	10	12.5	27	33.7	29	36.2	5	6.2	9	11.4	
	Elem.	6	12.2	15	30.6	23	46.9	4	8.2	1	2.1	
	Sec.	2	13.4	5	33.3	5	33.3	3	20	0	0	
	Univ.	10	23.2	10	23.2	16	37.2	6	14	1	2.4	

Table (31):Cross-tabulation of the participants' responses to the questions related to the cost of treatment by their level of education.

Variable	Educ ation	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
You have to pay for your medical care more than what you can afford.	None	12	11.4	16	15.2	26	24.8	39	37.1	12	11.5	.00
	Prim.	8	10	19	23.7	17	21.2	25	31.2	11	13.9	
	Elem.	2	4.1	3	6.1	20	40.8	19	38.8	5	10.2	
	Sec.	3	20	0	0	3	20	5	33.3	4	26.7	
	Univ.	8	18.6	6	14	11	25.6	6	14	12	27.8	
You do not follow your drug regimen or you go without the medical care you need because you cannot afford the expenses.	None	5	4.8	13	12.4	47	44.7	21	20	19	18.1	.28
	Prim.	3	3.7	8	10	34	42.6	27	33.7	8	10	
	Elem.	2	4.1	6	12.2	26	53.1	12	24.5	3	6.1	
	Sec.	0	0	2	13.3	6	40	2	13.3	5	33.3	
	Univ.	3	7	5	11.6	15	34.9	9	20.9	11	25.6	
It is a problem to cover your share of the cost for a medical care.	None	11	10.5	23	21.9	39	37.1	24	22.9	8	7.6	.10
	Prim.	8	10	10	12.5	38	47.5	14	17.5	10	12.5	
	Elem.	2	4.1	5	10.2	21	42.9	17	34.7	4	8.2	
	Sec.	2	13.3	1	6.7	4	26.7	6	40	2	13.3	
	Univ.	2	4.7	8	18.6	14	32.6	9	20.8	10	23.3	
You worry about having to pay large medical bills.	None	7	6.7	22	21	43	41	15	14.2	18	17.1	.32
	Prim.	7	8.7	14	17.5	31	38.6	18	22.5	10	12.5	
	Elem.	0	0	9	18.4	25	51	8	16.3	7	14.3	
	Sec.	0	0	2	13.3	4	26.7	5	33.3	4	26.7	
	Univ.	3	7	8	18.6	11	25.6	13	30.2	8	18.6	
The amount you have to pay to cover your medical needs is reasonable.	None	11	10.5	38	36.2	30	28.6	16	15.2	10	9.5	.10
	Prim.	16	20	21	26.2	25	31.3	12	15	6	7.5	
	Elem.	7	14.3	13	26.5	18	36.8	5	10.2	6	12.2	
	Sec.	0	0	2	13.4	5	33.3	3	20	5	33.3	
	Univ.	7	16.3	7	16.3	12	27.9	10	23.3	7	16.3	
High cost of your drugs and the treatment plan in general makes me less compliant with my treatment regimen	None	4	3.8	9	8.6	28	26.6	34	32.4	30	28.6	.14
	Prim.	2	2.5	9	11.2	20	25	32	40	17	21.2	
	Elem.	2	4.1	6	12.2	9	18.4	24	49	8	16.3	
	Sec.	0	0	3	20	1	6.7	3	20	8	53.3	
	Univ.	4	9.3	4	9.3	10	23.3	11	25.6	14	32.5	

Table (32):Cross-tabulation of the participants' responses to the questions related to their knowledge and perception of hypertension by the duration of their illness.

Variable	Dura-tion	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
In general you consider yourself to be in good health	<10	45	23.4	78	40.6	55	28.6	14	7.4	0	0	**.02**
	10<20	12	14.5	26	31.3	35	42.2	9	10.8	1	1.2	
	>=20	7	41.2	5	29.4	2	11.8	3	17.6	0	0	
You consider your BP to be well controlled	<10	20	10.4	88	45.8	75	39	9	4.8	0	0	.24
	10<20	7	8.4	35	42.2	30	36.1	9	10.8	2	2.5	
	>=20	1	5.9	9	52.9	5	29.4	2	11.8	0	0	
You consider HTN as a serious problem	<10	64	33.3	67	34.9	45	23.4	13	6.8	3	1.6	.13
	10<20	30	36.1	29	34.9	20	24.1	4	4.9	0	0	
	>=20	3	17.6	3	17.6	10	58.9	1	5.9	0	0	
You think that HTN leads to other serious conditions	<10	53	27.6	67	34.9	52	27.1	14	7.3	6	3.1	.87
	10<20	26	31.3	22	26.5	25	30.1	7	8.4	3	3.7	
	>=20	3	17.6	7	41.2	5	29.4	2	11.8	0	0	
You think that HTN has hereditary basis.	<10	23	12	40	20.8	62	32.3	30	15.6	37	19.3	.09
	10<20	17	20.5	10	12	23	27.7	18	21.7	15	18.1	
	>=20	4	23.5	1	5.9	5	29.4	6	35.3	1	5.9	
You think that being male or female will affect your risk of getting HTN.	<10	27	14	30	15.6	47	24.5	36	18.8	52	27.1	.44
	10<20	8	9.6	12	14.5	22	26.5	26	31.3	15	18.1	
	>=20	2	11.8	2	11.8	5	29.4	5	29.4	3	17.6	
You think that HTN risk increases with age	<10	50	26	82	42.8	40	20.8	13	6.8	7	3.6	.24
	10<20	21	25.3	28	33.8	18	21.7	10	12	6	7.2	
	>=20	3	17.6	11	64.7	1	5.9	2	11.8	0	0	
You think that decreasing tension and anger will help you in controlling your BP	<10	72	37.5	70	36.5	35	18.2	9	4.7	6	3.1	.22
	10<20	41	49.4	22	26.5	16	19.3	2	2.4	2	2.4	
	>=20	3	17.6	7	41.2	6	35.3	0	0	1	5.9	
You think that dietary changes will help you in controlling your BP	<10	54	28.1	80	41.7	44	23	7	3.6	7	3.6	.29
	10<20	27	32.5	24	28.9	21	25.4	7	8.4	4	4.8	
	>=20	4	23.5	6	35.3	3	17.6	2	11.8	2	11.8	
You think that physical activity will help you in controlling your BP	<10	36	18.8	50	26	58	30.2	32	16.7	16	8.3	.50
	10<20	14	16.9	16	19.3	28	33.7	19	24.1	5	6	
	>=20	5	29.4	3	17.6	3	17.6	3	17.6	3	17.6	
You think that it is necessary to take HTN medications regularly	<10	80	41.7	61	31.8	31	16.1	11	5.7	9	4.7	.45
	10<20	36	43.4	24	28.9	18	21.7	4	4.8	1	1.2	
	>=20	5	29.4	9	52.9	1	5.9	1	5.9	1	5.9	

Variable	duration	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
You think that HTN medications help you to control your BP	<10	54	28.1	73	38	47	24.5	10	5.2	8	4.2	.18
	10<20	26	31.3	22	26.5	28	33.7	6	8.5	0	0	
	>=20	2	11.8	6	35.3	6	35.3	2	11.8	1	5.9	
You sometimes feel it is safe or not necessary to take your medication	<10	13	6.8	22	11.5	43	22.4	55	28.6	59	30.7	.41
	10<20	7	8.4	11	13.3	22	26.5	19	22.9	24	28.9	
	>=20	0	0	5	29.4	5	29.4	2	11.8	5	29.4	
You feel it is safe to increase or decrease your medication dose without consulting your doctor	<10	8	4.2	19	9.9	47	24.5	51	26.6	67	34.8	.24
	10<20	3	3.6	13	15.7	17	20.5	14	16.9	36	43.3	
	>=20	1	5.9	5	29.4	3	17.6	3	17.6	5	29.4	
You think that your HTN medications have serious side effects that may affect your health	<10	12	6.3	27	14	62	32.3	55	28.6	36	18.8	.11
	10<20	11	13.3	12	14.4	29	34.9	17	20.5	14	16.9	
	>=20	0	0	6	35.3	3	17.6	4	23.5	4	23.5	
You think that HTN is a disease that can be prevented.	<10	7	3.6	31	16.1	58	30.3	48	25	48	25	.09
	10<20	6	7.2	3	3.6	22	26.6	23	27.7	29	34.9	
	>=20	2	11.8	1	5.9	5	29.4	4	23.5	5	29.4	

All p-values were derived using the chi-squared test.

Table (33):Cross-tabulation of the participants' responses to the questions related to the effect of the chronic nature of hypertension by the duration of their illness.

Variable	duration	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
The long duration of your illness affect your desire to take your medication	<10	21	10.9	71	37	66	34.4	14	7.3	20	10.4	.42
	10<20	13	15.7	32	38.6	28	33.7	6	7.2	4	4.8	
	>=20	5	29.4	6	35.3	5	29.4	0	0	1	5.9	
Because HTN is a chronic disease, you do not take your medication continuously.	<10	7	3.6	25	13	77	40.1	52	27.1	31	16.2	.13
	10<20	2	2.4	11	13.3	25	30.1	21	25.3	24	28.9	
	>=20	1	5.9	4	23.5	8	47.1	4	23.5	0	0	
Because HTN is a chronic disease, you do not follow the diet regimen or change your lifestyle according to your doctor advice	<10	8	4.2	17	8.9	56	29.2	75	39.1	36	18.6	**.04**
	10<20	3	3.6	15	18.1	22	26.5	19	22.9	24	28.9	
	>=20	2	11.8	3	17.6	6	35.3	4	23.5	2	11.8	
Because HTN is a chronic disease, it makes you feel sad and depressed	<10	11	5.7	46	24	70	36.5	39	20.3	26	13.5	.41
	10<20	6	7.2	18	21.7	36	43.4	12	14.4	11	13.3	
	>=20	2	11.8	2	11.8	7	41.1	1	5.9	5	29.4	

All p-values were derived using the chi-squared test.

Table (34): Cross-tabulation of the participants' responses to the questions related to their family support by the duration of their illness.

Variable	duration In years	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
Your family reminds you about your medications	<10	65	33.9	73	38	33	17.7	14	7.3	6	3.1	.80
	10<20	32	38.7	28	33.7	10	12	8	9.6	5	6	
	>=20	7	41.2	4	23.5	3	17.6	2	11.8	1	5.9	
Your family helps you in taking your medications	<10	52	27.1	74	38.6	50	26	10	5.2	6	3.1	.61
	10<20	23	27.7	29	35	21	25.3	2	2.4	8	9.6	
	>=20	4	23.5	7	41.2	4	23.5	1	5.9	1	5.9	
Your family helps you financially to get your medications when you need	<10	63	32.8	68	35.4	40	20.8	9	4.7	12	6.3	**.00**
	10<20	27	32.5	18	21.8	25	30.1	10	12	3	3.6	
	>=20	4	23.5	2	11.8	6	35.3	1	5.9	4	23.5	
Your family helps you in measuring your BP	<10	59	30.7	47	24.5	31	16.2	25	13	30	15.6	.25
	10<20	19	22.9	13	15.7	21	25.2	15	18.1	15	18.1	
	>=20	3	17.6	6	35.3	2	11.8	2	11.8	4	23.5	
Your family helps you in reaching the medical facility if you are tired or sick	<10	89	46.4	48	25	37	19.3	8	4.2	10	5.2	.34
	10<20	45	54.2	12	14.5	20	24.1	2	2.4	4	4.8	
	>=20	7	41.2	2	11.8	5	29.4	2	11.8	1	5.9	
Your family helps you to accomplish the life style changes if it is required by your doctor	<10	34	17.7	87	45.4	49	25.5	15	7.8	7	3.6	**.04**
	10<20	23	27.7	19	22.9	24	28.9	12	14.5	5	6	
	>=20	2	11.8	9	52.9	4	23.5	1	5.9	1	5.9	
Your family encourages you to be more compliant with your medication and treatment plan	<10	45	23.4	59	30.7	67	35	14	7.3	7	3.6	.22
	10<20	24	28.9	17	20.5	25	30.2	10	12	7	8.4	
	>=20	5	29.4	2	11.8	7	41.2	1	5.9	2	11.8	

All p-values were derived using the chi-squared test.

Table (35): Cross-tabulation of the participants' responses to the questions related to their regularity on appointments and treatment plan by the duration of their illness.

Variable	Dura-tion	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
You are always regular at your doctor appointments	<10	85	44.3	71	37	25	13	5	2.6	6	3.1	**.05**
	10<20	27	32.6	31	37.3	16	19.3	2	2.4	7	8.4	
	>=20	10	58.8	3	17.6	1	5.9	2	11.8	1	5.9	
You measure your BP on regular basis.	<10	30	15.6	59	30.7	63	32.8	24	12.6	16	8.3	.09
	10<20	10	12	15	18.1	31	37.3	11	13.3	16	19.3	
	>=20	1	5.9	6	35.3	5	29.4	4	23.5	1	5.9	
You manage to do physical exercises as advised by your doctor	<10	9	4.7	32	16.7	72	37.5	34	17.7	45	23.4	.40
	10<20	4	4.8	11	13.3	24	28.9	15	18.1	29	34.9	
	>=20	0	0	2	11.8	5	29.4	6	35.3	4	23.5	
You manage to maintain a healthy weight as advised by your doctor	<10	14	7.3	41	21.4	70	36.5	43	22.3	24	12.5	**.00**
	10<20	5	6	21	25.3	19	22.9	13	15.7	25	30.1	
	>=20	3	17.6	6	35.3	2	11.8	2	11.8	4	23.5	
You manage to eat healthy food as advised by your doctor	<10	32	16.7	65	33.9	61	31.7	23	12	11	5.7	.30
	10<20	12	14.5	27	32.5	29	35	7	8.4	8	9.6	
	>=20	4	23.5	2	11.8	9	52.9	0	0	2	11.8	
You manage to use your HTN drugs on regular basis as prescribed.	<10	46	24	68	35.4	62	32.3	11	5.7	5	2.6	.80
	10<20	27	32.5	29	34.9	22	26.5	3	3.6	2	2.4	
	>=20	4	23.5	7	41.7	5	29.4	0	0	1	5.9	
You forget taking your medication because you have busy life.	<10	10	5.2	25	13	60	31.3	67	34.9	30	15.6	.94
	10<20	3	3.6	12	14.5	27	32.5	23	27.7	18	21.7	
	>=20	1	5.9	2	11.8	6	35.3	5	29.4	3	17.6	
When you feel better, you stop taking your medication	<10	5	2.6	20	10.5	50	26	50	26	67	34.9	.63
	10<20	5	6	10	12	23	27.7	16	19.4	29	34.9	
	>=20	0	0	1	5.9	6	35.3	6	35.3	4	23.5	
If you feel worse because of the side effects of your medicine you stop taking it without consulting your doctor.	<10	10	5.2	18	9.4	56	29.2	45	23.4	63	32.8	.38
	10<20	8	9.6	5	6	25	30.1	21	25.3	24	28.9	
	>=20	1	5.9	1	5.9	5	29.4	8	47	2	11.8	
You always visit your doctor personally for drug prescription	<10	79	41.1	83	43.2	22	11.5	5	2.6	3	1.6	.11
	10<20	32	38.6	24	28.9	18	21.7	5	6	4	4.8	
	>=20	6	35.3	7	41.2	3	17.6	0	0	1	5.9	
You are kept waiting for a long time in reception area when you visit the doctor.	<10	56	29.2	78	40.6	44	22.9	6	3.1	8	4.2	.37
	10<20	30	36.1	28	33.8	24	28.9	0	0	1	1.2	
	>=20	5	29.4	8	47.1	3	17.6	1	5.9	0	0	
if you know that your medication will increase your weight , you will continue taking them	<10	28	14.6	71	37	81	42.2	6	3.1	6	3.1	.33
	10<20	16	19.3	35	42.2	24	28.9	5	6	3	3.6	
	>=20	4	23.5	3	17.6	9	53	1	5.9	0	0	
if you know that your medication will affect your sex life, you will continue taking them	<10	30	15.6	59	30.7	77	40.1	18	9.4	8	4.2	**.00**
	10<20	21	25.3	26	31.3	14	16.9	12	14.5	10	12	
	>=20	1	5.9	6	35.3	5	29.4	4	23.5	1	5.9	

All p-values were derived using the chi-squared test.

Table (36): Cross-tabulation of the participants' responses to the questions related to the costs of their treatment plans by the duration of their illness.

Variable	Duration In years	Always		Often		Sometime		Rarely		Never		P
		F.	%	F.	%	F.	%	F.	%	F.	%	
You have to pay for your medical care more than what you can afford	<10	17	8.9	26	13.5	47	24.5	68	35.4	34	17.7	.14
	10<20	15	18.1	14	16.9	26	31.3	20	24.1	8	9.6	
	>=20	1	5.9	4	23.5	4	23.5	6	35.3	2	11.8	
You do not follow your drug regimen or you go without the medical care you need because you cannot afford the expenses	<10	5	2.6	15	7.8	90	46.9	50	26	32	16.7	**.01**
	10<20	8	9.6	16	19.3	32	38.6	15	18.1	12	14.5	
	>=20	0	0	3	17.6	6	35.3	6	35.3	2	11.8	
It is a problem to cover your share of the cost for a medical care	<10	13	6.8	25	13	81	42.2	47	24.5	26	13.5	.12
	10<20	12	14.5	19	22.9	28	33.7	18	21.7	6	7.2	
	>=20	0	0	3	17.6	7	41.2	5	29.4	2	11.8	
You worry about having to pay large medical bills	<10	7	3.6	35	18.3	81	42.2	44	22.9	25	13	**.00**
	10<20	10	12	13	15.7	30	36.1	13	15.7	17	20.5	
	>=20	0	0	7	41.2	3	17.6	2	11.8	5	29.4	
The amount you have to pay to cover your medical needs is reasonable	<10	28	14.6	45	23.4	66	34.4	28	14.6	25	13	**.03**
	10<20	9	10.8	33	39.8	22	26.5	12	14.5	7	8.4	
	>=20	4	23.5	3	17.6	2	11.8	6	35.3	2	11.8	
High cost of your medication and the treatment plan makes you less compliant with your treatment regimen	<10	6	3.1	19	9.9	39	20.3	72	37.5	56	29.2	.19
	10<20	4	4.8	9	10.8	24	29	30	36.1	16	19.3	
	>=20	2	11.8	3	17.6	5	29.4	2	11.8	5	29.4	

All p-values were derived using the chi-squared test.