

Institute for Christian Teaching
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**NUTRITION, HEALTH AND FAITH:
INCIDENTS OF HYPERTENSION AMONG
SEVENTH-DAY ADVENTISTS IN FOUR DIET GROUPS –
EVIDENCE FROM SOUTH-WESTERN NIGERIA**

by

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INTRODUCTION

Background:

Global epidemiological studies have generally found a progressive increase in the prevalence of high blood pressure (hypertension) with increase in total body fat. In the same vein, hypertension is the most common treatable risk factor for cardiovascular diseases (*CVD*).¹ It has however become an important public health challenge notably in black population worldwide compared to whites.² This has led to speculations that African-origin populations are particularly susceptible to this condition.³ It accounts for many premature deaths⁴ from *CVD*, and related complications can affect vital organs especially the brain, eyes, heart and kidneys.⁵⁻⁸

Considering that many developing countries are still contending with infectious diseases and malnutrition problems,⁹ the emergence of non-communicable diseases such as cardiovascular diseases,² and various types of cancer, contributes to an even greater morbidity and mortality.¹⁰

Statistically, high blood pressure is responsible for 12.4 million deaths annually, most of which (9.6million or 77.4%) occur in developing countries.⁶ The prevalence of hypertension in Nigeria, the largest black nation on earth, ranges from 8-10% in the rural area to 10-12% in the urban population baseline of 160/95mmhg.^{2,11,12} Lifestyle factors have been reported to play a major role in the development of hypertension.^{2,13,14} Rapid movement to urban areas, as a result of improved socio-economic and political changes² has led to increased consumption of processed westernized diet which has increased the risk of cardiovascular diseases.¹⁵

Body mass index (BMI) is often used to reflect total body fat amount (general obesity), whereas waist circumference (WC), waist-to-hip ratio (WHR) or waist-to height ratio (WHtR) is used as a surrogate of body fat centralization (central obesity).⁵⁵ Obesity, one of the known risk factors for hypertension^{17,18} usually defined *BMI* of ≥ 30 kg/m² has received a lot of research attention.

Obesity, a diet-related factor can be responsible for substantial morbidity and early mortality. Relatively low body weight has also been associated with increased mortality.²¹ Relationship between obesity and hypertension among black Africans is not completely understood because of paucity of data.

Studies have shown a lot of differences in *BMI* and nutrient intakes between meat-eaters and vegetarians.²² Findings have also severally focused on *BMI* and other anthropometric variables and socio-economic factors on high blood pressure among Nigerian¹⁷⁻¹⁹ and other black African populations.²⁰

In Nigeria, 3% of the population dies of hypertension every year and about 7% are at risk.²⁴ Hypertension is a disease most commonly found among middle-aged and elderly Nigerians.^{25, 26}

There is evidence to demonstrate that many hypertensive individuals in Nigeria are blissfully ignorant of the occurrence of this disease and very few are knowledgeable of associated risks or needed therapy to minimize such risks. Even when detected, less than half of victims have access to proper treatment to control the silent killer disease.¹

Several studies on dietary habits have implicated food consumption patterns in the occurrence of cardiovascular disease²³ and other associated risk factors.^{23,20,50} This has also been confirmed by the writings of the 19th century health and spiritual educator, Ellen G White.³¹

Eden Nutritional Heritage:

Since no human exists on earth without an acquired philosophical worldview, it suffices to state *à priori* that the biblical philosophy of world origins is at the base of this presentation. This worldview is also very explicit on God's nutritional provision for the ideal sustenance of human life on earth. In Eden, the Genesis account besides its specificity on the Author, content, order, purpose, and perfection of creation, also clearly identified the operating system, and maintenance diet provided by God⁴⁵

Although there was no thought or talk of a non-wholesome meat-based diet at creation, it was still stated in Genesis 1:31 that "God saw everything that He had made, and indeed it was very good." In the beginning, life on earth was simply divided into three: fish of the sea, birds of the air and beasts of the field and every creeping thing (Gen 1:26). Even up to the preparation for the flood, the Edenic diet was still preserved for all creatures in the Ark (Gen 6:21). But just before the very idea of a flesh-based diet was first introduced immediately after the flood when the freshly plucked olive leaf (Gen 8:7) signified the renaissance of all vegetation, a sort of pre-emptive "disclaimer" exclusive restriction was

introduced by the Maker: *“But you shall not eat flesh with its life, that is its blood.”* (Gen 9:4). One other curious distortion of the hitherto perfect harmony of relationship at creation between humans and animals on this occasion was the introduction of the “fear” element, especially at the presentation of a generic comprehensive nutritional package which included all flesh food (Genesis 9:2-3)

This was the occasion of God’s first “covenant” with His animate creation which included both humans and animals that made it out of the Ark – a covenant for life (Genesis 9:9,10). It is significant that even as God was accepting the worship in sacrificial offering brought by Noah for surviving the flood, God did not miss to commend the sweet aroma of food preparation while guaranteeing the continuation of the food production cycle of planting and harvesting.

By the time of the second covenant with man, notably God’s Alliance with Israel as a chosen people to preserve a “true knowledge” of the “true God” in an increasingly ungodly society, the food provided to Israel in the desert between Egypt and Canaan was Manna (the bread of heaven), not meat. It was not until the Israelites rejected the heavenly diet in preference to the twisted taste buds of Egyptian fleshpots that God now provided meat and so much that its inherent dangers were highlighted by its immediate abundant harvest of death (Number 11:31-33). The remarkable reality should not be missed out that the flesh food allowed Israelites as a chosen people all the more stringent with a further restriction to the “clean” as opposed to the “unclean” meats. The Bible clearly teaches that He brought the Israelites out of Egypt and undertook their training, that they might be a people for His own possession. Through them He desired to bless and teach the world. The use of flesh for food brought disease and death to millions. Yet, the restriction to a non flesh diet was never heartily accepted. It continued to be the cause of discontent and murmuring, open or secret, and it was not made permanent. Departing from divinely planned appointed diet, the Israelites suffered great loss. They desired a flesh diet, and they reaped its results. They did not reach God’s ideal of health and character nor did they fulfill His purpose. The Lord "gave them their request but sent leanness into their soul." They valued the earthly above the spiritual, and the sacred pre-eminence which was His purpose for them they did not attain.³¹

NUTRITION, HEALTH and FAITH NEXUS (connection)

"God's original plan for man's health is based on the consumption of diet rich in raw fruits and vegetables. Mankind has strayed far from that original diet handed down in Eden. The price paid for modern diet and lifestyle is a general health care problem (premature death) that cannot be compared with the time of the creation. When God created man, He placed him in the garden and told him his diet was to consist of raw fruits and vegetables. On this diet, man lived an average of 912 years without sickness! After the flood, meat and cooked food were added to man's diet. As a result, different type of sicknesses came in and human life span decline from an average of 912 years to 100 years. There are, although, other factors that could contribute to this sharp decline but it is accepted that fleshy diets were never God's ideal diet for His children. Fleshy foods are harmful to the body and responsible for most health and physical problems."⁴⁴

In most parts of sub-Saharan Africa, as economic status improved, and urbanization sets in, the diet of the people becomes changed from diet rich in fresh fruits vegetables to highly processed food, physical activity decreases, life expectancy drops and there was an increase in the incidence of cardiovascular diseases and other modern diseases.^{16,49} Because of lack of information and education on the connection between proper nutrition, health and lifestyle factors, we have begun to suffer the same diseases of the Israelites.

The relevance of the covenant of Israel with God to nutrition, health and longevity is that very often, God parallels obedience in worship and faithfulness with appetite and blessings. There certainly was nothing physically poisonous or nutritionally wrong in the Tree of the Knowledge of Good and Evil when God forbade its consumption because everything that God made was "very good". And yet, it transformed humanity and indeed the entire creation into predicted morbidity and mortality. Its "wrongness" was not therefore tied to our knowledge of nutrition but to His word by which we creatures must live because He the "Designer" knows better. Jeremiah 11:29 declares that He "knows" what good plans He has for each of His creatures. Everything depends on it, even life expectancy on the long run.

Dietary patterns, a reflection of the complexity of food preference, lifestyle and socio-economic status play a major role in health and longevity. Understanding dietary patterns and their correlates is important to the research of diet, health and longevity relationship. Humans generally adapt to the environment that their ancestors survived in and that consequently conditioned their genetic makeup. There is a profound environmental change especially in diet and other lifestyle conditions that began with drift from rural to urban environment and from simple local African diet to the sophisticated, highly processed diet of the developed countries.

Results of several national and international studies on the variation of risk factors in the etiology of cardiovascular diseases (*CVD*) have prompted more research work to be carried out. The report from the Shanghai Men's health study posited that dietary patterns appeared to be associated with the presence of health conditions. The food consumption patterns and risk factors for cardiovascular diseases study among the Dutch population confirms that, food consumption patterns were independently associated with blood pressure and increase in cholesterol concentrations. The study, on the prevalence and correlates of hypertension in a Theological college in Umuahia, Nigeria came out with findings that the prevalence of hypertension in the college is higher than that of the general Nigeria population which precludes the need for nutrition and health education especially with regards to regularity of blood pressure check and lifestyle modification⁵⁷.

Little or no attention has been directed to explore the risk factors associated with cardiovascular diseases and the potential differences in hypertension prevalence among the faith-based diet groups of Seventh-day Adventist in South-Western Nigeria. It is against this backdrop that this study has set out to determine the impact on the health of a population, of a faith-based nutritional lifestyle through a study of the prevalence of hypertension, a major cause of morbidity and mortality, in relation to anthropometric measurements (BMI and upper-body adiposity-WC, WHR, and WHtR) and socio-demographic factors among Seventh-day Adventists in South-Western Nigeria.

METHODOLOGY

The target population was Seventh-day Adventists in Southwestern Nigeria. Sample size of 397 adults mean (\bar{x}) age (years) 34.11 consisting of 108 men Mean \pm SD (39.99 \pm 14.31), 289 women Mean \pm SD (31.92 \pm 11.83). Their food intake over the previous year was collected using the food frequency questions (FFQ) section of the structured lifestyle questionnaire. The responses to the questions were used to classify the population into 4-diet groups, Red meat eaters (*RME*), White meat eaters (eat fish and chicken) (*WME*), Lacto-ovo-vegetarians (consume, milk and products and eggs) (*L-O-V*) and Vegans (exclude all animal flesh and products but eat only plant based diet) (*V*). The participants were also asked to state their age, gender, and marital status, level of education, socio-economic conditions, and exercise level. Anthropometric measurements, reasons for choosing a particular dietary habits, physical activity levels, high blood pressure status awareness and actual blood pressure status were obtained. Diagnosis of hypertension was based on blood pressure of $\geq 140/90$ mmHg. Data were coded and subjected to descriptive statistics and correlation using SPSS 11.0.

RESEARCH FINDINGS

Sample size of 397 adults mean (\bar{x}) age (years) 34.11 consisting of 108 men Mean \pm SD (39.99 \pm 14.31), 289 women Mean \pm SD (31.92 \pm 11.83). (Table 1) The higher ratio of women in the sample, as shown in table 1 is as a result of the occurrence of more women in the target population. Furthermore this findings shows that women have higher reception for nutrition and health programs in the study area.

The BMI is much lower in the Vegans followed by the Lacto-Ovo-Vegetarian and higher in the White Meat Eaters and Red Meat Eaters but not much difference was observed with the other anthropometric measurements. (Table 2)

Table 1 Demographic characteristics

Characteristics	Men	Women
Number of subjects	108	289
Number of hypertensive (%)	14 (12.96)	25 (8.65)
Age (yr)	39.99 \pm 14.31	31.92 \pm 11.83
Sample size=397; mean age (in years) = 34.11		

Source: Field survey, 2006

Table 2 Anthropometric characteristics and blood pressure values obtained for the diet groups

	Red Meat Eater N=253 Mean±SD	White Eater N=84 Mean±SD	MeatVegetarian (Lacto-Ovo) N=46 Mean±SD	Vegan N=14 Mean±SD
BMI	24.77±4.57	24.48±4.30	22.92±3.61	21.19±4.71
Systolic Blood Pressure	114.12±4.71	115.01±15.18	115.37±17.32	107.62±17.09
Diastolic Blood Pressure	72.08±11.13	73.86±2.9	74.72±13.72	73.46±14.91
Waist Circumference*	80.88±11.59	81.04±10.77	79.50±10.15	81.77±12.79
Hip Circumference	96.06±10.52	96.0±9.44	94.04±9.28	97.77±12.22
Waist Hip Ratio	0.84±0.06	0.84±0.06	0.85±0.07	0.84±0.06
Waist Height Ratio	0.50±0.09	0.49±0.10	0.49±0.07	0.50±0.08

*Cut-off value for waist circumference was 102cm for males and 88 for females

** Cut-off value for waist-hip ratio was 1.00

*** Cut-off value for waist-height ratio was 0.55

Source: Field survey, 2006

Rationale for Dietary Patterns:

Economic status which determines ability to pay for a chosen basket of food items (a function of income level and percentage of income spent on food) and health reasons ranks highest for the choice of dietary habits among the study group. (Table3) Approximately 60%, 43%, 35% and 33% of *RME*, *WME*, *Vegan* and *L-O-V* respectively chose to belong to these diet groups based on economic reasons, while 46%, 34%, 29%, and 23% of *L-O-V*, *WME*, Vegans and *RME* respectively chose their dietary habits based on health reasons. The result further shows that 29%, 10%, 9% and 7% of vegans, *L-O-V*, *RME* and *WME* respectively chose their dietary habit based on religious reasons. Economic reasons among others rank highest for choice of dietary habit which means that the level of disposable income plays a significant role in the choice of food consumed among the study groups. This result indicates a high vulnerability to nutritional transition among respondents based on how much is earned and not necessarily the

quality of food consumed. The situation is especially highest among *RME* and least among *L-O-V*.

However, result shows that more *L-O-V* (41.7%) gave health reasons for their choice and considerable number of vegans chose their dietary habits based on religious and health reasons.

Table 3 Criteria for dietary patterns by diet group

	RME (N=253)	WME (N=84)	L.O.V (N=46)	Vegan (N=14)
Religious practices	22(8.71)	6(7.1)	5(10.8)	4(28.6)
Health reasons	58(22.91)	29(34.4)	21(45.7)	4(28.6)
Economic reasons	151(59.68)	36(42.8)	15(32.7)	5(35.7)
Cultural and social practices	22(8.71)	13(15.7)	5(10.8)	1(7.1)

Source: Field survey, 2006

Blood Pressure status awareness

The awareness of blood pressure status among the respondents is generally poor; many were not aware whether or not they are hypertensive (Table 4). This posed major limitations to this study. However, when assessed across the diet groups, *L-O-V* have highest awareness (15%) and vegans are the least aware (7%) of BP status. This result explains why most of the respondents who chose *L-O-V* do so for health reasons. The poor awareness of blood pressure status among the non-meat- eaters (especially vegans) is an indication of respondents' nonchalant or poor knowledge of the nutrition and health implications of their dietary habit. This again strengthens high vulnerability to nutritional transition.

Table 4 Blood pressure status awareness by diet group

HBP Awareness n (%)	RME (N=253)	WME (N=84)	L.O.V (N=46)	Vegan (N=14)
Yes	29(11.5)	7(8.3)	7(15.2)	1(7.1)
No	224(88.5)	77(91.7)	39(84.8)	13(92.9)

Source: Field survey, 2006

Food intake by diet group

Analysis across the diet groups (using the high consumption values) show that wholesome bread, cereal and grains are consumed more by vegans and least by *RME* ;

animal milk and products are consumed more by *L-O-V* and least by *RME*. The consumption value for milk and products by the vegans is (0%) their consumption of vegetables and fruits is the highest and least by *RME*. Nut consumption was included in these analyses because of previously published evidence showing positive associations between nut consumption and deaths due to cardiovascular disease.⁵⁴ Vegans have the highest consumption of nuts and seeds while the *RME* consumes the lowest. However the quantity of meat consumed by the meat eaters is relatively low as compared with those of the America and Europe. This is adduced to the poverty level among the respondents.

DISCUSSION OF FINDINGS

Blood pressure is directly and causally associated with body mass index (*BMI*) in populations worldwide. However, the relationship across *BMI* in populations of African origin may vary.⁴³ In this study there is no significant correlation between the anthropometric measurements and blood pressure in the vegans. That means they are not at much risk for cardiovascular diseases as their *RME* counterparts. However there is significant ($P < 0.05$) correlation with the rest of the group (*RME*, *WME* and *L-O-V*), meaning they are at risk for *CVD*. That the non-vegans are much more prone to the risk factors of *CVD* lend credence to the need to promote return to the original diet of grains, fruits, nuts and vegetables chosen for us originally by our Creator.⁴⁴

That the lacto-ovo vegetarians in this study are prone to these risk factors also is a pointer to the peculiarity of African dietary habits and culinary practices. Major protein sources available to this group (eggs and dairy products) have high saturated fat content.

All the anthropometric measurements are based on *WHO* criteria but this varies from one population group to the other population e.g. Finland, Singapore, Australia, Europe and India. Each of this country carried out their own study and then formulates their own cut-off for the indices. The *WHO* indices for anthropometric measurement used for Nigeria population may not be adequate and appropriate to predict cardiovascular risk. Therefore there is need for an African study to determine anthropometric indices.

Vegans comprise only a small population in this study. This observation is similar to what is obtained around the world.^{21,53}

In general, this study revealed high blood pressure in male than female. The difference SBP and DBP are 1.42 ± 1.67 kg and 2.17 ± 2.95 in male and female. This appears to reflect the high level of adipose tissues seen in males as compared with the females.

Among the various diet groups only the vegans had the lowest *BMI* but there is not much difference with other anthropometric measurements. The differences in macronutrient intake by vegans and L-O-V may account for about half the difference in mean *BMI* between the diet groups. High protein and low fiber intake among the meat eaters were the most likely factors responsible for the strong association with increased *BMI*.²¹

The study shows that nutrition and health awareness programs and religious participation plays a major role in the choice of diet. This is consistent with Ellen G White writings that emphasize incorporation of faith and beliefs in our nutrition and health education curriculum at all levels of educational institutions also in the awareness programs in all the churches where healthy living practices can be thought for prevention and reduction of occurrence of chronic diseases, hence longevity promoted.

More epidemiological studies should be carried out among Africans to assess the magnitude of hypertension prevalence in various populations, especially among the Seventh-day Adventists in South-Western Nigeria populations where there is dearth of knowledge and data.

CONCLUSION ON RESEARCH FINDINGS

This study has clearly demonstrated the direct connection between diets, health and faith. It shows that all the *CVD* risk factors are relatively low among the diet groups and especially in the vegetarians when compared with the general Nigeria population. Lifestyle factors, food consumption patterns and socioeconomic status could be used to explain the differences observed and which played a major role in the development of hypertension.^{2,13,14} Also shows that a higher relationship incidence exists between anthropometric measurements and blood pressure levels in meat eaters (especially female) than non-meat eaters, thus, prevalence of hypertension varies with dietary patterns as reported elsewhere.¹⁷ Non-meat eaters, especially the vegans, have a lower prevalence of hypertension and lower systolic blood pressure than meat eaters (*RME* and *WME*). This may be largely due to low *BMI*. The results supported the hypotheses that *BMI* is a strong risk factor for hypertension in this population. It was also observed that

the consumption of diet rich in wholesome grains, fruits and vegetables is capable of reducing blood pressure the major risk for *CVD*.²²

Studies, have shown that reduction of salt intake and embracing the Dietary Approach to Stop Hypertension (*DASH*)²² (diet rich in vegetables, fruits and the use of low-fat dairy foods) and use of Mediterranean diets²⁹ is effective in lowering blood pressure in both normotensive and hypertensive individuals. Several studies have confirmed that the use of these diets lower the blood pressure in the vegetarians than the non-vegetarians. Lifestyle factors played a major role in the development of hypertension not only blood pressure but also hemorheological,³⁸ lipid profile^{39,40} and haemostatic³⁹ cardiovascular risk factors. The low blood pressure observed in this study may be due to increase consumption of Nigerian local fruits and vegetables which is rich in dietary fiber, potassium, magnesium and low in sodium and also confirmed to have anti-hypertensive and hypocholesterolemic effects.^{40,41}

APPLICATION OF FAITH TO LEARNING:

Findings from this study further reinvigorate the need for a holistic research approach into dietary practices and its associated health implications.

The fact of the harmful effect of a flesh diet on the human body not being immediately evident is no evidence of its positive value to human health. It is very difficult to convince people that their meat diet is largely responsible for their blood poisoning and resultant suffering. The death of many people is actually wholly traceable to meat diet-related diseases, even though the victims and others may be ignorant of the real causes.^{28,31,32}

Educative preventive program and dissemination of information on the burden of this disease is very essential especially as we approach the second coming of Christ. There is an urgent need to develop effective strategies for detection, treatment, systemic prevention and control of some of the modifiable risk factors such as hypertension, dietary patterns, and lifestyle factors responsible for cardiovascular diseases.⁷ This can be achieved through public health education in developing countries such as the current study areas.^{24,29,30,42}

The promotion of healthy diet and lifestyle is a function of faith which promotes God's ideals for man dating back to Eden.^{45, 52} In all cases educate the conscience, enlist the will, supply good, wholesome food, and the change will be readily made, and the demand for flesh will soon cease.⁴³

The spiritual dimension of diet is that Scripture defines the human body as Christ's purchased possession, which forecloses our liberty to do with it as we please. All who understand the laws of nutrition and health should realize their obligation to obey these laws (operational system) which God has established in their being. Obedience to the laws of nutrition and health is to be made a matter of personal duty. We ourselves must suffer the results of violated law. We must individually answer to God for our habits and practices. Therefore the question with us is not, "What is the world's practice?" but, "How shall I as an individual treat the habitation that God has given me?"^{46, 47}

The scripture or science does not make a conclusive declaration that everyone should exclude all animal products. Vegan diet is a very good and an acceptable choice, however, a properly planned plant based diet which includes some animal products (milk, cheese, eggs) is equally adequate. It is advisable to choose organically produced foods.

The restoration should start from now not until we get to heaven. It is only when we are in good health that we can better serve Him and has strength to withstand the fiery trials and temptations of earth's last days.⁵⁶

God has provided eight natural remedies to help us start and keep the restoration process to good health going before His appearing in the form of the acronym, **NEWSTART**.
Nutrition; Exercise; Water; Sunshine; Temperance; Air; Rest; Trust in God.

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