



THE UNIVERSITY OF THE WEST INDIES
AT ST. AUGUSTINE, TRINIDAD AND TOBAGO

A Research Paper
Submitted in partial requirements
for HUEC 3012
of
The University of the West Indies

Title: Awareness, knowledge and life style modification practices of hypertension among women.

Student Name: Miranda Alexander

Project Supervisor: Dr Neela Badrie

Year Submitted: 2010

Department of Agricultural Economics & Extension
Faculty of Food and Agricultural

TITLE: AWARENESS, KNOWLEDGE AND LIFE STYLE MODIFICATION PRACTICES
OF HYPERTENSION AMONG WOMEN.

A Research Paper

Submitted in Partial requirements for HUEC 3012

of

The University of the West Indies

Miranda Alexander

Supervised by Dr Neela Badrie

2010

Department of Agricultural Economics and Extension

THE UNIVERSITY OF THE WEST INDIES

Faculty of Science and Agriculture

St. Augustine Campus, Trinidad, West Indies

ACKNOWLEDGEMENT

Thanks to God firstly for strength and blessing to complete this project. To Dr Neela Badrie, thank you for your guidance and assistance in development this research project. I would like to thanks Dr George Legall for assistance and kindness, and to everyone who made it possible for my project to be completed, Dana Alexander, Marissa Alexander and Ray Neptune for their assistance in distributing questionnaires and special thanks to Ray Neptune for assistance in editing and entering data. To my mother, Catherine Alexander thanks for your inspiration.

I am very grateful to you all.

TABLE OF CONTENT

	Page
<i>Title page</i>	<i>i</i>
<i>Acknowledgement</i>	<i>ii</i>
<i>List of tables</i>	<i>v</i>
<i>List of figures</i>	<i>v</i>
<i>Abstract</i>	<i>vi</i>
Chapter 1: Introduction	1-3
1.1: Background and Rationale.....	1-2
1.2: Research Objective.....	3
1.3: Specific Objective and Hypothesis.....	3
Chapter 2: Literature review	4-13
2.1: Background on Hypertension and the implication in the Caribbean.....	4-7
2.1.1: Hypertension Background.....	4-5
2.2: Hypertension in the Caribbean.....	6-7
2.3: Hypertension among women and Hypertension Associated Risk Factors.....	8-9
2.3.1: Knowledge, Awareness and perception of hypertension and heart disease Among women.....	7
2.3.2: Lack of awareness of cardiovascular disease among women	7
2.3.3: Women, Age and Hypertension.....	8-9
2.3.4: Ethnicity and Hypertension.....	8-9
2.4: Practicing of Lifestyle Modification Measures.....	9
2.5: Summary of review.....	9-13
Chapter 3: Methodology	13
3.1: Subjects/Participants.....	14-16

3.2: Data collection and Sampling Procedures.....	14
3.3: The sample size.....	15
3.4: Data Collection Instrument.....	15-16
3.5: Data Analysis.....	16
Chapter 4: Results	17-29
4.1: Demographics.....	17
4.2: Awareness and Perception of Disease Conditions.....	17
4.3: Knowledge of Hypertension.....	19-20
4.4: Source of Information about Hypertension.....	20-21
4.5: Perception of Risk factors for Hypertension and Hypertension Prevention.....	23
4.6: Participants Prevention or control Strategies and History of Hypertension....	28
Chapter 5: Discussion, Conclusion and Recommendation.....	30-35
5.1: Limitations.....	34
5.2: Recommendation.....	34-35
5.3: Conclusion.....	35
Chapter 6: References.....	36-38
Chapter 7: Appendices.....	36-46
Appendix A : Questionnaire	39-41
Appendix B : Strategies for Management of Hypertension.....	1
Appendix B1: Classification of Adult aged 18 years and over Hypertension stages...2	
Appendix B 2 : Dash Eating Patterns.....	2
Appendix C: Additional Tables.....	3-4
Appendix C 1 : Lifestyle and Dietary Practices by Personal history of Hypertension given by Respondents.....	3
Appendix C 2: Lifestyle and Dietary Practices for Prevention or Treatment of Hypertension by Source of Information given by Respondents	4

LIST OF TABLES

Table 1: Demographics characteristics of Respondents	18
Table 2: Knowledge of Hypertension risk factors by source of information given by Respondents	22
Table 3: Factors most important to Participant in controlling High Blood Pressure.....	24
Table 4: Knowledge of Hypertension Risk Factors by Education Level completed given by Respondents.....	26
Table 5: Knowledge of Hypertension Associated disease Condition by Source of information given by Respondents.....	27
Table 6: Identified Lifestyle and Dietary Practices Respondents are engage in for Prevention or control of High blood Pressure	29

LIST OF FIGURES

Figure 1: Perceived Leading Health Problem Facing Women Today in Trinidad.....	19
Figure 2: Perceived risk factors for High Blood Pressure.....	25
Figure 3: Perceived High Blood Pressure Associated Disease Condition	27

ABSTRACT

Objectives: To assess the current awareness, knowledge and practices of life –style modification measures related to hypertension among women in Trinidad.

Methods : A survey of women aged 25 years and over using convenient sampling were conducted from October to November 2010, with 120 respondents ; 46 % Afro Trinidadian, 33% Indo Trinidadian, and 22 % of Mixed ethnicity. A 30–item closed ended questionnaire was incorporated into four sections for evaluating awareness, knowledge, history (family and personal), life style modification, and demographics. The study data was analysis using frequency, cross tabulation and chi squared (X^2) tests. Statistical significance was set at $P<.05$. Data entry and analysis were done using SPSS for windows version 19.

Results: Education attained by women influenced knowledge of risk factors. Majority of women report they were moderately (51%) to not well informed (15%) about hypertension. Less than 37 % identified heart failure and renal disease as complication with untreated hypertension. Sources of information receive from dietitians, nurses, media and printed media were significant with majority of risk factors identified ($P <.05$), and most dietary and lifestyle practices for prevention or control of hypertension.

Conclusions: The findings suggest women had adequate knowledge of most risk factor and some disease risk regarding hypertension. Sources of information receive by respondents influence their knowledge of risk factors and dietary and lifestyle practices. Education level influenced knowledge to a greater extent than age or ethnicity. The findings reveal that continuous educational interventions amount public and healthcare providers are vital.

1.0: INTRODUCTION

1.1: Background

Hypertension (HTN) is the fifth highest cause of mortality in females and the seventh highest in men in CARICOM countries with females having higher mortality rates than males. Hypertension is a major contributor to heart diseases which currently is the leading cause of death in both men and women in Trinidad and Tobago and worldwide, while cerebrovascular disease being the fourth leading mortality in the Caribbean including Trinidad and Tobago (Caribbean Epidemiology Centre, 2007; Ministry of Planning and Development; and American Heart Association, 2010). Hypertension, also termed high blood pressure poses a problem directly or indirectly by contributing to cardiovascular complication (Caribbean Health Research Council. 2007).

Hypertension is referred to as a chronic or persistent elevation in blood pressure and has both modifiable and non modifiable risk factors (Nelms, Sucher, and Long 2007). Non modifiable factors are age, gender, ethnicity and family history of HTN. Each factor increases the prevalence of HTN risk among women. For instance, risks for HTN are higher among those of African descent and persons with a family history of the diseases. In addition to being prevalent, HTN increases with advancing age. Data has shown that mortality from heart disease incidence occur from aged 25 years and over (Caribbean Epidemiological Centre, 2007; Caribbean Health Research Council. 2007). The prevalence of HTN in the Caribbean rises with increasing age among persons 50 years and over and in this age group the disorder is common among females (Hagley 1990). Other studies have also observed males having high mortality rates earlier than 50 years of age but females surpass males after 50 and 55 years. Aging women particularly, with the onset of menopause, experience a dramatic rise in the prevalence of hypertension and heart diseases (Ashraj and Vongpatanasin 2006; Mahan and Escott 2008; Pan America Health Organization 2001; Pramparo, et al., 2010).

Contrary to a common belief women are also much at increased risk of hypertension. Coupled with age, other non modifiable factors and a combination of modifiable risk factors for example obesity, excessive salt and fat intake, inadequate physical activity, tobacco and alcohol use, low potassium, calcium and magnesium use and stress etc. increases women's chances of HTN. Changing lifestyle and dietary practices have been shown to lower blood pressure, control hypertension and support prevention (Mahan and Escott 2008). However, research has shown from both developing and developed countries that although awareness is increasing, there is a gap between what people perceive and the actual risks associated with heart disease. Though general knowledge and awareness is adequate, persons including hypertensive patients do not comprehend the condition (Ike, Aniebue, Aniebue 2010; Oliveria et al. 2009). However, lack of awareness and knowledge may hinder prevention efforts including practicing lifestyle modification which is crucial for the control and prevention of hypertension.

Nonetheless, efforts have been made to raise public awareness and knowledge of HTN, and its risks factors in Trinidad and Tobago in an effort to prevent or control the disease but there are lack of research concerning women awareness and knowledge of HTN and their dietary and lifestyle practices for prevention or control. The purpose of this study is to assess the current awareness, knowledge and practices of life –style modification measures as it relates to hypertension among women in Trinidad.

1.2: RESEARCH OBJECTIVE

The purpose of this study was to assess the current awareness, knowledge and practices of life –style modification measures related to hypertension among women in Trinidad.

TARGET GROUP- Women aged 25 years and older in Trinidad.

1.3: SPECIFIC OBJECTIVE:

- To assess women knowledge and awareness of hypertension, its risk factors and association disease conditions among adult women in Trinidad.
- To assess women lifestyle modification practices for prevention or control of hypertension.

HYPOTHESIS

Alternative Hypothesis - Is there a relationship of knowledge and awareness of hypertension on lifestyle modification.

Null Hypothesis _ Is there no relationship of knowledge and awareness of hypertension on lifestyle modification.

2.0: LITERATURE REVIEW

This paper presents information from the review of hypertension and heart diseases literature among non hypertensive random sample of women and hypertensive patients in developing and non-developing countries. Previous studies on hypertension and heart disease revealed there was poor to adequate knowledge and awareness among women and patients with high blood pressure (Mosca et al., 2000; Alexander, et al., 2003; Mosca et al., 2004; Oliveria et al., 2004; Petrella et al., 2005; Cutler et al, 2008; and Ike, Aniebue, and Aniebue, 2009). Studies have also indicated that women perceive breast cancer as the greatest problem facing them. Breast cancer and cancer in general had a heightened awareness and was the most feared condition, opposed to awareness and knowledge of HTN and heart diseases (Mosca et al. 2000; Mosca et al 2004) .Therefore, poor awareness and knowledge may affect the preventive efforts and adoption of lifestyle and dietary measures for prevention and management of hypertension and furthermore cardiovascular diseases. The review focuses firstly on awareness and knowledge of hypertension, followed by women and hypertension, elevated blood pressure risk factors and finally lifestyle modification measures.

2.1: *Background on Hypertension and the implication in the Caribbean*

2.1.1: Hypertension background. The term hypertension (HTN) is the persistent elevation in blood pressure. When measuring blood pressure the value that represents the top number is systolic blood pressure, which measures the maximum pressure in the arteries during contraction of the ventricles of the heart. The bottom number is termed diastolic blood pressure that measures the blood pressure while the heart muscle is relaxing between beats (Caribbean Health Research Council. 2007). In 2003, the seventh report of the Joint National Committee for the Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) designates hypertension as 140/90 mmHg and higher; less than 120/80 mmHg for normal, and prehypertension is considered between 120/80 mmHg and 139/89 mmHg. However, it is

not necessary for both systolic and diastolic blood pressure to be elevated for an individual to be considered hypertensive. The guidelines for prehypertension group were defined by JNC 7 for the purpose of motivating physicians to treat blood pressure more aggressively (Nelms, Sucher and Long, 2007 and Chobanian et al, 2003).

Hypertension is an asymptomatic condition, commonly termed the “silent killer” and is classified into two categories. One of which is primary hypertension or essential hypertension in which there is no specific cause identified and accounts for approximately 95 % of all cases, and may be a result of a variety of factors, such as poor dietary practices, inadequate physical exercise, excessive alcohol intake, tobacco use, and obesity. Primary hypertension may be multi-factorial with a combination of genetic and environmental factors. The remaining 5 % can arise as the result of another disease, usually endocrine, renal disease, and as a result of drugs use e.g. oral contraceptive, which is referred to as secondary hypertension (Caribbean Health Research Council. 2007; Nelms, Sucher and Long, 2007; and Mahan and Escott-Stump, 2008).

Mahan and Escott-Stump, (2008) reported that despite improvements in detection, the prevalence of hypertension in the United States has not declined. This increase in the prevalence may be related to an increase in body mass index (BMI). A working document for the summit of CARICOM heads of government on chronic non-communicable disease (2007) stated, the Caribbean has a high prevalence of hypertension and this elevation of blood pressure is seen even in the Caribbean citizens who migrate to United States and United Kingdom. In addition, the Caribbean has at least 25% obese adults, some 25% are hypertensive, and diabetes is over 10% in at least four countries (including Trinidad and Tobago) and the situation is increasing. A relationship is also seen with blood pressure increases with the degree of obesity. Hypertension is one of the most important modifiable risk factor but if left untreated it can result in cerebrovascular accident (stroke), congestive heart failure, coronary arteries diseases, renal failure and myocardial infarction (heart attack), aneurysm (Chobanian et al, 2003; Nelms, Sucher and Long, 2007).

2.2.2: Hypertension in the Caribbean. According to the data from the Caribbean Epidemiological Center from the time period 2000- 2004, hypertension was the fifth cause of mortality in females and the seventh cause of mortality in men in Caricom countries. However, in the Americas, the Caribbean is faced with the highest cases of non-communicable diseases and this contributes to an economic burden in the health sector (Caribbean Epidemiology Centre, 2007; Chobanian et al, 2003; and Cutler et al, 2008; and Summit of CARICOM heads of government on chronic non-communicable disease 2007).- Prior studies reported by the Pan American Health Organization (2007) had revealed the prevalence of hypertension is estimated to be 26% and as high as 55% in studies of population over 25 and 40 years respectively and cardiovascular diseases which results from hypertension as well as diabetes accounts for about 40% of Caribbean mortality. Persons with diabetes especially women can have an increased risk for hypertension and mortality from heart disease (Mahan and Escott-Stump, 2008; Caribbean Epidemiological Centre, 2007). According to data from to Healthy Caribbean Coalition (2007), high blood pressure has been shown to occur in 24.0% – 37.5% of adults age 25 – 64 in the Caribbean and control of hypertension would be expected to reduce death rates by 15 % to 20 %.

In a report from JNC 7, it states that a relationship between blood pressure and the risk of cardiovascular disease (CVD) events is continuous, consistent and independent of other risk factors. The higher the blood pressure, the greater is the chance of heart attack, heart failure, stroke, and increase incidences of renal diseases. Thus control of hypertension and prevention reduces the total mortality.(Chobanian et al, 2003). Mahan, and Escott- Stump, (2008) reported from the National Health and Nutrition Examination Survey (NHANES) III, states 66% of adults with prehypertension has one major CVD risk factor; and 29% had CVD, diabetes, or target organ disease and lowering blood pressure in patients with diabetes and hypertension is associated with a decrease in CVD events and renal failure. However, the presence of additional risk factors increases the risk of hypertension. Hypertension risk factors are both modifiable and non modifiable. Non-modifiable factors are age, gender, ethnicity and family history of hypertension or diabetes. Modifiable risk factors for hypertension are poor

dietary and lifestyle practices such as excessive salt and fat intake , inadequate exercise or physical activity, excessive alcohol use etc., (Mahan, and Escott- Stump, 2008; Caribbean Health Research Council. 2007). Some factors which contribute to hypertension are similar to those of other major chronic diseases for example unhealthy diet and inadequate exercise.

2.3: Hypertension among women and Hypertension Associated Risk Factors

2.3.1: Knowledge, awareness and perception of hypertension and heart disease among women. The Ministry of Health Annual Report for all hospital “discharges by diagnosis” (2004-2005), which shows females accounting for the highest cases of primary hypertension and other hypertension diseases. The reported figures are 354 males and 543 females for primary hypertension; other hypertension disease 468 males and 636 females. The mortality rate in Trinidad and Tobago for hypertension in females is higher than males and circulatory diseases dominate the mortality rate in the 45-64 year older adults (Caribbean Epidemiology Centre, 2007).

2.3.2: Lack of Awareness of Cardiovascular Disease among Women. Mosca, et al., (2000) revealed that the National Council on Aging (Washington, DC) reported 9% of women between the ages 45-64 years said that the condition most feared was heart disease and 61% of women in the United States reported breast cancer as the most feared. This perception of the effect of CVD is not in agreement with the severity of the known consequences on CVD morbidity and mortality because of a lack of awareness of the risk for the diseases, and this may hinder preventive efforts as well as the adoption of positive lifestyle for cardiovascular diseases. Whereas, Cutler, (2008) shown trends among hypertensive persons, as there were modest increases in awareness from 68.5% to 71.8%. But the rate for women did not change significantly. And Mosca et al., (2004) indicated previous studies shows women younger than 45 years cited heart disease less frequently than older women in each survey (1997-2003).

2.3.3: Women, Age and Hypertension. Grell, G.A.C., (1987), have reported previously in the Caribbean the prevalence of HTN increases with age, particularly among persons 50 years and over and within this age group females are most commonly affected. Keyhani et al .(2008) stated during a recent national health and nutrition examination survey in the United States for the period 1999-2004, hypertension prevalence increased among women especially older women > 70 years and had no significant change in hypertension control. The American Heart Association (2010), and Mahan, Escott-Stump, (2008) stated that as women grow older their incidence of high blood pressure becomes greater. Before the age of 45-50 years men may lead the prevalence of hypertension, from age 45-54 the percentages of men and women are similar. After 50- 55 years women surpass men in their group and are more likely to develop high blood pressure. The prevalence of HTN rises with increasing age and nearly half of all adults with high blood pressure are women (American Heart Association, 2010; Pan American Health Organization 2001, Mahan and Escott-Stump, 2008).

The Caribbean epidemiological centre (2007), 2004 data showed that from the onset of 25 years and over, the mortality from cardiovascular diseases begins and increases with age. The American Heart Association (2010) stated that persons older than age 35 experience blood pressure level increase. Framingham Heart Study investigators reported that lifetime risk of hypertension to be approximately 90% for men and women who were non-hypertensive at 55 or 65 years old and survived to age 80 to 85. Even after adjusting for competing mortality, the remaining lifetime risks of hypertension were 86 to 90% in women and 81 to 83% in men (Chobanian et al, 2003). Lifetime prevalence of hypertension increases with advancing age to the point where more than half of persons aged 60-69 years, and three- fourths of those aged 70 years older are affected according to JNC 7. While the rise in systolic blood pressure continues throughout life, in contrast with diastolic blood pressure, which increases until an estimated 50 years old and tends to level off over the next decade, then remains the same, or fall later in life (Chobanian et al., 2003). However, studies have shown that after the onset of menopause, particularly once over the age of 65 years, women's risk of hypertension increases as the levels of estrogen start to

decline. This is probably due to the protective effects of estrogen. Studies have indicated that as estrogen levels decrease the arteries lose some of their elasticity, but the underlining mechanisms responsible are not clearly understood (Ashraf, Vongpatansin; 2006; American Heart Association, 2010; Pramparo, et al., 2010). Factors that may also contribute to the higher number of women with hypertension are longevity.

2.5: Ethnicity and Hypertension. Research has shown the prevalence of hypertension and strokes are more common among the black population. They develop hypertension earlier in life, maintain higher blood pressure levels and their risk of fatal stroke, heart disease or end stage renal diseases increases (Mahan and Escott-Stump, 2008; and Cooper, et al., 1997). A previous study reported by Cooper, et al., (1997) identifies a consistent blood pressure gradient between West Africa origin, Caribbean and the United States. But have shown that a mean blood pressure was similar among 25-34 years of age and increased with age in the United States population than West Africa population, suggesting that factors may be attributed to environmental factors such as obesity, sodium and potassium intake, because they live under very different social and economical conditions.

2.6 Practicing of Lifestyle Modification Measures

The Joint National Committee for the Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) recommends lifestyle modification as an intervention for all patients with hypertension or pre-hypertension; a new category developed to draw attention for early intervention; (Wexler and Aukerman, 2006). Chobanian, et al., (2003) reported individuals with prehypertension have twice the risk of developing hypertension compared to those with lower values. Hypertension involves non pharmacological treatment particularly as the initial treatment and includes pharmacological treatment when lifestyle modification measures do not achieve treatment goals or if the signs of target organ damage (Caribbean Health Research Council. 2007). Lifestyle modification is used to treat hypertension and other chronic diseases for the prevention and management of all stages of high blood pressure and forms an important part of treatment of other chronic diseases such as diabetes (Caribbean

Health Research Council, 2006). There are three categories of high blood pressure (140/90 mm Hg or higher) and each stage JNC 7 recommends lifestyle modification along with drug therapy (see Appendix). According to the Caribbean Health Research Council (2007), non pharmacological treatment alone will be effective in reducing blood pressure to goal levels (<140/90 mmHg) in about 25% of patients. And effective lifestyle modification may lower blood pressure to a similar magnitude as a single drug therapy.

Non-pharmacological intervention provides an effective means to lower blood pressure and has been emphasized increasingly as having the potential to prevent the development of hypertension in non hypertensive persons and lower risks for blood pressure complications (Mahan and Escott-Stump, 2008; Coleman, 2010). In addition, this intervention helps to increase the effectiveness of drug treatment agents and improve other CVD risk factors (Caribbean Health Research Council. 2007; Mahan and Escott-Stump, 2008). The lifestyle modification recommended by JNC 7 are reduced dietary sodium, regular exercise/physical activity, moderate alcohol consumption, weight reduction and following a DASH diet pattern (dietary approaches to stop hypertension) which includes increasing potassium intake and other dietary factors proven to reduce blood pressure. However, other lifestyle intervention for example cessation of tobacco use, studies have shown persons with high blood pressure who smoked had increased risk of CVD related to the number of cigarette where smoking (Wexler and Aukerman, 2006; Mahan and Escott-Stump, 2008).

Strategies such as cessation of tobacco use are essential, as the effects of nicotine released while smoking cigarettes is believed to impact blood pressure (Wexler and Aukerman, 2006). It is also critical for reducing the risk of vascular complications of hypertension and diabetes (Caribbean Health Research Council, 2006). According to Wexler and Aukerman, (2006), cigarette use causes a 4 mmHg increase in systolic blood pressure and a 3 mmHg increase in diastolic blood pressure compared with placebo. Tobacco use is a cardiovascular risk factor for diseases.

However, excessive consumption of sodium chloride can result in elevated blood pressure levels but a reduction of sodium chloride (salt) may have approximately 2-8mmHg reduction of systolic blood pressure for no more than 100 ml per day of 2.4 g of sodium or 6 grams salt. Research has indicated that persons of African descent, older adults and patients with hypertension or diabetes are more sensitive to changes in dietary sodium chloride than the general population (Coleman, Ellen, 2010).

Physical activity such as aerobic exercise has a positive effect on blood pressure whether or not an individual has hypertensive, producing an average reduction of 4 mmHg in systolic blood pressure and 3 mmHg in diastolic blood pressure (Wexler and Aukerman, 2006). According to Mahan and Escott-Stump (2008) engaging in regular aerobic physical activity such as brisk walking, at least 30 minutes most week results in approximate systolic blood pressure reduction of 4-9 mmHg. In addition, limited alcohol consumption is also an important lifestyle modification for reducing blood pressure. A total of three drinks per day (3 oz of alcohol) is the threshold for a raising blood pressure and is associated with a 3 mmHg rise in systolic blood pressure (Mahan and Escott-Stump, 2008). Thus, JNC 7 recommend alcohol intake should be no more than two alcoholic drinks per day for men and no more than one alcoholic drink per day for women for a systolic blood pressure reduction of approximately 2-4 mmHg (Wexler and Aukerman, 2006). Furthermore, sodium and potassium intake have shown a strong inverse relationship.

However, supplementation of potassium appears to play an enhanced role in individuals with initially high sodium intake (Wexler and Aukerman, 2006). But recommendations are to obtain adequate potassium intake from a healthy diet. An increase in potassium intake can lead to sodium excretion thus; potassium is associated with lowering blood pressure levels (Nelms, Sucher, and Long, 2007). The mechanism by which a diet low in potassium contributes to increased blood pressure is not known. But when individuals with essential hypertension are consuming a diet low in potassium it results in a systolic blood pressure increase of 7 mmHg because of increased sodium retention which indicates the

importance's of potassium in the prevention of hypertension (Wexler and Aukerman, 2006). Other dietary factors such as calcium, magnesium intake, omega 3 fatty acids (High doses -average of 3.7 gm/day; lowered systolic and diastolic blood pressure by an average of 2.1 and 1.6 mmHg respectfully) and monounsaturated fat from olive oil; (which content high in phenolic compounds in olive oil by promoting vasodilatations); appear to reduce blood pressure (Wexler and Aukerman, 2006; Coleman, 2010). Supplementing the diet with calcium and magnesium has not been associated with clinically important reduction in blood pressure in persons consuming a healthy diet. And current use of calcium, magnesium and omega 3 fatty acids for hypertension is not recommended because of the lack of clinical data (Wexler and Aukerman, 2006; Mahan and Escott-Stump, 2008).

Weight reduction (in persons overweight) of approximately 9 kg (20lb) may produce a decrease of 5-20 mmHg systolic blood pressure (Caribbean Health Research Council, 2007; Mahan and Escott-Stump, 2008). There is a strong association between BMI and hypertension among men and women in all races or ethnic groups and in most age groups. According to Mahan and Escott-Stump, (2008) the prevalence of high blood pressure in persons with BMI $>30 \text{ kg/ m}^2$ is 42 % in men and 38 % in women compared with 15 % for both men and women with a normal BMI ($<25 \text{ kg/ m}^2$) in a (NHANES) III Survey in the United States. The risk of developing elevated blood pressure is two to six times higher in over weight than in normal weight person. Obesity is known to correlate with diabetes and hypertension.

DASH eating pattern emphasize fruits, vegetables, low fat diary products with reduced a content of saturated fat and total fat, lean meats and sodium reduction etc (see Appendix); is responsible for decreased Systolic blood pressure of approximately 6mmHg and diastolic blood pressure 3 mmHg (Wexler and Aukerman, 2006) and a systolic blood pressure range of 8-14 mmHg (Mahan and Escott-Stump, 2008). The DASH diet is recommended for pre-hypertensive and hypertensive individuals for prevention and treatment. However, normotensive and persons trying to reduce weight have shown positive results. The greatest reduction in blood pressure is seen in persons with hypertension. Although

the DASH diet is safe the diet is high in potassium, phosphorus and protein thus depending on their status it would not be advisable for individuals with end stage renal diseases (Mahan and Escott-Stump, 2008;Coleman, 2010).

2.7: Summary of review

The focuses of the review were to reveal the literature on hypertension and its associated disease implications on women health. Among women in Trinidad the risk of hypertension is estimated as high as 25 % to 55% between age 25 to 64 years, and coupled with non modifiable risk factors such as increasing age, family history of hypertension and diabetes, ethnicity and modifiable factors such as dietary and lifestyle practices pose an increase risk of elevated blood pressure. However, the literature also highlighted recommended practice for lifestyle modification such as increasing exercise, weight management, reduce alcohol consumption, cessation of tobacco use, following a DASH eating pattern and losing excess body weight all aimed at reducing blood pressure.

3.0: MATERIALS AND METHODS

3.1: Subjects/ Participants

The population of Trinidad and Tobago consist of three main ethnic groups, approximately 40.3 % East Indian descent, 39.5 % African descent, Mixed racial ancestry 18.4 % and others accounting for the remaining percentages (1.8 % e.g. Caucasian, Chinese etc). The female population accounts for 656,892 (49.85%) and an estimated 40 per 100,000 of the female population for the crude mortality rate in the caricom member states according to (2004) data from Pan America Organization, World Health Organization and CAREC. This cross- sectional survey was carried out in four locations in Trinidad between October and November 2010, on four consecutive weeks, between the hours 11.00 am and 7.00 pm. The locations were north, south, north eastern and the central vicinity. The study had more participants 44 years and younger willing to participate thus in the effort to acquire older participants two church groups of women mainly aged 45 years and older where assessed from north (Diego Martin) and south (Fifth Company, Moruga) . The questionnaire was administered from afternoon and evening times to all women ranging from aged 25 years and over.

3.2: Data collection and Sampling Procedures

A total of 120 women were obtained from the four locations. Women were approached and asked to participate in the study and upon consent the questionnaires were administered. On completion; if there were question relating to the questionnaire; the respondents were then informed. In the cases where women declined to participate in the study the researcher would repeat the process by approaching the next potential respondent. Questionnaires with 80 % of answers and above where accepted and used to analyze data. The study was conducted to provide data about current awareness, knowledge life style and dietary practices among women concerning hypertension. Responses where based on a self report of high blood pressure and lifestyle measures. The type of sampling procedure used was non probability

convenience sampling, to access to a wider population and because of time constraints. Purposive samplings were use for a specific target population of interest. The **independent variables** were women's awareness and knowledge of hypertension. The **dependent variables** were dietary and lifestyle practices in relation to hypertension. The questionnaire was pretested using cronbach's alpha for reliability analysis for all questions. Cronbach's alpha was .537 and cronbach's alpha based on standardized items was .719. The final draft questionnaire was then administered.

3.3: The sample size

The sample size was determined by using a standard formula: $N = Z^2 p \times q / e^2$

Where $Z^2 = 1.96$ (at 95% confidence level).

$p = 0.0178$ $e = 5\% = 0.05$

Where p = estimated prevalence of women with hypertension, $q = 1 - p$. Using a prevalence of 1172 from 2005 Trinidad and Tobago Ministry of Health Annual Statistical Report for women discharge and diagnosis from all hospitals and sampling error of 5%. The sample size required was 225. The total sample size used in the study was 120 with individuals from three categories of women who subjectively reported that they are hypertensive and not hypertensive and individuals whom are not aware of their status.

3.4: Data Collection Instrument

Upon establishing the questionnaire it contained forty questions with five sections but ultimately a 30-item questionnaire was developed for use in this study (see Appendix A). Closed ended question were incorporated into four sections evaluating awareness, knowledge, history and life style modification demographics. The first section queried awareness of women's health issues. Respondents were asked

questions concerning the greatest health problem in the Caribbean and greatest health problem facing women today. They were also asked if they were aware of public health information concerning high blood pressure; normal blood pressure values; risk factors; and dietary and lifestyle practices to control high blood pressure.

The second section evaluated the respondents' understanding of high blood pressure, using the term "high blood pressure" instead of hypertension in the entire questionnaire except a particular question inquiring what the term hypertension means to them. The term "top number" was used to indicate systolic blood pressure and "bottom number" used to indicate diastolic blood pressure. Knowledge of high blood pressure risk factors, dietary and lifestyle choices, and major disease associated with hypertension were inquired. The questionnaire also inquired respondents' source of information concerning high blood pressure, their subjective rating of their concerns about high blood pressure, the values for normal blood pressure, and finally, participants' rating of how informed they are about high blood pressure.

The third section was concerned with participants' family and personal history and their dietary and lifestyle practices. This section also questioned respondents' perception, and practices of life style and dietary modification. If the respondents practiced lifestyle and dietary measures for prevention and control of hypertension they were allowed to indicate from a given list. The final section contained questions about the demographic characteristics of the participants.

3.5: Data Analysis

The frequencies of subjects and their responses in categorical variables were calculated using descriptive statistics and data was reported in percentages. Statistical analysis included cross tabulation and chi-square analysis which were used to determine significant relationships between categorical variables. Statistical significance was set at $P < .05$. Data entry and analysis were done using the Statistical Package for the Social Science (SPSS) version 19 (SPSS Inc., Chicago, IL, USA).

4.0: RESULTS

4.1: Demographics

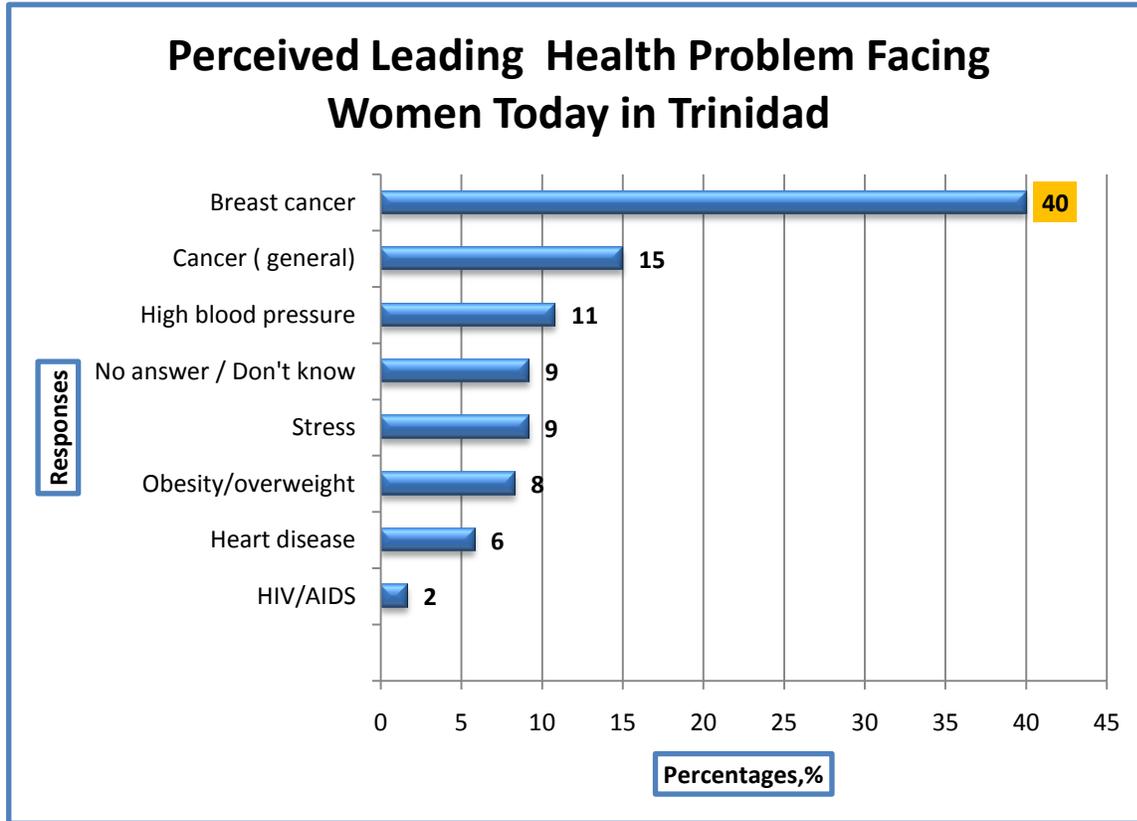
The demographic characteristics of 120 female participants are shown in **Table1**. Less than 1% of the respondents identified as “other” ethnic group (Chinese), were excluded from the statistical analysis. The ethnic compositions of the remaining 120 eligible respondents were African descendents, East Indian descendents and mixed ethnic group. The differences among age and ethnicity were noted for several demographic characteristic including marital status, education, employment status and all variables were similar among groups.

4.2: Awareness and Perception of Disease Conditions

Respondents were asked which gender is most affected by high blood pressure, most women (63%) state females are most affected by high blood pressure than males. Most women perceive breast cancer and cancer in general as the greatest health problem facing them, while few responses by women were cited for heart disease. This perception was significant with participants with primary and secondary school education level compared to women with tertiary level education ($P= 0.020$). Significant differences were noted for women that identify females as the most affected by hypertension and women that perceive breast cancer as the greatest problem facing women today (41%); ($P= 0.007$). The responses to questions concerning the perceived leading health problem facing women today are shown in **Figure 1**. When identifying the leading health problem in the Caribbean 23 % of the participants perceive high blood pressure, 19 % heart disease, 18 % cancer (general), 13% HIV/ AIDS and 8% breast cancer. The majority of participants respond ‘yes’ to being aware of dietary and lifestyle practices to control high blood pressure (88 %).

Table 1: DEMOGRAPHICS CHARACTERISTICS OF RESPONDENTS	
CHARACTERISTICS	n=120 (%)
<u>Age</u>	
No response	1(0.8)
25 – 34	59(49.2)
35 – 44	19(15.8)
45 – 64	34(28.3)
65 and over	7(5.8)
<u>Marital Status</u>	
Single	46(38.3)
Married / living together	64(53.3)
Separated / Divorced	5(4.2)
Widow	3(2.5)
Others	2(1.7)
<u>Education</u>	
No response	2(1.7)
Primary	24(20)
Secondary	37(30.8)
Tertiary	57(47.5)
<u>Employment Status</u>	
No response	3(2.5)
Employed	74(61.7)
Unemployed	15(12.5)
Retired	8(6.7)
Student	20(16.7)
<u>Ethnicity</u>	
Afro Trinidadian	55(45.8)
Indo Trinidadian	39(32.5)
Mixed	26(21.7)

Figure. 1.1



All values are given as percentages.

4.3: Knowledge of Hypertension

Approximately half of respondents rate their knowledge of hypertension as “moderately informed” (51%) while 20 % state they were “ well informed” ; 14% considering themselves to be “very well informed” and the remaining 15% indicate “don’t know”, and “not at all” informed about hypertension. There were significant differences among employed women that stated they were well informed about hypertension (P=0.000). Majority of women provide correct responses or were knowledgeable that hypertension meant high blood pressure (64 %) but 19% responses were “ high level stress” and about 17 % of women responses were tension, nervous condition, high blood sugar, over

activity and do not know . Approximately more than half of the women with tertiary level education state the term hypertension meant high blood pressure (79%) compared with women from all other education level whom cited mainly high level stress ($P= 0.030$). As the education level increases participant cited hypertension meant high blood pressure.

Nearly all respondents perceive hypertension as a condition with symptoms (70%) whereas 16% state high blood pressure has no symptom. Most of the women (86 %) indicate lowering their high blood pressure even a bit would improve a person's health, while 10% indicate "somewhat", and 4% did not know if lowering blood pressure a bit would improve a persons health. This question were significant with women responding that hypertension were extremely dangerous to their health ($P=0.004$). Majority of participants respond 'yes' to being aware of normal blood pressure values or target (69 %). But when asked more specific questions about blood pressure, 62 % did not know the normal blood pressure values or levels (for adults 18 years and over) for systolic blood pressure and for diastolic blood pressure (72 %) while 38% stated normal systolic blood pressure to be less than 120, and 28% perceive diastolic blood pressure to be less than 80.

4.4: Source of Information about Hypertension

The majority of the participants rate high blood pressure as extremely serious condition to their health (88%), while 4% stated somewhat, 4% not at all and 3% did not know. Significant differences were observed by half of the women with tertiary level education responding to questions about high blood pressure being extremely dangerous to their health ($P=0.002$) and similarly for most of the women in the employed women group ($P=0.046$). Nearly all of the women (66%) indicate they were aware of public health information concerning high blood pressure. All respondents were allowed to indicate where they receive information concerning hypertension; and 56% of women cited they receive information about high blood pressure from a physician or doctors, 38% from media (television, radio, internet etc), 27% nurses, 19 % printed media (newspaper, magazine, etc) while 9% of women each receive

information from dietitians and 9% from other groups. Doctors, media, nurses and printed media were identified as the most common source of information by all women. But information received by physicians were significant only for cited risk factor, low potassium intake whereas, women responses were significant primarily with dietitians, nurses, printed media, and media shown in **Table 2**.

When comparing source of information and ethnic groups, Afro- Trinidadian were significant with receiving information from nurses ($P=0.039$) whereas, Indo- Trinidadian, and Mixed group receive information from media (television, radio, internet), ($P=0.028$). The percentage of women who report that they were comfortable talking to health care provider about prevention and treatment options for high blood pressure were 86% followed by 12 % of respondents stating “sometimes”. In addition, responses concerning women source of information and lifestyle modifications were significant with dietitians for limited or no alcohol consumption ($P= 0.027$), and stress avoidance ($P= 0.037$). Weight management (losing excess weight or maintaining a health body weight) were significant with information from nurses ($P= 0.018$) and media ($P= 0.037$). Whereas, consumption of diet rich in potassium were significant with information from dietitians ($P= 0.035$) and nurses ($P= 0.023$) (see Appendix C).

Table 2. Knowledge of Hypertension Risk Factors by Source of Information given by Respondents

Identified Risk Factors of Respondents	Physicians /doctor (n=67)	Media (TV, radio, internet) (n=46)	Nurses (n=32)	Printed media (newspaper, magazine, etc) (n=23)	Dietitian (n=11)	Others (n=11)
Excessive alcohol consumption	48	44	56	52	64	46
P-values	0.271	0.980	0.085	0.341	0.154	0.882
Inadequate physical activity and exercise	55	70	72	78	100	64
P-values	0.720	0.025	0.043	0.020	0.002	0.625
Age (increasing age)	36	41	56	52	73	46
P-values	0.897	0.144	0.001	0.033	0.004	0.371
Smoking	45	41	56	57	82	27
P-values	0.230	0.818	0.028	0.072	0.003	0.366
High sodium/ salt intake	84	83	84	83	100	82
P-values	0.726	0.980	0.744	0.988	0.109	0.950
Obesity/ excess body weight	57	59	69	65	100	55
P-values	0.298	0.284	0.032	0.174	0.001	0.887
Diabetes mellitus	21	24	31	17	64	27
P-values	0.586	0.298	0.043	0.810	0.000	0.474
Family history of high blood pressure	58	76	72	70	82	73
P-values	0.190	0.022	0.242	0.490	0.182	0.498
Stress	60	52	53	52	82	73
P-values	0.451	0.434	0.637	0.629	0.077	0.259
Low potassium intake	21	15	25	17	55	18
P-values	0.017	0.795	0.040	0.622	0.000	0.689
High cholesterol/ fat diet	51	63	66	57	100	55
P-values	0.552	0.011	0.022	0.382	0.000	0.665
Pressure (genetic factors)	36	35	53	57	73	46
P-values	0.667	0.911	0.008	0.012	0.005	0.408

All values are given as percentage of respondents who spontaneously reported risk factors for hypertension. For all groups P<0.05 consider significant within category.

4.5: Perception of Risk factors for Hypertension and Hypertension Prevention

Women were asked to identify risk factors for hypertension; most important treatment or control options and the disease condition that untreated hypertension could have on their health. Respondents were asked to indicate if high blood pressure can lead to heart diseases and 83% of the women indicate “yes”, while 15 % did not know if hypertension can lead to heart disease. In addition, the majority of the women (71%) perceived hypertension were a major contributor to heart disease but 23 % did not know if hypertension was a major contributor and 6 % respond no to that that question. Most respondent cited reduce salt or sodium intake, and exercise as the most important to them for controlling blood pressure and the least respondent’s state reducing alcohol consumption (**Table 3**). Among all respondents, highest percentages were seen for high sodium or salt intake, family history of hypertension, inadequate physical activity or exercise and stress this is shown in **Figure 2**.

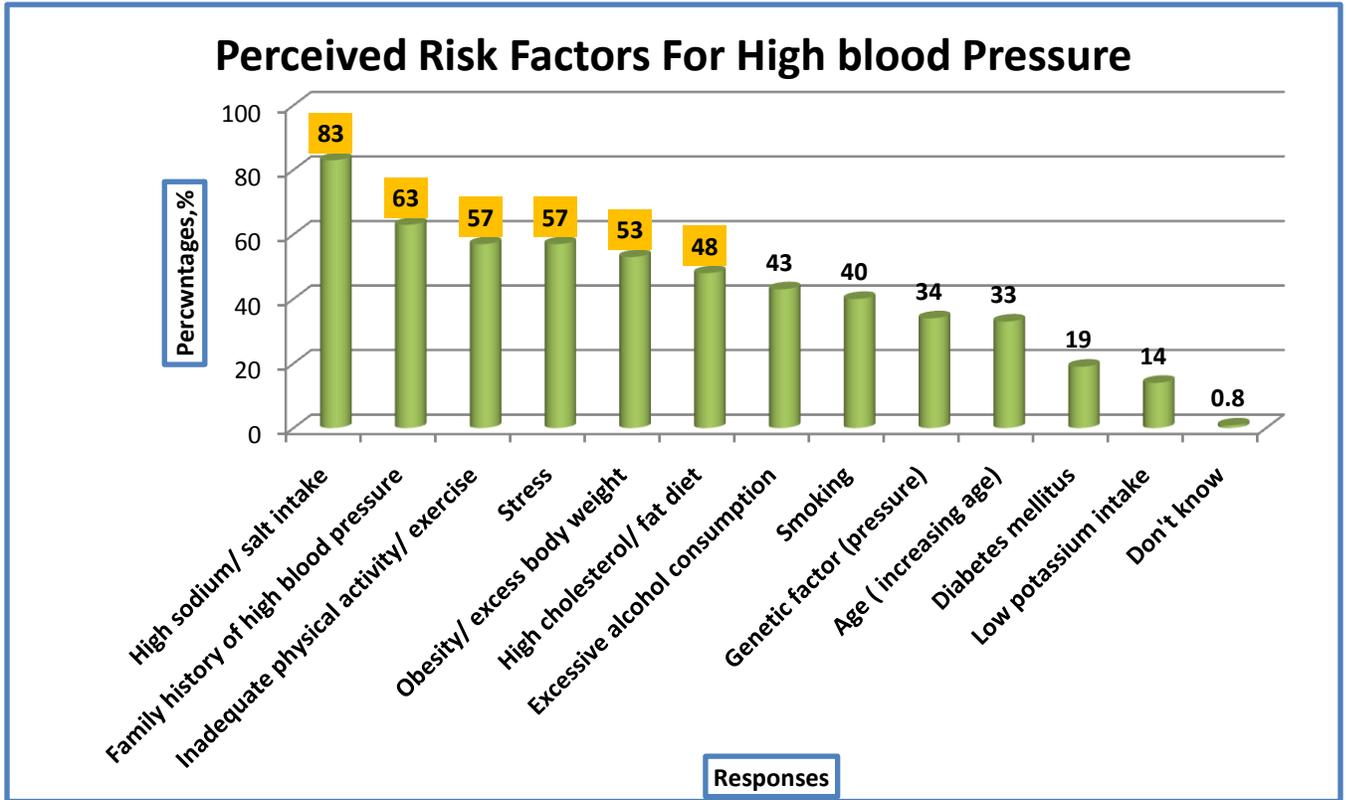
Differences among age groups were observed for responses concerning the identified risk factor “increasing age (age)” for women 65 years and over (71%); $P=0.003$ compared to women less than 65 years. Differences among participants’ education levels and cited risk factors for hypertension were noted for inadequate exercise or physical activity, increasing age (age) among women with tertiary education and high sodium or salt intake among women with secondary education (**Table 4**). Nearly all participants (87%) stated they were told of risk factors for high blood pressure. When identified risk factors for hypertension were compared with ethnic groups, stress were frequently cited by women of Indo- Trinidadian and Mixed group ($P=0.029$). The respondents were also asked to identify the associated disease condition with untreated hypertension. More than half of the participants indicate stroke, followed by, heart attack while about a third of the women perceived heart failure and fewer cite renal disease (**Figure 3**). Among the women citing heart attack the source of information were significant with media , printed media and dietitians and renal disease were significant with nurses as a source of information concerning hypertension disease risk(**Table 5**).

Table 3.

FACTORS MOST IMPORTANT TO PARTICIPANT IN CONTROLLING HIGH BLOOD PRESSURE		
Responses	n	%
Reduce salt/ sodium intake	76	63
Exercising	60	50
Taking medication	33	28
Less stress/ avoid stress	33	28
Lose weight	13	11
Reduce fat intake	7	6
Quit smoking	6	5
Reduce alcohol consumption	3	3
Don't know	1	0.8

All values are given as percentage of respondents

Figure2.



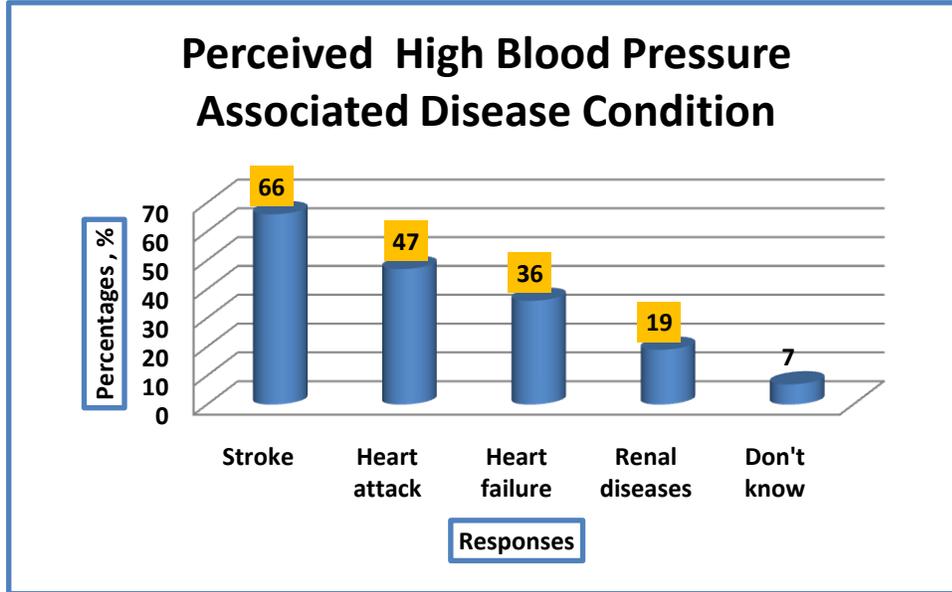
All data are given as percentage of respondents who spontaneously reported risks factors for high blood pressure.

Table 4. Knowledge of Hypertension Risk Factors by Education Level completed given by Respondents

Risk factors for Hypertension given as responses	Primary (n= 24)	Secondary (n=37)	Tertiary (n= 57)	P- values
Excessive alcohol consumption	25	43	53	0.078
Inadequate physical activity/exercise	42	49	70	0.018
Age (increasing age)	13	32	44	0.036
Smoking	29	38	47	0.276
High sodium/salt intake	75	87	86	0.010
Obesity/excess body weight	46	54	56	0.395
Diabetes mellitus	13	14	26	0.283
Low potassium intake	4	14	19	0.314
Family history of high blood pressure	58	62	68	0.224
Stress	42	54	67	0.065
High cholesterol/fat diet	33	46	58	0.102
Pressure(genetic factors)	21	35	40	0.270

Don't know / no answer – one respondent. All data are given as percentage of respondents who spontaneously reported risks factors for high blood pressure. All groups within category P- value was significant if $P < .05$.

Figure 3.



All values are given as percentage of respondents.

Table 5. Knowledge of Hypertension Associated Disease Conditions by Source of Information given by Respondents

Identified Hypertension Associated disease conditions	Physician /doctors (n=61)	Media (TV, radio, internet) (n= 46)	Nurses (n=32)	Printed media- news paper, magazine, etc) (n=23)	Dietitian (n=11)	Others (friend, relative etc.) (n=11)
Stroke	69	65	72	65	73	73
P-values	0.463	0.911	0.400	0.945	0.613	0.613
Heart attack	48	59	56	74	82	64
P-values	0.787	0.037	0.204	0.004	0.014	0.237
Heart failure	37	41	44	39	46	36
P-values	0.704	0.324	0.275	0.714	0.485	0.969
Renal diseases	18	17	31	9	36	27
P-values	0.694	0.697	0.043	0.156	0.128	0.474
Don't know	10	4	3	0	0	0
P-values	0.062	0.422	0.348	0.154	0.352	0.352

All percentages of respondents who reported disease condition associated with untreated hypertension.

4.6: Participants Prevention or control Strategies and History of Hypertension

Percentage of women that self reported family history of hypertension were 69 %, while 28 % report they did not have any family history of hypertension and 3 % did not know their family history . Whereas, 25% of women reported personal history of hypertension and 71 % state they do not have personal history while 3% did not know their status. In addition, 80% of those women who self reported they have hypertension also had a family history of hypertension (P= 0.000). Nearly all respondents (95%) claim they were aware of lifestyle modification but fewer women 45 years and over noted they were aware in contrast to women less than 45 years of age (63%); (P= 0.003). But fewer women younger than 45 years respond that changing life style and dietary practices will help to reduce high blood pressure levels compared with women older than 45 years (P=0.000), this were also similar with women with tertiary level education (P=0.009) and employed women group (P=0.022).

In addition, less than half of the women (37 %) said “yes” they practice health dietary and lifestyle measures for prevention and/or control of hypertension, 34 % said “sometimes” and 26 % state “no”, all respondents practicing lifestyle modification (occasionally and always) indicate their lifestyle and dietary habits. Lifestyle practices such as weight management (weight loss if over weight and maintaining a health body weight) was significant with Indo- Trinidadian women group (P= 0.041). Women who responded to question about personal history were divided in to three groups. Differences among women self reporting they were hypertensive, non hypertensive and status unknown group were compared with identified dietary and lifestyle practices. More women from the hypertensive group watch salt and sodium intake (P= 0.005) and consume a diet rich in calcium and magnesium (P= 0.028) (see Appendix C). The total percentages of respondents practicing lifestyle modification for prevention or control of hypertension are show in **Table 6**. Women mainly reported practicing a reduce salt or sodium consumption; engage in physical activity or exercise, no smoking (included cessation), trying to avoid stress, increasing fruits and vegetables intake, reduce fat and fatty foods regularly.

Table 6.

Identified Lifestyle and Dietary Practices Respondents are engage in for Prevention or Control of High Blood Pressure		
RESPONSES	n	%
Reduce salt/ sodium intake	47	39
Engage in physical activity/ exercise	45	38
Smoking cessation and avoid smoking	44	37
Try to avoid stress	42	35
Increase fruits and vegetables intake	39	33
Reduce fat and fatty foods regularly	38	32
Weight management -weight loss/ maintain health weight	27	23
No alcohol/ limited alcohol consumption	17	14
Consume a diet rich in calcium and magnesium	9	8
Consume diet rich in potassium	6	5

*Percentages of respondents reporting lifestyle modification practices.

5.0: DISCUSSION

The study purpose were to assess the current awareness, knowledge and practices of life –style modification measures related to hypertension that among women in Trinidad. Difference in knowledge and awareness were seen among women for risk factors and associated diseases and sources of information pertaining to hypertension. The level of education attained influences the degree of awareness and knowledge of blood pressure targets and health information, but were not significant with lifestyle modification measures. Minimal differences with ethnic groups and age were found in the study. The findings reveal that the majority of women in the survey perceived breast cancer as the greatest health problem facing them today. This may indicate a heightened awareness of this disease and information that are targeted to women in this study. This was similar with studies reported by Mosca et al, 2000 and Mosca et al 2010, stating from previous study that breast cancer were feared and overestimated by women for the risk of breast cancer than heart disease. These findings in this study were significant mainly with women with less than a tertiary level education. The educational strategies use to rise awareness and knowledge of breast cancer may promote help inform women about the diseases and the implication on heart disease and prevention and control practices concerning hypertension.

Most women in the study (63%) state females are the most affected by hypertension than their male counterparts and the majority of women (88%) rate high blood pressure as extremely dangerous or a serious condition to their health. While question regarding knowledge of the condition few of the women were unaware that high blood pressure can lead to heart disease; majority perceived hypertension had warning signs (70%), and a third of all the respondents cited the normal range for blood pressure. This finding suggests respondents had limited understandings of some aspects of hypertension condition. They perceived high blood pressure had warning signs; two thirds did not correctly identified normal blood pressure values because of lack of awareness and knowledge. And this can hinder the early detection and treatment interventions and even prevention efforts (Chobanian, et al., 2003; Oliveria et al., 2004). More

than half of the women transfer their knowledge into practiced with some form of lifestyle modification (71%) and most cited reduces salt or sodium intake and exercising as factors most important as intervention in controlling or preventing high blood pressure. This is important for women in the Caribbean as the prevalence of non communicable diseases are high and sedentary lifestyle and poor dietary habits hinder the efforts to reduce morbidity and mortality to hypertension and cardiovascular disease (Caribbean Epidemiology Centre, 2007 and (Caribbean Health Research Council. 2007). With increase aware of the specific condition and the consequences this may be transferred into more preventative measures and better control.

Among all respondents, most of the women report they were moderately informed (51%) to not at all informed (15 %) about hypertension. A greater percentage cited they receive information from physicians, media (e.g. television, radio etc), nurses and printed media than dietitians and other groups. While most women were comfortable talking to health care providers (86%). However, when comparing the type of information in regards to the risk factors and associated disease risk with hypertension, women receive information for risk factors such as inadequate physical activity or exercise, age (increasing age) , smoking, obesity or excess body weight, diabetes mellitus, family history of high blood pressure, low potassium intake, high cholesterol or fat diet and genetic factors for hypertension from dietitians and nurses, followed by media and printed media . Similar finding occur in other study with media and printed media commonly cited compare to physicians (Mosca et al., 2000).

In addition, heart attack was frequently cited for information from the media, printed media, nurses and dietitian. Renal diseases were significant with sourcing information from nurses. When comparing the responses for lifestyle modification practices among the source of information, significant association were noted from women receiving information from dietitian, nurse and media (television, radio, internet) for no or limited alcohol consumption, weight management, consuming a diet rich in potassium and avoiding stress. Though physicians were cited by most of women, they were cited the least

(only low potassium intake as a risk factor) for information concerning risk factors for hypertension; associated disease condition; and dietary and lifestyle practices. With regards to this study an opportunity exist to use women source of information in order to disseminate information to increase awareness, knowledge and prevention or control intervention for hypertension. Most of the women understand that lifestyle modifications are important in the fight against hypertension and its diseases complication (Caribbean Epidemiology Centre, 2007).

Mosca et al., (2000), Petrella et al., (2005), and Oliveria et al., (2000), indicate from their study that mass media have been identified as a major source of information for women. However, previous studies shown television and health care professionals as the main source of information for women but 70% of the participants in pervious study reported that physicians did not discuss heart disease with patients while more respondents (75%) were comfortable talking to physicians (Mosca et al, 2000). This was an opportunity missed for patient and physician discussion. According to Petrella et al, (2005), even though the primary responsibility for high blood pressure prevention and control is with patients, strategies must include providers armed with proper educational tools and support to change hypertension behavior among those at risk.

There were an understanding in all individuals who self reported they were hypertensive as the finding reveal they practice reduce salt or sodium intake (67%) and consuming a diet rich in calcium and magnesium (20%) that the other groups. Results suggest that women 25 years and over were knowledgeable about hypertension risk factors, but fewer knew about disease condition associated with untreated hypertension for heart failure, and particularly kidney disease compared with most cited response stroke and heart attack. The JNC 7 indicated that there is a relationship between blood pressure and the risk of heart disease and the higher the blood pressure, the greater is the chance of heart attack, heart failure, stroke, and increase incidences of renal diseases. (Chobanian et al, 2003).

An opportunity exists to educate women about associated disease risk with hypertension particularly for heart failure and renal disease and risk factors for hypertension especially the least cited responses such as excessive alcohol use, smoking, aging (increasing in age), diabetes mellitus and low potassium intake. Highlight the connection of diabetes mellitus and hypertension. Diabetes was the second least cited risk factor among all respondents. This may indicate women are unaware of its association to hypertension as it contributes also to a high prevalence of heart disease in Trinidad. Lowering blood pressure in persons with diabetes and hypertension is associated with a decrease in CVD events and renal failure (Mahan and Escott-Stump, 2008, Caribbean Health Research Council, 2006). More women aged 65 years and over cited age as a risk factor. Age of these women may have influence their perception since aging women older than 45 years, and postmenopausal women experience an increase prevalence of hypertension as estrogen level decreases with the onset of menopause (America Heart Association, 2010; Mahan, Escott- Stump, 2008; Pramparo, et al., 2010).

These findings suggest an opportunity to educate more women. In particular hypertensive women, about practicing lifestyle modification seen most of the lifestyle and dietary habits were not significantly different from the other group (non- hypertensive and unknown status group) concerning excessive alcohol consumption, smoking cessation and weight management, reducing fat or fatty foods regularly, consuming a diet rich in potassium increasing fruits and vegetable intake and stress reduction. And continuous emphasize to all women the importance of proper dietary and lifestyle practices regularly to prevent and reduce blood pressure incidence (Wexler and Aukerman, 2006, Chobanian et al, 2003). The alternative hypothesis supports the relationship of knowledge and awareness of hypertension on lifestyle modification. There are no standardized instruments available to assess hypertension knowledge and awareness. Thus, the study questionnaire were design utilizing existing literature, recommended lifestyle and dietary practices for hypertension and related research articles data collection instruments.

5.1: LIMITATIONS

There are limitations with the survey used in the current study because some women were included from two church groups that may not consumed alcohol or smoked due to religious reasons rather than for prevention or control of hypertension. Participants were not asked to indicate if they had diabetes, heart disease, renal disease, were pregnant or any disease that may result in an increase in blood pressure levels. Participants may have renal diseases that are usually not allowed to consume foods with high potassium levels in their diet. However, the questionnaire used the term ‘normal blood pressure’ which refer to individuals with normotensive blood pressure (<120/80 mmHg) and may be misinterpreted by some with a health condition, with higher ranges consider normal for their condition. Individuals may practices health habits in as part of their lifestyle and may or may not respond to the question to indicate their practices for high blood pressure prevention. No blood pressure records were taken, only self reported claims of hypertension. During the selection process some groups may be over represented using the convenience sampling approach. Ethnicity was not reflective for some ethnic groups in Trinidad and age group < 25 years were not included thus limiting generalization. There were limitations to questions pertaining to risk factors because non-established variables were included as risk factors to prevent reporting bias, in spite of respondents indicating variables they perceived as risk factors, or diseases condition with hypertension. However, being a cross sectional study, disadvantages of recall bias and confounders may be unequally distributed. For convenience sampling, the findings may not represent the entire population of women which may be subjected to sampling bias and limited generalization of the assumption made about the entire population. Purposive samplings were use which is likely to overweigh subgroups in the population that are more readily accessible.

5.2: RECOMMENDATION

The study suggest women were adequately aware and knowledgeable about high blood pressure risk factors but awareness and knowledge about hypertension condition need to be improved especially

for the least cited responses for risk factors among all respondents. Need for greater interest in lifestyle and dietary practices for weight management, no or limited alcohol consumption, consuming a diet rich in potassium, calcium and magnesium that were least cited by women in the effort to improve management of hypertension and prevention. These findings support the continuous public and healthcare information as it is imperative to address hypertension, its risk factors and associated disease condition. Social marketing strategies specifically target to women with different education level using their most common sources of information example, media, printed media, nurses and dietitians to disseminate information to women. There are also areas for improvement for health care providers particularly physicians to inform female patients with health information and lifestyle modification interventions in the effort to reduce and prevent hypertension morbidity and mortality.

5.2: CONCLUSION

The study found majority of women were aware and knowledgeable about hypertension risk factors and some disease risk such as stroke and heart attack than heart failure and kidney disease. Education also influenced some risk factors than age and ethnicity. Better communication between females and physicians are needed to provide health information concerning hypertension. Continuous education interventions amount public and healthcare providers is needed to address the knowledge and awareness of the basic underlining aspects of the condition, the risk factors that increases likelihood of the diseases, and measures to prevent or control hypertension in women in Trinidad. The alternative hypothesis supports the relationship of knowledge and awareness of hypertension on lifestyle modification.

6.0: REFERENCES

1. Alexander, Mark, Nancy P. Gordon, Catherine C. Davis, et al. 2003. Patient Knowledge and Awareness of Hypertension Is Suboptimal: Results From a Large Health Maintenance Organization. *The Journal of Clinical Hypertension*. 5:254–260.
2. America Heart Association. High Blood Pressure, Factors that contribute to. <http://www.americanheart.org/presenter.jhtml?identifier=4650> (accessed October 17, 2010).
3. American Heart Association. High Blood Pressure and Women. http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/UnderstandYourRiskforHighBloodPressure/High-Blood-Pressure-and-Women_UCM_301867_Article.jsp (accessed September 20, 2010).
4. Ashraf M. S., and W. Vongpatansin. 2006. Estrogen and hypertension. *Pubmed*. 8 (5): 368-76.
5. Caribbean Epidemiology Centre (carec/paho/who).2007. Data for action: *Unite to stop the Chronic Non communicable disease epidemic in the Caribbean region*. http://new.paho.org/carec/dmdocuments/NCD_Mortality_data_2000_and_2004.pdf (accessed September 30, 2010).
6. Caribbean Health Research Council. 2006. *Managing Diabetes in Primary Care in the Caribbean*. <http://www.chrc-caribbean.org/files/Guidelines/Diabetes%20Guidelines.pdf> (accessed September 16, 2010).
7. Caribbean Health Research Council. 2007. *Managing hypertension in primary care in the Caribbean*. <http://www.chrc-caribbean.org/files/guidelines/HypertensionGuidelines.pdf> (accessed September 16, 2010).
8. Chobanian, V. Aram, George L. Bakris, Henry R. Black, et al. 2003. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Journal of the American Heart Association*. *Hypertension*. 42: 1206-1252.
9. Coleman, Ellen. 2010. Stalking the “Silent killer”. Nutrition Dimension, Inc. http://www.rd411.com/ce_modules/stalking_the_silent_killer.pdf (accessed October 28, 2010).
10. Cooper, Richard, Charles Rotimi, Susan Ataman, et al.1997 The prevalence of hypertension in seven populations of West African origin. *American Journal of Public Health*. 87:160-168.
11. Cutler, Jeffrey A., Paul D. Sorlie, Michael Wolz, et al. 2008. Trends in Hypertension Prevalence, Awareness, Treatment, and Control Rates in United States Adults between 1988–1994 and 1999–2004. *Hypertension*. 52:818-827.

12. Grell, G.A.C. 1987. Guidelines for regional hypertension control in the Caribbean as part of a chronic disease policy. The University of the West Indies (Mona, Kingston, Jamaica). Department of medicine. *Cajanus*. 20 (3): 127-137.
13. Hagley, K. 1990. An overview of the problem. Pan American Health Organisation (Barbados). Office of the Caribbean Programme Coordination. *Cajanus*. 23 (1): 8-13.
14. Healthy Caribbean Coalition. 2007. Regional Summit on Chronic Non- Communicable Diseases. Trinidad and Tobago: Healthy Caribbean Coalition.
http://healthycaribbean.org/fact_sheets/fact_sheet_1.html (accessed November 1, 2010).
15. Hypertension and the African – Caribbean Community: Guidance for health professionals. 1998. Health Education Authority.
http://www.nice.org.uk/nicemedia/documents/hypertension_africarib.pdf (accessed September 16, 2010).
16. Ike, S.O., P.N. Aniebue, U.U. Aniebue, 2010. Knowledge, perceptions and practices of lifestyle-modification measures among adult hypertensive’s in Nigeria. *Royal Society of Tropical Medicine and Hygiene*. 104 (1): 55-60.
17. Keyhani, Salomeh, Janice V. Scobie, Paul L. Hebert, Mary Ann McLaughlin. 2008. Gender Disparities in Blood Pressure Control and Cardiovascular Care in a National Sample of Ambulatory Care Visits. *Hypertension*. 51:1149-1155.
18. London. 1998. Health Education Authority. Hypertension and the African- Caribbean Community: Guidelines for health professionals.
http://www.nice.org.uk/nicemedia/documents/hypertension_africarib.pdf (accessed September 16, 2010).
19. Mahan, L. Kathleen, and Sylvia Escott- Stump. 2008. *Krause’s food Nutrition Therapy*. 12th ed. St Louis, Missouri: Saunders Elsevier.
20. Mosca, Lori, Anjanette Ferris, Rosalind Fabunmi, et al. 2004. Tracking women’s awareness of heart disease. An American Heart Association National Study. *Circulation*. 109: 573-579.
21. Mosca, Lori, Wanda K. Jones, Kathleen B. King, et al. 2000. Awareness, perception, and knowledge of heart disease risk and prevention among women in the United States. *Arch Fam Med*. 9: 506-515.
22. Nelms, Marcia, Kathryn Sucher, and Sara Long. 2007. *Nutrition Therapy and Pathophysiology*. International edition. United States: Thomson Wadsworth.

23. Oliveria, Susan A., Roland S. Chen, Bruce D. Mc Carthy, et al. 2009. Hypertension knowledge, awareness, and attitude in a hypertensive population. *J Gen Intern Med.* 20: 219-225.
24. Pan American Health Organization. 2001. *Women and chronic disease in Latin America.* <http://www.paho.org/English/DD/PUB/SP541-82-89.pdf> (accessed October 5, 2010).
25. Petrell, Robert J., Mark Speechley, Peter W. Kleinstiver, et al. 2005. Impact of social marketing media campaign on public awareness of hypertension. *American Journal of Hypertension.* 18: 270-275.
26. Pramparo, Palmira, Auris Flores de Finizola, Bartolomé Finizola et al. (2010). Women and Cardiovascular Diseases in Latin America and the Caribbean. <http://www.fac.org.ar/scvc/llave/PDF/prampai.PDF> (accessed November 13, 2010).
27. Trinidad and Tobago. 2007. Working document for Summit of CARICOM Heads of Government on Chronic Non- Communicable Diseases. Caribbean Community (CARICOM) Secretariat. <http://www.caricom.org/jsp/community/chronic.pdf>.
28. Trinidad and Tobago. 2010. Ministry of Health Annual Statistical Report for 2004-2005. <http://www.health.gov.tt/sitepages/default.aspx?id=122> (accessed November 1, 2010)
29. Wexler, Randy, Glen Aukerman. 2006. Non pharmacologic strategies for managing hypertension. *Am Fam Physician.* 73:1953-6, 1957-8.

7.0: APPENDICES

Appendix A: Questionnaire

No _____

High Blood Pressure Awareness, Knowledge and Practices among Women

AWARENESS

1. Which gender is the most affected by high blood pressure? Males Females
2. Identify the greatest health problem in the Caribbean?
Breast cancer Cancer (general) Heart disease High blood pressure
Stress HIV/AIDS Obesity/ overweight Smoking Others Don't know
3. What is the greatest health problem facing woman?
Breast cancer Cancer (general) heart disease Stress HIV/AIDS
Obesity/ overweight Smoking others don't know high blood pressure
4. Are you aware of any public health information concerning high blood pressure?
Yes No
5. Are you aware of the target for normal blood pressure? Yes No
6. Have you ever been told of risk factors for high blood pressure? Yes No
7. Are you aware of dietary and life style changes to control high blood pressure?
Yes No Don't know
8. Would lowering your high blood pressure even a bit improve a person's health?
Yes No Somewhat Don't Know

KNOWLEDGE

9. What does the term hypertension mean to you?
High level stress Tension High blood pressure Nervous condition
High blood sugar Over activity I don't know
10. Does high blood pressure have symptoms? Yes No I don't know
11. Where do you receive information about high blood pressure?
Physicians Dietitian Nurses Media (TV, radio, internet)
Printed media (newspaper, magazine etc) Other _____

12. Are you comfortable talking to health care provider about prevention and treatment options of high blood pressure? Yes No Sometimes No response

13. How dangerous is high blood pressure to your health? Extremely Somewhat
Not at all Don't know

14. What are the normal blood pressure levels?

Top number: less than 120 greater than 120 120 Don't know

Bottom number: less than 80 more than 80 80 Don't know

15. Can high blood pressure lead to heart diseases? Yes No Don't know

16. Is high blood pressure a major contributor to heart disease? Yes No Don't know

17. Identify which TWO factors are the most important to you in controlling blood pressure?

Taking medications Exercising Less stress Quit smoking Reduce fat intake

Reducing salt/ sodium intake Reducing alcohol Losing weight

Others Don't know

18. Are you well informed about high blood pressure? Not at all Moderately informed

Very well informed Well informed Don't know

Risk Factors

19. Identify which is risk factor/s for high blood pressure?

Excessive alcohol intake Physical inactivity/ inadequate exercise Age (increasing age)

High sodium/ salt intake Obesity/ excess body weight Smoking

Diabetes mellitus Family history of high blood pressure Low potassium intake

High cholesterol/ fat diet Genetic factors Stress Don't know

20. Which of these do you think high blood pressure increases the risk for developing?

Stroke Heart failure Kidney disease Heart attack Don't know

HISTORY AND LIFESTYLE MODIFICATION

21. Do you have family history of high blood pressure? Yes No Don't know

22. Do you have personal history of high blood pressure? Yes No Don't know

23. Do you think that changes in life style and dietary practices will help to reduce your blood pressure? Yes No Don't know

24. Are engage in any lifestyle and dietary practices for high blood pressure? Yes No
Sometimes (*If sometimes, also tick for question 22*)

25. If your answer is yes to question 22, please tick which apply to you.

- Stop smoking Do not smoke
- Non / Limited alcohol consumption (Women no more than one alcoholic drink per day)
Reduce fat and fatty food regularly
- Reduce salt / sodium intake
- Engage in physical activity or exercise
- Weight loss /maintain a health body weight (i.e., body mass index less than 25 kg per m2).
- Consume diet rich in potassium
- Consume diet rich in calcium and magnesium
- Increase fruit and vegetables intake
- Try to reduce Stress

DEMOGRAPHICS

26. Age: 25-34 35-44 45-64 65 and over

27. Education level completed: Primary Secondary Tertiary
Others _____

28. Employment status: Employed Unemployed Retired Student

29. Ethnicity :

Afro Trinidadian Caucasian
Indo Trinidadian Chinese
Mixed Others (please specify) _____

30. Marital Status: Single Married or living together Separated/ Divorced
Widow Others

Appendix B :

STRATEGIES FOR MANAGEMENT OF HYPERTENSION	
Sodium reduction	Reducing intake of dietary sodium. Limit use of salt to less than 2.4 gms of sodium (6 gms salt) per day. No addition salt in cooking or table use; avoid canned foods, salted meats, etc. This is particularly relevant in the Caribbean where the diets are frequently rich in salt.
Reduce excessive dietary fat (Especially saturated and trans fatty acids)	No more than 30% of calories. Saturated fat should not exceed 10% of total calories.
Fibre	Ensure intake of fibre of at least 30-40 gm/day. 7-8 servings per day.
Ensure intake of potassium	Between 70-80 mmol/l daily. Good selection of fruits and vegetables than contain potassium, i.e. bananas, tomatoes, and oranges as well a coconut water.
Fruits and vegetables	Four to five serving each day

STRATEGIES FOR MANAGEMENT OF HYPERTENSION	
Physical exercise	Untaken for 30-60 minutes at least five times each week, but preferably daily. Patient with prehypertension and hypertension exercise for 30mins on most days of the week.
Weight management	Attain and maintenance of desirable body weight i.e. <25 or at least a significant reduction, if overweight or obese.
Reduction of alcohol intake	Alcohol should not exceed 2 drinks /day for men and 1 drink/ day for women. (one drink equal 1oz spirits, or 1 bottle of beer or 1 glass of wine)
Cessation of tobacco use	Should be part of a comprehensive lifestyle modification plan to reduce the risk of high blood pressure and cardiovascular disease
Reduce stress	Psychosocial stress is often implicated but difficult to measure.

Note: Non pharmacological strategies for management of hypertension by the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of high blood pressure and Caribbean Health Research Council. 2007. *Managing hypertension in primary care in the Caribbean.*

**Appendix B1: CLASSIFICATION OF BLOOD PRESSURE FOR ADULTS
AGED 18 YEARS AND OLDER**

Hypertension Classification	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
Stage 1	Cut-off points of 140 (systolic) mmHg	90 (diastolic) mmHg
Stage 2	160-179 (systolic) mmHg	100-109 (diastolic) mmHg
Stage 3	≥180 (systolic) mmHg	≥110 (diastolic) mmHg

Source: Seventh Reports of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (USA).

Appendix B 2 : DASH EATING PATTERN

Eating Patterns	DASH
Grains	6-8 servings/day
Vegetables	4-5 servings/day
Fruits	4-5 servings/day
Low-fat or fat-free dairy products	2-3 servings/day
Meats, poultry, fish	6 or less servings/day
Nuts, seeds, dry beans and peas	4-5 servings/day
Fats and oils	2-3 servings/day
Sweets	5 or less/week

Mahan, L. Kathleen, Sylvia Escott- Stump. 2008. Krause's food Nutrition Therapy. 12th ed. St Louis, Missouri: Saunders Elsevier.

APPENDIX C : ADDITIONAL TABLES

C 1 : Lifestyle and Dietary Practices by Personal history of Hypertension given by Respondents

LIFESTYLE AND DIETARY HABITS OF HYPERTENSIVE AND NON-HYPERTENSIVE WOMEN				
Lifestyle and/or Dietary Habit	Hypertensive (n= 30)	Non- hypertensive (n=85)	Status Unknown (n=3)	P- values
Stop smoking	13	2	0	0.45
Don't smoke	30	29	100	
No / limited alcohol consumption	20	12	33	0.479
Reduce fat / fatty foods regularly	47	27	33	0.180
Watch salt/ sodium intake	67	29	33	0.005
Engage in physical activity/ exercise	57	32	33	0.068
Weight management - Weight loss/maintain a health body weight	30	21	0	0.474
Consume a diet rich in potassium	13	2	0	0.116
Consume a diet rich in calcium and magnesium	20	4	0	0.028
Increase fruits and vegetable intake	47	28	0	0.160
Try to avoid stress	47	32	33	0.352

All values are given as percentage of respondents within category.

Two (1.7 %) respondents reported no response to personal history.

Appendix C 2: Lifestyle and Dietary Practices for Prevention or Treatment of Hypertension by Source of Information given by Respondents

Life style and Dietary Practices	Physician /Doctor (n=67)	Dietitian (n=11)	Nurses (n=32)	Media (TV, radio, internet) (n=46)	Printed Media (newspaper, magazine etc) (n=23)	Others (n=11)
Stop smoking	6	9	9	4	0	0
Don't smoke	31	36	31	32	22	55
P- value	0.860	0.727	0.410	0.534	0.191	0.200
No / limited alcohol consumption	16	36	13	13	17	27
P- value	0.427	0.027	0.752	0.781	0.622	0.191
Reduce fat / fatty foods regularly	33	55	44	30	26	36
P- value	0.757	0.087	0.086	0.819	0.522	0.725
Watch salt/ sodium intake	43	55	47	33	30	46
P- value	0.299	0.273	0.297	0.246	0.340	0.654
Engage in physical activity/ exercise	40	55	47	37	30	27
P- value	0.476	0.220	0.201	0.923	0.436	0.462
Weight management- loss weight / maintain a healthy body weight	19	36	38	33	17	0
P- values	0.361	0.248	0.018	0.037	0.514	0.061
Consume a diet rich in potassium	8	18	13	7	9	9
P- value	0.164	0.035	0.023	0.546	0.366	0.514
Consume a diet rich in calcium and magnesium	9	9	9	9	4	0
P- value	0.496	0.834	0.638	0.695	0.523	0.322
Increase fruits and vegetable intake	36	55	38	33	22	36
P- value	0.383	0.101	0.481	0.984	0.220	0.774
Try to reduce/avoid stress	39	64	47	30	30	46
P- value	0.346	0.037	0.100	0.408	0.610	0.446

All values are given in percentages of all respondents within category and significant P- value < 0.05.