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Risk Factors for Hypertension among a Church-based, Black Population in London

Maxine A Newell, Naomi N Modeste, Helen Hopp Marshak, Colwick Wilson, Sherma J. Charlemagne-Badal

Abstract

Compared to other ethnic groups, there is an increased prevalence of hypertension, and subsequent morbidity and mortality, among people of African descent residing in the United Kingdom. We studied a group of people of African descent living in London to examine the impact of their lifestyle on hypertension. A cross-sectional study, using a convenience sample of individuals aged 25-79 from 17 predominantly Black Seventh-day Adventist churches across London. Linear regressions were run between the main variables of RR score for hypertension and blood pressure levels. Hypertension was more prevalent among males (34%) than females (21.6%). Relative Risk Estimates for hypertension were predictive of diastolic blood pressure ($p<.05$). The blood pressure levels among the participants in this study were lower than Caribbean-born Blacks but higher than African-born Blacks in the national UK data for minorities. For this church-based group education concerning health practices did not significantly impact their moving towards lifestyles that decreased HTN risk. Behavior change, therefore, must be the focus of future interventions.

Keywords. hypertension, risk factors, minority

Introduction

The increased prevalence of hypertension (HTN) and subsequent morbidity and mortality among people of African descent in the United Kingdom (UK) as compared to other ethnic groups has been well documented (Higginbottom, 2006; Khan & Beevers, 2005; Swift, Markandu, Sagnella, He, & MacGregor, 2005; Hajat, Tilling, Stewart, Lemic-Stojcevic & Wolfe, 2004; Agyemang & Bhopal, 2003; Lane & Lip, 2001; Lemic-Stojcevic, Dundas, Jenkins, Rudd, & Wolfe, 2002). The Health Survey for England 2004 (National Centre for Social Research, 2005) reported HTN prevalence rates for men and women in the general population as 31.7% and 29.5% respectively, but reported higher prevalence rates for Black Caribbean men and women at 38.4% and 31.7% respectively.

The literature generally lists smoking as an important risk factor for cardiovascular disease/coronary heart disease (Bernaards, Twisk, Snel, van Mechelen, & Kemper, 2005; Kaplan, 2004; Onal, Erbil, Ozel, Aciksari, & Tumerdem, 2004; Lee et al. 1998), but the specific relationship between smoking and HTN is not fully understood. While there is a consistent acute rise in blood pressure (BP) during smoking (Kaplan, 2004; Lee et al., 1998), the effects of long-term smoking on HTN are less clear in some epidemiological studies.

There appears to be a J-shaped association between alcohol use and cardiovascular disease, in general, and HTN specifically, where moderate or light drinkers have lower BP than both non-drinkers and heavy drinkers (Tomson & Lip, 2006; Kaplan, 2004; Ohmori et al., 2002; Malinski, Sesso, Lopez-Jimenez, Buring & Gaziano, 2004; Twisk, Kemper, Mechelen, & Bertheke, 2001). According to Nanchahal, Asdon and Wood (2000), however "the J-shaped association between alcohol intake and all-cause mortality represents the sum of its protective effect on CHD mortality and detrimental effect on other, primarily non-cardiovascular causes of death" (p.57).

Although the statistics for heritability risk vary from study to study ranging from 14 to 82% for systolic blood pressure (SBP) and 8 to 64% for diastolic blood pressure (DBP) (DeStefano et al., 2001), most authorities now recognize that children of parents with HTN have a higher risk of developing HTN than children of normotensive parents (Jackson & Dishman, 2002).

Stress, both mental and physical, also play a role in developing HTN (Bedi, Varshey, & Babbar, 2000). While

the exact mechanism of how stress leads to HTN is not completely understood (Player & Peterson, 2011, Plante, 2002; Esler, Rumantir, Kaye, & Lambert, 2001), it is "well accepted that… [stress] contributes to the pathogenesis of HTN" (Bierhaus, Humpert and Nawrithit, 2004, p. 1,189). Blacks have greater increases in vascular tone in response to stress than Whites, and it has been suggested that this is due to the combination of increased peripheral vascular resistance and higher levels of environmental and psychosocial stress. These ethnic differences lead to sustained HTN (Stein, Lang, Singh, He, & Wood, 2000).

Age is described as a risk factor for HTN (Schwartz, Gerin W, Davidson, Pickering, Brosschot, & Thayer, 2003), with both SBP and DBP increasing with age from the second decade (Kornitzer, Dramaix, & De Backer, 1999). Before the age of 30 the BP of Blacks in the UK is lower than that of Whites, but higher after age 30 (Agyemang & Bhopal, 2003).

Body mass index (BMI) is also noted to be significantly related to HTN. Overweight (a BMI > 25) and obesity (a BMI > 30) are major risk factors for many chronic conditions such as diabetes, cardiovascular disease and coronary heart disease (Goldberg, 2003). They are related to HTN, independent of age or gender, (Appleby, Davey, & Key, 2002; Lopes, Bortolotto, Szlejf, Kamitsuji, & Krieger, 2001) and account for 78% and 65% of HTN in males and female, respectively (Pausova, 2006; El-Atat, Aneja, McFarlane, & Sowers, 2003). The prevalence rates of overweight (including obesity) for Caribbean (64.5%) and African (69.8) women in the UK are somewhat higher than those of the general female population (51.7%). The overweight prevalence rates for African men (61.8%) are lower than the general male population (66.5%) while those for Caribbean men (67.4%) are higher (National Health Services, 2005).

Specific to the prevention and treatment of HTN is physical activity (PA): 20-30 minutes of moderate to vigorous cardiovascular exercise on 4-5 days of the week reduces BP and is effective for long-term HTN control (Pescatello et al., 2004). Additionally, many practitioners recommend accumulated PA, which is less intense, as a modality for treating HTN which can significantly reduce BP in both pre-hypertensive and hypertensive individuals (Brookes, 2005; Padilla, Wallace, & Park, 2005).

Sodium intake has also been consistently linked to HTN. He and Macgregor (2002) conducted a meta-analysis of randomized control trials on salt intake and HTN. The results demonstrated that a reduction of sodium had a significant effect on SBP and DBP: On average the BP of hypertensives decreased by 5/3 mm Hg and normotensives by 2/1 mm Hg. They suggest that, in the long-term, population salt reduction would have a positive impact on public health by decreasing BP and therefore cardiovascular mortality. Hooper et al.'s (2004) meta-analysis also led them to conclude that sodium reduction resulted in an average decrease of 1.1 mm Hg for SBP and 0.6 mm Hg for DBP, and that the low salt diet enabled those who were hypertensive to discontinue their medications without a subsequent loss of BP control.

Diet also plays a key role in the prevention and treatment of HTN. In 2002, John et al. (2002) carried out a randomized control trial to examine the specific effects of fruit and vegetable consumption on BP. They reported that after six months of a diet with a minimum of five daily portions of fruit and vegetables, the SBP and DBP of the intervention group fell 4 mm Hg and 1.5 mm Hg respectively, more than in the control group.

Comparisons of the effects of vegetarianism, and non-vegetarianism show that the SBP and DBP of vegetarians are 3 to 14 mm Hg and 5 to 6 mm Hg lower, respectively, than non-vegetarians. For vegetarians, the prevalence of HTN ranges from 2% to 40%, while the range is from 8% to 60% in non-vegetarians (Berkow & Bernard, 2005).

As part of its policy on health, the British government set one of the 2010 targets as the reduction of deaths from heart disease and stokes in those less than 75 years of age by two fifths. One of the means by which they planned to achieve this goal was by the improvement of individual lifestyles (Department of Health, 1999). Most of these lifestyle recommendations are part of the emphasis on diet and healthy living advocated by the Seventh-day Adventist (SDA) church (Fraser, 1999; Fønnebø, 1994).

In the United States (US), the health profile of Black SDAs is better than that of non-SDA Blacks (Montgomery et al, 2007). Therefore, this study aimed to examine the lifestyles of SDAs living in London and to compare their risk factors for HTN to US Black SDAs and to the non-SDA Black population in the UK.

Methods

This was a cross-sectional study of Black SDA Christians living in London. Using a convenience sampling technique, 352 participants from 17 predominantly Black SDA churches, across London, self-selected to be part of the study. The participants completed a questionnaire and had their blood pressure and anthropometric measurements taken by qualified nurses.

Participants were included if they: (a) were current members of the SDA church, (b) resided in any of the London boroughs, (c) were between the ages of 25 and 79 years, and (d) self-identified as Black. Participants were excluded if they: (a) reported current use of alcohol or tobacco, (b) had a diagnosis of HTN and currently taking medication to control BP.

Measures

Blood Pressure. Blood pressure was recorded using digital monitors and classified according to the British Hypertension Society (BHS)(Mead, 2004). It was measured seated, once in each arm and then repeated in the arm with the highest reading. An average of the repeated measure in one arm was calculated.

BMI. Anthropometric measures were taken with participants in light clothing and without shoes. Weight was measured using a Conair Weight Watchers Glass Memory Precision Electronic Scale (WW43). Height was measured using a portable Seca Leicester height measure. Body mass index was calculated as the body weight in kilograms divided by height in meters squared, and classified as < 18.5 being underweight, 18.5 – 24.9 being normal, 25.0 – 29.9 being overweight and 30 – 39.9 being obese, and > 40 being extremely obese. Waist circumference (WC) was measured and recorded in centimeters using a flexible measuring tape. (Increased cardiovascular disease risk when WC is $\geq$ 102 cm in men and 88 cm $\geq$ in women.)

Survey Instrument. A structured questionnaire was developed for use in this study. The items in the first section focused on demographic questions such as age, gender, education, and yearly income. Questions were formulated to assess the participants' knowledge and lay beliefs about HTN. The health belief model (HBM) was the theoretical framework used to develop the section examining perceptions about HTN. Most of the items for the HBM constructs were drawn from the instrument developed by Desmond, Price, Roberts, Pituch and Smith et al (1992) or adapted from Champion's (1984) HBM scale. Cohen's 10-item Perceived Stress Scale was used for measuring stress (Cohen, Kamark, & Mermelstein, 1983). Also included were items on diet (salt, fruit, and vegetable consumption, whether participants were vegan or vegetarian) and levels of daily PA to evaluate participants' current practices related to HTN prevention. The questionnaire was checked for clarity before it was used for data collections.

Building on the 10-year relative risk estimates (RRE) for cancers developed by researchers at Harvard Medical School and Harvard School of Public Health (Colditz et al, 2000), researchers at the Siteman Cancer Center expanded the RRE to include heart disease and stroke (Siteman Cancer Center, nd.). Using the heart disease and stroke estimates as guidelines a 10-year RRE was developed to score the risk of HTN for the participants in this study (Table 1).

Table 1. Ten-Year Relative Risk Estimates for Hypertension

Risk Factor	**RR Score**
Age: > 50	+2
Female	+1
Family History	
Parental	+2
Sibling	+3
BMI	
Women	
25-28.9	+2
$\geq$ 30	+3
Men	
25-29.9	+2
$\geq$ 30	+3
Waist circumference	
Women >35in	+1
Men >40in	+2

Risk Factor	RR Score
Stress Score >14.7	+2
Salt	
Added during cooking	+1
Generally added at table without tasting food	+3
Generally taste then food then add salt at the table	+2
Taste food and occasionally add salt at the table	+1
Rarely/never add salt to food at the table	-1
Vegan	-4
Vegetarian	-3
Fish ≥ 3 servings per week	-2
Red meat consumption ≥ 3 servings per week	+2
White meat consumption ≥ 3 servings per week	+1
Fruit/Vegetable ≥ 5 servings per day	-1
Physical Activity at least 30 minutes per day for five days or three hours per week	-2

Data Entry/Analysis. The Statistical Package for the Social Sciences (SPSS) for Windows software program version 14 was used for data entry and analysis Linear regressions were run to examine the associations between the RRE score for HTN, SBP and DBP, as classified by the BHS.

Results

Demographics

A total of 352 questionnaire were distributed. 27 (7.67%) were not returned, and 13 of those returned could not be used. Ultimately the sample size used for analyses was 312. Table 2 provides details on the respondents surveyed. Of the 312 respondents, the majority were born in the Caribbean, followed by those born in the UK. Two thirds were female. The mean age for all of the respondents was 44.37 years. When age was examined by place of birth, African Blacks were on the average younger than Caribbean Blacks. The majority (43.2%) reported being married for the first time followed by 36.4% who were single/never married. A little over one third (34.7%) completed graduate degrees.

Table 2. Demographic Characteristics of Participants

	Total* **N=312**	**Caribbean 171 (55%)**	**African 32 (10.3%)**	**U.K. born 108 (34.7%)**	**p-value**
Gender‡					
Male	94 (31.1)	53 (31.7)	11 (37.9)	30 (28.6)	
Female	208 (68.9)	114 (68.3)	18 (62.1)	75 (71.4)	
Mean Age (SD)	44.37 (12.7)	49.24 (14.1)	37.38 (10.8)	38.9 (6.4)	<.0001
Marital Status					<.0001
Single/Never married	112 (36.4)	43 (25.6)	9 (29.0)	59 (54.6)	
First time married	133 (43.2)	80 (47.6)	19 (61.3)	34 (31.5)	
Remarried	14 (4.5)	10 (6.0)	0 (.0)	4 (3.70)	
Divorced	28 (9.1)	21 (12.5)	1 (3.2)	6 (5.6)	

	Total* N=312	Caribbean 171 (55%)	African 32 (10.3%)	U.K. born 108 (34.7%)	p-value
Separated	12 (3.9)	6 (3.6)	1 (3.2)	5 (4.6)	
Widowed	9 (2.9)	8 (4.8)	1 (3.2)	0 (.0)	
Annual household income					.003
Less than £10, 000	41 (16.7)	25 (19.7)	4 (16.0)	11 (11.8)	
£10 - £20, 000	58 (23.6)	35 (27.6)	8 (32.0)	15 (16.1)	
£20 - £30, 000	55 (22.4)	30 (23.6)	3 (12.0)	22 (23.7)	
£30 - £40, 000	37 (15.0)	16 (12.6)	3 (12.0)	18 (19.4)	
£40 - £50, 000	17 (6.9)	9 (7.1)	3 (12.0)	5 (5.4)	
£50 - £75, 000	27 (11.0)	10 (7.9)	1 (4.0)	16 (17.2)	
£75 - £100, 000	5 (2.0)	0 (.0)	3 (12.0)	2 (2.2)	
More than £100, 000	6 (2.4)	2 (1.6)	0 (.0)	4 (4.3)	
Highest level of education					<.0001
Primary school	12 (4.2)	10 (6.6)	0 (0)	2 (1.9)	
Secondary school	35 (12.2)	30 (19.7)	2 (6.9)	3 (2.8)	
Trade/vocational school	59 (20.5)	35 (23.0)	4 (13.8)	19 (17.9)	
Undergraduate polytechnic or university	82 (28.5)	39 (25.7)	7 (24.1)	36 (34.0)	
Graduate degree	100 (34.7)	38 (25.0)	16 (55.2)	46 (43.3)	

* One respondent did not indicate country of birth, 16 respondents did not indicate gender, 4 did not indicate marital status, 66 did not report household income, and 24 did not indicate level of education

Anthropometric Measurements

More men than women were overweight (45.2% and 40.1% respectively), but more women (18.4%) than men (16.1%) were obese. The only morbidly obese participants were female. None of the BMI differences by gender were significant, however. Twenty-one percent of women had WC measurements that placed them at risk for cardiovascular disease when compared to 12.5% of men (p =.000). Women also had significantly higher perceived stress means (18.2) than men (16.1, p =.004). Women, however, had lower BP measurements than men (126/77 and 136/78 respectively) and a significantly smaller percentage of them (21.6) were hypertensive than men (34.0, p = .037).

Dietary Patterns

The dietary patterns of respondents are presented in Table 3. Vegetarians made up 32.8% of the sample and of the 25.1% who met the government recommendation of five servings of fruit and vegetables daily, 56 were women and 17 were men. While the majority of the study population was neither vegan nor vegetarian, only 2.6 of them ate meat or fish seven days a week. Although the majority (68.6%) said that they rarely or never added salt to their food at the table, 78.9% generally added salt during cooking.

Table 3. Dietary Patterns of Seventh-day Adventists Living in London

Dietary Patterns	Male n (%)	Female n (%)	All n (%)
Vegans	11 (12.5)	29 (14.9)	40 (14.2)
Vegetarians	17 (20.3)	25 (15.1)	41 (16.7)
Red Meat Consumption			
Less than 1 day/week	37 (67.3)	97 (77.0)	139 (73.9)

Dietary Patterns	Male n (%)	Female n (%)	All n (%)
1-2 days/week	13 (23.6)	18 (14.3)	33 (17.6)
3-4 days/week	3 (5.5)	11 (8.7)	14 (7.4)
5-6 days/week	2 (3.6)		2 (1.1)
White Meat Consumption			
Less than 1 day/week	16 (28.6)	39 (30.7)	56 (29.5)
1-2 days/week	23 (41.1)	53 (41.7)	81 (42.6)
3-4 days/week	11 (19.6)	28 (22.0)	40 (21.1)
5-6 days/week	5 (8.9)	5 (3.9)	10 (5.3)
7 days/week	1 (1.8)	2 (1.6)	3 (1.6)
Fish Consumption*			
Less than 1 day/week	17 (27.0)	37 (26.8)	56 (26.9)
1-2 days/week	29 (46.0)	71 (51.4)	104 (50.0)
3-4 days/week	14 (22.2)	18 (13.0)	33 (15.9)
5-6 days/week	1 (1.6)	12 (8.7)	13 (6.3)
7 days/week	2 (3.2)		2 (1.0)
Fruit and vegetable consumption			
Less than one portion/day	4 (4.3)	10 (5.0)	14 (4.6)
1-2 portions/day	37 (39.8)	51 (25.5)	90 (29.7)
3-4 portions/day	35 (37.6)	83 (41.5)	123 (40.6)
5 or more portions/day	17 (18.3)	56 (28.0)	76 (25.1)
Sodium intake			
Do you generally add salt during cooking?	70 (78.7)	160 (79.2)	236 (78.9)
Do you generally add salt at the table without tasting your food?	3 (3.2)	10 (4.8)	14 (4.5)
Do you generally taste your food and then add salt at the table?	9 (9.6)	23 (11.1)	32 (10.3)
Do you taste your food and occasionally add salt at the table?	13 (13.8)	23 (11.1)	37 (11.9)
Do you rarely, or never, add salt to your food at the table?	66 (70.2)	141 (67.8)	214 (68.6)

* Only variable with significant *p*-value ($p = .036$)

Physical Activity

Overall, the women participated in less PA than the men: Except for the category of heavy housework, almost half of the women reported never or rarely exercising (see Table 4).

Table 4. Levels of Physical Activity among a Sample of Black Seventh-day Adventists Living in London

Physical Activity	Male n (%)	Female n (%)	All n (%)	p value
How many days per week, on average, do you get at least 30 minutes of moderate to vigorous exercise?				.042
Never or rarely	21 (25.0)	84 (44.4)	105 (37.2)	

1-2 days	30 (35.7)	47 (24.9)	82 (29.1)	
3-4 days	16 (19.0)	32 (16.9)	50 (17.7)	
Physical Activity	**Male n (%)**	**Female n (%)**	**All n (%)**	**p value**
5-6 days	8 (9.5)	13 (6.9)	21 (7.4)	
7 days	9 (10.7)	13 (6.9)	24 (8.5)	
How many days per week, on average, do you take a walk of at least 30 minutes?				.573
Never or rarely	24 (27.3)	55 (28.4)	81 (27.7)	
1-2 days	24 (27.3)	49 (25.3)	76 (26.0)	
3-4 days	10 (11.4)	36 (18.6)	46 (15.8)	
5-6 days	18 (20.5)	34 (17.5)	55 (18.8)	
7 days	12 (13.6)	20 (10.3)	34 (11.6)	
How many days per week, on average, do you do heavy housework for at least 30 minutes?				.014
Never or rarely	29 (34.9)	41 (21.6)	72 (25.4)	
1-2 days	35 (42.2)	67 (35.3)	103 (36.4)	
3-4 days	9 (10.8)	40 (21.1)	53 (18.7)	
5-6 days	7 (8.4)	20 (10.5)	29 (10.2)	
7 days	3 (3.6)	22 (11.6)	26 (9.2)	
How many days per week, on average, do you do heavy manual work for at least 30 minutes?				.000
Never or rarely	35 (38.9)	124 (67.0)	166 (58.2)	
1-2 days	26 (28.9)	32 (17.3)	60 (21.1)	
3-4 days	10 (11.1)	13 (7.0)	24 (8.4)	
5-6 days	13 (13.8)	7 (3.8)	20 (7.0)	
7 days	6 (6.4)	9 (4.9)	15 (5.3)	
Meet government recommendations of PA 5 days per week				.930
Yes	47 (56.0)	103 (55.4)	150 (55.6)	
No	37(44.0)	83 (44.6)	120(44.4)	

Direct comparison with Health Survey for England data was not possible, but some comparisons can be made between the risk factors of BMI, WC, PA, fruit and vegetable consumption, sodium use in cooking and at the table, and the mean levels of BP in this study and the national data (see Table 5).

Table 5. Comparison of hypertension risk factors in current study and the health survey for England 2004

	Current study		**Health Survey for England 2004***			
			Caribbean		**African**	
	Male	Female	Male	Female	Male	Female
Mean BMI	26.0	26.6	27.1	28.0	26.4	28.8
WC "at risk" (%)**	12.5	20.5	22.0	47.0	19.0	53.0
Meet government guidelines for physical activity (%)	20.2	13.8	37.0	31.0	35.0	29.0
Consume five or more portions of fruit and vegetables daily (%)	18.3	28.0	32.0	31.0	31.0	32.0

	Current study		Health Survey for England 2004*			
			Caribbean		African	
Add salt during cooking (%)	78.7	79.2	77.0	69.0	74.0	83.0
Rarely/never add salt at the table (%)*	70.2	67.8	49.0	64.0	43.0	45.0
Mean SBP	136.24	125.75	133.3	123.0	128.0	118.1
Mean DBP	78.35	77.04	74.70	73.70	73.50	72.80
Hypertensive (%) †	34.0	21.6	38.0	32.0	25.0	19.0

* National Health Services, 2005

** Increased cardiovascular disease risk when WC is ≥ 102 cm in men and 88 cm ≥ in women.

† British Hypertension Society classifications [52]

Regressions were run (see Table 6) to determine if the RRE score of the risk factor variables for HTN predicted SBP, DBP and BP classification according to the BHS. When controlling for age, gender, family history of HTN and SES, the RRE score was only predictive of, and positively associated with DBP (R = .165). Physical activity was not significantly related to DBP, therefore was excluded from the regression model and presented descriptively in Table 4 above. When controlled for gender, the only risk factors that were significantly associated with DBP and SBP were BMI at .444 (p = .000) and WC at .403 (p = .000).

Table 6. Results for Regressions for the Dependent Variable of Diastolic Blood Pressure

	B	SE B	β
Step 1			
Constant	73.54	6.26	
Age	0.09	0.62	.11
Gender	-2.03	1.48	-.10
Family history of HTN	2.51	1.51	.12
Education*	0.05	2.26	.00
Step 2			
Constant	73.97	6.17	
Age	.11	0.06	.14
Gender	-2.70	1.48	-.13
Family history of HTN	1.63	1.52	.08
Education	-0.51	2.23	-.02
RRE Score	0.50	0.19	.20†

* Education "up to secondary" versus "beyond secondary" used as proxy for SES

NOTE R^2 = .03 for Step 1; Δ R^2 = .03 for Step 2; †p <.05

Discussion

Research documents that only a small portion of the population that is hypertensive is diagnosed and adequately managed (Lane & Lip, 2001). Additionally, Blacks in the UK are more likely to have their HTN detected in the community than their counterparts from other ethnic groups (Lip et al., 2007). In the present study it was not surprising then that even though one of the inclusion criteria was that the participants were not being treated for HTN, 34.0% of males and 21.6% of females actually had elevated BPs.

In the US, African American women are 1.81 times more likely than African American males to have HTN (Townes, 1988), and in the UK there is a greater prevalence of HTN among Caribbean women than Caribbean men (Nazroo, 2001). Despite the increased risk for females in several of the HTN risk factors in this study, unlike the findings of Townes and Nazroo both SBP and DBP measurements were lower for women than men 125.8/77.0 and 136.2/78.4 respectively, and fewer women were hypertensive when compared to men, 21.6% versus 34.0% (p = .037). It is unclear why this is so, but research has shown that there is a strong association

of overweight and obesity with HTN (El-Atat, Aneja, McFarlane, & Sowers, 2003; Lopes, Bortolotto, Szlejf, Kamitsuji, & Krieger, 2001), and the absence of any significant differences of BMI between the genders in this study might account for the lower levels of HTN among females.

Dong and colleagues (1999) state that by the age of 50 one in two UK Blacks is hypertensive. When those who were 50 and older were separated from the younger participants in this study a similar proportion, 48.8%, were hypertensive. As with the whole group, however, fewer women were hypertensive than men, 45.5% versus 53.6%, though the difference was not statistically significant.

When the findings of this study are compared with the data reported for minorities in the Health Survey for England (2004) the population in this study had lower BMI means, a lower percentage of those with WC that put them at risk for HTN, and a lower percentage of salt added at the table. Salt use in cooking, however was higher, and those who met the government guidelines for daily PA and fruit and vegetable consumption were lower (see Table 5).

Because such a large percentage of this study population rarely or never used salt at the table, the higher percentage of salt use in cooking than those reported in the national data could be due to the subjects' knowledge that salt added at the table is worse than salt added in cooking.

Given the emphasis on this among SDAs, the low percentage of the subjects that met the government guidelines for daily consumption of fruit and vegetables is baffling. The presence of many imported fruit and vegetables means that they have access to produce from many of their native countries. Sixty-three percent of the participants, however, had annual incomes of $\leq$ £30,000 which might make the price of familiar produce prohibitive.

The lower levels of PA might be explained by age: In the national data the levels of PA drops off as age increases. The mean age for our study sample was 44.37 and only ranged from 25-79 years, compared to a range of 16- 55+ for the national survey. A large proportion of younger individuals with higher levels of PA were probably excluded from this study.

Nationally, only 5% of the population identify as vegetarian or vegan (Henderson, Gregory, & Swan, 2002), but in our study 14.2% reported being vegan and 16.7% claimed to be vegetarians. In other studies omnivores had higher BPs than vegetarians, vegans and those who ate fish (Berkow & Bernard, 2005; Appleby, Davey, & Key, 2002) and while the percentage of omnivores in our study was high, only 1.1% ate red meat and 1.6% white meat daily. The mean BP levels for our study were 132.0/78.9 for vegetarians 128.4/76.8 for vegans and 128.1/76.9 for omnivores. These results might be explained by the fact that the fruit and vegetable consumption in our study population was low and therefore little of their HTN controlling benefits were experienced by the vegans and the vegetarians. As noted earlier, few of the omnivores had daily meat consumption, and this could be the reason for their low BP levels.

Besides the use of salt at the table, BMI and WC were the only risk factors where the participants in this study were at decreased risk for HTN when compared with the national data for minorities. Despite the higher SBP and DBP means, for the subjects in this study, when compared to the national data, the actual percentage of respondents in this study who were hypertensive was lower than the Caribbean Blacks, but higher than the African Blacks in the national study (see Table 5).

Much of the data looking at HTN in Blacks in the UK separates the group into Caribbean Blacks and African Blacks. One limitation of this study was the low number of African-born Blacks, only 10.3% of the sample. Another limitation is that no pilot study was done prior to data collection. This could have increased the reliability of the instrument used. Finally, having a convenience sample of individuals who self-selected into the study increased the probability that the participants represented individuals who were more concerned about their health, in general, than others from this segment of the Black population. Randomization would have avoided this effect and increased the generalizability of the findings.

We recommend that in the future a similar study be carried out including respondents from other of the large cities in the UK with a greater proportion of Africans. This would increase the significance of comparisons with the national data. Additionally, this study reinforces the need for educators to develop programs that aim for behavior change. Despite the exposure to information on health within the SDA community, the respondents did not have many health behaviors that decreased their risk for HTN.

In conclusion, the evidence for the lifestyle of Black SDA's in London as being protective against HTN is mixed: Contrary to previous findings (Townes, 1998; Nazroo, 2001), women in this study had less HTN than men and as a whole the BP levels for this group were lower than the Caribbean Blacks but higher than the African-born Blacks in the national data. Unlike their US counterparts, the health profile of the Black SDAs in London, does not stand out as superior to that of the general Black population in the UK. Many of the

health practices traditionally emphasized by the SDA church were not being practiced even though there was knowledge of the association of these practices with the reduction of HTN risk. (These findings are reported in another paper.)

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About the Authors

Dr Maxine A Newell works at the Faculty of Science, Asia-Pacific International University, Thailand.

Professor Dr Naomi Modeste works at the School of Public Health, Loma Linda University, California, USA.

Associate Professor Dr Helen Hopp Marshak works at the School of Public Health, Loma Linda University, California, USA.

Professor Dr Colwick Wilson works at the School of Behavioral Health, Loma Linda University, California.

Assistant Professor Dr Sherma J. Charlemagne-Badal works at the Schoolf Public Health, Lomda Linda University, California.