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Risks for Hypertension among Undiagnosed African American Mothers and Daughters

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Abstract

Introduction—This study examines risks for high blood pressure (BP) among undiagnosed African American (AA) mothers and daughters, because AA children are at risk for hypertension due to familial influences.

Method—This study was cross-sectional in design and included 70 AA mother and daughter participants from the Detroit metropolitan area.

Results—BP readings clinically diagnostic of hypertension were found for mothers (25.7%) and daughters (54.3%), although they were undiagnosed. Many participants with BP readings in pre-hypertension or hypertension categories were overweight or obese (mothers, 90.9%; daughters, 50.2%). Fewer underweight or normal weight mothers (25.0%) and daughters (64.3%) had BP readings indicative of hypertension. Lower diastolic BP was associated with higher body mass index (BMI) among mothers ($r = -.34, p = .045$). Higher systolic blood pressure was positively related to potassium consumption among daughters and total AAs ($r = .55, p = .005$ and $r = .41, p = .003$ respectively).

Discussion—Early screening for hypertension is needed to improve health among AAs. Health providers should use American Academy of Pediatrics (AAP) guidelines for determining hypertension in children. Research on familial and environment influences on BP among children is recommended to determine early risk for hypertension development.

Keywords

children; blood pressure; African American; risks

Introduction

Studies have shown that significant correlations in blood pressure (BP) exist between mothers and their children (Munger, Prineas, & Gomez-Marin, 1988; Taylor, Maddox, & Wu, 2008). Familial influences for high BP have been noted in children of hypertensive parents, but not in children of normotensive families (Sinaiko, 1996). According to the American Heart Association (AHA, 2007), African Americans (AAs) have the highest prevalence of hypertension of any ethnic group, with approximately 44% of AA women diagnosed with hypertension (Rosamond, 2007). Hypertension diagnosis in children is estimated to have an

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overall prevalence of 2% to 5%, with AA children at greatest risk due to familial influences (Sorof, Lai, Turner, Poffenbarger, & Portman, 2004; Moore, Stephens, Wilson, Wilson, & Eichner, 2006). A study of a nationally representative sample revealed that between 1999 to 2002, age-adjusted high BP increased among children of African American (4.2%), Hispanic (4.6%), and Caucasian (3.3%) ancestry (Din-Dzietham, Liu, Bielo, & Shasma, 2007). Increases in prevalence of pre-hypertension and hypertension was statistically significant for African American and Hispanic children (Din-Dzietham et al., 2007). This disparate prevalence of hypertension among AAs does not consider those women or children, more specifically, girls, who may have high BP readings, but are not yet diagnosed or treated for hypertension. The purpose of this study is to examine risks for high blood pressure (BP) among undiagnosed AA mothers and daughters, because AA children are at risk for hypertension as a result of family influences.

Review of Literature

Prevalence of Undiagnosed Hypertension among African Americans

Because hypertension does not have visible symptoms, many people go undiagnosed until the occurrence of a cardiac event (e.g., heart attack, stroke, etc.). An estimated 16.1% of adults nationwide meet the clinical criteria for hypertension, but are undiagnosed, with AA comprising 25% of these undiagnosed cases (Diaz, Mainous, Koopman, & Geesey, 2004; Graham et al., 2006). One study of 14,187 African American and Hispanic children found that 74% of the participants met the clinical criteria for hypertension, but were undiagnosed (Hansen, Gunn, & Kaelber, 2007). Among all of the children in the study, the African American group had the largest number of undiagnosed participants who met the criteria for hypertension (Hansen et al., 2007).

Diagnostic Criteria for Hypertension

Specific issues must be considered when diagnosing girls with hypertension. Standard practice in pediatrics requires the use of age and height in determining percentiles that can be used in diagnosing girls with hypertension. The standards for women are not appropriate for girls. However, many health care providers use women cut offs because they are easier to remember rather than taking the time to use age/height charts required for girls. As a result, many girls may meet the criteria for hypertension in children but are undiagnosed using adult standards. One problem with diagnosing girls as hypertensive is that criteria are not as straightforward with numerical cut-points as with women. Girls are not typically tested for high BP until age 3 and diagnostic criteria for hypertension are based on percentile rankings for age and height. Repeated systolic and/or diastolic BP readings at the 90th to 95th percentile for age and height is considered “pre-hypertension,” while readings greater than the 95th percentile is indicative of “hypertension” (National High Blood Pressure Education Working Group on High Blood Pressure in Children and Adolescents, 2004). In contrast, women use the cut-points for repeated BP readings of 120/80 to 139/89 as “pre-hypertension,” 140/90 to 159/99 for “stage 1 hypertension,” and 160/100 or higher as “stage 2 hypertension” (Rosamond et al., 2007).

Risk Factors for Hypertension

Risk factors for hypertension include: family influences, AA ethnicity and gender, overweight, lack of physical activity, and high sodium intake (Chen & Wu, 2008; Lauer & Clarke, 1989; Pietrobelli, Malavolti, Battistini, & Fuiano, 2008). People with a greater number of risk factors may be more susceptible to developing hypertension.

Familial influences—Research has indicated that familial influences for high BP in children are significantly correlated with maternal BP, but not paternal BP (Sinaiko, 1996). AAs have the highest prevalence of hypertension worldwide, which places these children at particularly

high risk for development of hypertension (Rosamond et al., 2007). Because AA women are particularly susceptible to development of hypertension, their daughters may also be at risk early in life.

Ethnicity and gender—AA women have the greatest prevalence of hypertension and obesity when compared with men of any race/ethnicity. Research has found a familial link that shows obese children often have parents who are either overweight or obese (Danielzik, Czerwinski-Mast, Langnese, Dilba, & Muller, 2004). A study conducted with 12,665 male and female children found that obesity was related significantly to increases in systolic BP (Ford, Mokdad, & Ajani, 2004). However over a one-year time period, increases in children's physical activity were associated with decreases in weight (Ford, et al., 2004).

Obesity—Obesity is a risk factor of concern for development of hypertension. A study of obese children over a two-year time period found that for every one kilogram of weight gained was associated with an increase of 0.77 mm Hg in systolic BP (McGavock, Torrance, McGuire, Wozny, & Lewanczuk, 2007). Another study on children found that sedentary lifestyle was significantly related to increases in BMI and systolic BP (Sugiyama, Xie, Graham-Maar, Inoue, Kobayaski, & Stettler, 2007). Both findings of dietary (Tekol, 2008) and physical activity lifestyle behaviors (McGavock et al., 2007) are important as they point to the need for early screening and interventions among girls who are "at risk" but have not yet been diagnosed with hypertension.

High BMI has been related to increased likelihood of hypertension among children in a previous study (Din-Dzietham, et al., 2007). However, the researchers indicated that increases in hypertension among children lagged behind increases in BMI by a decade. Because BMI is considered a major risk factor for hypertension, it will be included in the analyses for the present study. When assessing risk factors, such as BMI, in children, the calculation is the same but the cut-points differ. For children, BMI is sometimes referred to as BMI-for-age and have percentile rankings as with BP. Percentile rankings for BMI between the 85th and 94th percentile is "at risk of overweight" and percentile rankings at or above the 95th percentile are considered "overweight" (CDC, 2008). These percentile rankings differ based on age. BMI is typically not used to assess for overweight until a girl reaches the age of 2 years (CDC, 2008).

Physical activity—The recommendation for physical activity is 30 minutes of physical activity each day for people diagnosed with hypertension (Chobanian et al., 2003). Research has also indicated that physical activity resulting in small declines in weight or body fat can improve blood pressure readings among patients diagnosed with hypertension (Stewart et al., 2003).

Sodium and potassium intake—According to some research, there are both reversible and irreversible components relative to hypertension. Dietary salt intake has been associated with hypertension, but researchers suggest that reduction in sodium intake may be beneficial for some individuals, but not for others (Tekol, 2008). Extended periods of exposure to high sodium levels throughout the lifespan can result in permanent renal damage to individuals and lead to hypertension even if low sodium interventions are implemented. Tekol suggested that interventions as early as in utero and during the childhood years could reduce irreversible effects of hypertension. For example, Kuna Indians who were part of a salt free society were found to have low BP even in advancing age (Tekol). Reducing sodium intake as an intervention early in life may be beneficial in preventing irreversible harm due to hypertension.

Potassium works inversely with sodium and maintains fluid and electrolyte balance in the body. Although no recommended dietary allowance (RDA) has been established for potassium,

consuming approximately 2,000 to 3,500 mg. per day can help reduce BP even when sodium intake is above normal (He, Marrero, & Macgregor, 2008; Braschi & Naismith, 2007). These reasons are why the Dietary Approaches to Stop Hypertension (DASH) diet recommends increases in the amount of potassium and reductions in dietary sodium for hypertension control (U.S. Department of Health and Human Services, 2005).

Purpose of the Study

The purpose of this study is to examine early risks (family history of undiagnosed high BP, as well as lifestyle and health related risks: minutes of physical activity, sodium and potassium intake, BMI among children and parents) and BP readings among undiagnosed AA mothers and daughters. The specific research questions for this study are: Are undiagnosed AA mothers and daughters at risk for hypertension based on their BMI? Are undiagnosed AA mothers' and daughters' lifestyle behaviors contributing to high blood pressure?

Methods

Participants

This study was cross-sectional in design and included 70 AA mother ($n = 35$) and daughter ($n = 35$) participants from the Detroit metropolitan area, ranging from one to 61 years of age. This sample size was sufficient for a power of .80 at an alpha level of .05 with a large effect size while it requires a sample size of 85 to reach a moderate effect size (Cohen, 1992). Recruitment strategies commenced after approval from the Institutional Review Boards (IRB) of the University of Michigan and Wayne State University. Participants in this study were part of a larger parent study of three generations of African American women who were both hypertensive and normotensive (Taylor, 2009).

Procedures

1. After agreeing to participate in the study, informed consent was obtained during home visits that served as the site for data collection. Research assistants were trained by the principal investigator regarding all instrumentation, home visitation, and coordinating visits. A baseline interview was completed that collected demographic information, BP readings, and BMI. A 3-month follow-up was conducted collecting information on additional variables including: self-reported minutes of moderate and hard physical activity and dietary intake of sodium. A detailed review of recruitment procedures can be found in Taylor (2009) and Wu, Prosser & Taylor (2008).

Inclusion/Exclusion Criteria

Inclusion criteria for potential participants were: (a) participants must self-identify as AA and female and (b) participants must have the ability to read and write in English. Individuals with diagnosed hypertension were excluded from the study. If participants were diabetic, an average BP of 130/80 without medication was indicative of hypertension which excluded them from participation in the present study. Exclusion criteria also included having a co-morbidity of substance abuse, mental illness, end-stage cancer, end-stage renal disease or other terminal illness.

Measures

Questionnaire—The demographic survey obtained information from the participant regarding age, educational level, household income, marital status, employment status, health insurance, and any family history of hypertension. This instrument was used to collect information at baseline only. This instrument was investigator developed in the parent study

in order to provide a demographic profile of the participants and used forced-choice options for answering the questions.

Blood Pressure, height and weight—BP was measured using a digital BP monitor with size appropriate upper arm cuff (model # A&D UA 767PC). BP measurements represent an average of three seated BP readings. Procedures for participant preparation for BP measurement are in accordance with JNC-7 (2003) recommendations. BP readings were collected at the baseline interview. Repeated BP readings for adults were categorized as “normal,” “pre-hypertension,” and “stage 1 or 2 hypertension” according to guidelines from the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure guidelines ([JNC-7], Chobanian et al., 2003). Repeated BP readings for children were categorized as “normal,” “prehypertension,” or “hypertension” based on percentile rankings of age, gender, and height as outlined by the AAP (National High Blood Pressure Education Program Working Group on High Blood Pressure in Children, 2004).

Body mass index (BMI) is the relationship between weight and height that is associated with body fat and health risk. According to AHA (2007), obesity is a major risk factor for hypertension, thus BMI was included in the analysis. The formula for calculating BMI is weight in pounds divided by the height in inches squared. The result is then multiplied by 703 to provide the BMI. BMI outcomes from 25 to 29 is considered overweight, with BMI outcomes equal to and greater than 30 indicative of obesity (CDC, 2008). BMI for children was calculated using the standard formula above and BMI-for-age charts (for girls) for percentile rankings in accordance with Center for Disease Control (CDC, 2008). Weight was measured by an electronic scale (BWB/807 Tanita Tokyo, Japan). Height was measured by portable stadiometer (Model 214 Road Rod, Seca Corporation, Hanover, MD).

Physical activity—The recommendation for physical activity is 30 minutes of moderate or hard physical activity every day (210 minutes per week) for people diagnosed with hypertension (JNC-7, 2003). To measure physical activity, participants were asked two questions. Participants were asked if they took part in a minimum of 30 minutes of moderate or greater physical activity on any day in the past seven days (Taylor, Washington, Artinian, & Lichtenberg, 2008). They were then asked to self-report the number of minutes of participation in moderate or greater physical activity over the past seven days. The minutes of moderate or greater physical activity were used for analyses in this study. A Cronbach’s alpha of 0.48 was obtained for physical activity in the present study.

Sodium and Potassium intake—Sodium and potassium intake (i.e., milligrams of per day) was determined using self-reported data from 24-hour food recalls. The recommendation for sodium intake is no more than 2300 mg per day (JNC-7, 2003). Although there is no established recommended daily allowance for amount of potassium intake, it is suggested that adolescents and adults consume 4,700 mg of potassium per day (U. S. Department of Health and Human Services, 2005). Participants were contacted on two randomly selected weekdays and one weekend day to ask them to recall what they had eaten within the last 24 hours. Each recall took approximately 10 minutes to complete. Data were translated into nutrient intakes using computer software entitled the Food Processor (ESHA Research, Salem, OR). Multiple-day food recall is considered valid because it represents a person’s usual or habitual intake accurately (Block, 1982).

Determination of dietary and physical activity information is an integral part of present study, as all these variables are related to blood pressure. The most feasible method of data collection was self report. Self reporting allows respondents to relay answers with specificity. This practice is particularly helpful for exploring sodium and potassium intake via meal choices.

Under-reporting is often influenced by issues of motivation and respondents' weight in correlation with social norms (social approval bias is also a limitation of self reporting for physical activity). Attention span, a developed concept of time and knowledge of foods names all play a role in skewing self reporting for girls, depending on age and cognitive maturity (Livingstone and Robson, 2000). However, self reporting remains the most effective way to measure the present study's variables. A Cronbach's alpha of 0.68 was obtained for dietary recall in the present study.

Data Analysis

Descriptive statistics were obtained on all variables using cross tabulations and measures of central tendency, depending on the scaling of the individual variables to provide a profile of the participants. Research question 1 was addressed using correlations to assess strength and direction of associations between BMI and BP. In addition, the second research question was addressed using correlations between risk factors with BP readings and personal characteristics of the sample. All decisions on the statistical significance of the findings were based on a criterion alpha level of .05.

Results

Characteristics of the Sample

A total of 70 African American women, including 35 mothers and 35 daughters, were included in the study. The demographic characteristics for the entire sample of AA mothers and daughters without a diagnosis of hypertension are presented in Table 1. The majority of the mothers had some college education or greater ($n = 28$, 80%), with the majority of the daughters having less than a college education ($n = 33$, 88.6%). The total household income of the entire sample ranged from less than \$10,000 ($n = 19$, 27.5%) to more than \$80,000 ($n = 9$, 13.0%). The largest group of mothers ($n = 20$, 57.1%) reported their marital status as single, divorced or separated, with 15 (42.9%) reporting they were married. All of the daughters ($n = 35$, 100%) were single. The mean age for mothers was 39.63 ($SD = 10.43$) years, with daughters having a mean age of 11.03 ($SD = 6.04$, Table 3).

Health Indicators and Lifestyle Behaviors that Reflect Risk for Hypertension

The descriptive statistics for health indicators are presented in Table 3. Among the mothers who reported working, the range in hours worked was 20.00–50.00, with a mean of 39.12 ($SD = 7.64$) hours per week (Table 3). The mean hours worked per week among daughters was 19.33 ($SD = 11.98$, $n = 6$; Table 3). The average systolic BP (SBP) and diastolic BP (DBP) readings for mothers were 125.87 ± 14.34 mmHg and 80.38 ± 11.11 mmHg, respectively. In contrast, the average SBP and DBP readings for daughters were 122.00 ± 17.89 mmHg and 76.51 ± 15.24 mmHg, respectively. Average pulse pressure readings were high for both mothers ($M = 45.49$, $SD = 11.95$) and daughters ($M = 45.48$, $SD = 13.38$). Approximately 25.7% ($n=9$) of mothers had BP readings diagnostic of hypertension. Among daughters, 54.3% ($n=19$) had BP readings diagnostic of hypertension. Of those with BP indicative of pre-hypertension or hypertension, 20 (90.9%) of mothers and 12 (52.2%) daughters were considered either overweight or obese. Findings indicate that African American girls are at risk for hypertension based on BMI, especially in comparison to their mothers. Interestingly, 1 of 4 mothers (25.0%) and 9 of 14 daughters (64.3%) who were rated as either underweight or normal weight had BP readings that were clinically indicative of hypertension.

Although none of the participants had a diagnosis of hypertension, most mothers ($n = 29$, 82.9%) and daughters ($n = 30$, 85.7%) had a family history of hypertension (Table 2). The majority of both mothers ($n = 30$, 85.7%) and daughters ($n = 32$, 94.1%) reported having health insurance coverage (Table 2). When examining other risk factors related to hypertension

development, the majority of mothers ($n = 34$, 97.1%) and all daughters ($n = 35$, 100%) reported that they did not smoke cigarettes (Table 2). When assessing lifestyle behavior risk factors associated with hypertension, both mothers ($M = 3203.42$, $SD = 1207.56$ mg) and daughters ($M = 3311.66$, $SD = 1151.64$ mg) consumed larger than recommended amounts of sodium and less than the suggested amount of potassium (mothers, $M = 1500.48$, $SD = 1168.98$; daughters, $M = 1475.63$, $SD = 1312.20$) in a 24-hour period on average (Table 3). Additionally, the average number of minutes of participation in physical activity per week reported by mothers ($M = 58.26$, $SD = 103.60$) and daughters ($M = 50.30$, $SD = 102.61$) was well below the recommended amount of 30 minutes each day (210 minutes). Findings suggest that lifestyle behaviors, specifically high sodium intake, contribute to high blood pressure among both mothers and daughters.

Relationships between Lifestyle Behaviors and Risk for Hypertension

Pearson product moment correlations were obtained between systolic BP and age ($r = .25$, $p = .041$) and potassium intake ($r = .41$, $p = .003$) for all participants. Age ($r = .52$, $p = .002$) was correlated with systolic BP for the mothers. For the daughters in the study, potassium intake was significantly correlated with systolic BP ($r = .55$, $p = .005$). The mother's diastolic BP was also related to their age ($r = .45$, $p = .006$) and BMI ($r = -.34$, $p = .045$) (Table 4).

Discussion

Body Mass Index (BMI)

A statistically significant inverse correlation between BMI and diastolic BP was found for mothers in the study. This correlation indicated that as BMI increased, diastolic BP decreased. These findings were similar to previous research done on a sample of more than 1,400 African Americans in the Genetic Epidemiological Network of Arteriopathy (GENOA; Taylor, Sun, Chu, Mosley, Kardia, 2008).

The percentage of normal or underweight mothers (25.0%) and daughters (64.3%) with clinically diagnostic hypertension should be an indication that BMI, especially among children, may not be the only or most important predictor of BP problems. These findings support the need for early health screening for high BP among AA women and girls, even when their BMI is low or normal.

Over half the daughters surveyed had BP readings diagnostic of hypertension and of this sample group, 52.2% of respondents were overweight or obese. This positive correlation between BMI and hypertensive characteristics, coupled with the well-documented link between BMI and blood pressure suggests that overweight African American daughters are especially at risk for hypertension. The fact that nearly as many mothers were overweight as daughters, yet mothers exhibited BP readings diagnostic of hypertension with less frequency (25.8%), suggests that BMI plays a less significant role in the risk for hypertension among African American mothers.

Diet (Sodium and Potassium Intake)

The statistically significant correlations with potassium intake, but not sodium intake create a conundrum that needs to be explored. Studies have shown that potassium acts as a protective mechanism against cardiovascular disease by inducing vascular smooth muscle relaxation and reducing peripheral resistance thereby decreasing BP (Braschi & Naismith, 2007; He et al., 2008). It is unclear why daughters who consumed suggested amounts of potassium had significantly higher diastolic BP. It may be possible that sodium potassium proton pathways at the cellular level function differently in adults than in children. Possible participant bias encountered during self reporting may also contribute to these results. An examination of

associations between potassium and BP are needed before this phenomenon in girls can be explained.

While the importance of reducing sodium intake in controlling hypertension has been cited in the literature review, the practicality is that women living in urban settings have difficulty in maintaining low sodium intake. For example, the high intake of sodium among study participants may have been affected by access, availability, and cost of fresh fruits and vegetables in the inner city of Detroit. One recommendation for decreasing sodium in the diet is to increase fresh fruits and vegetables and decrease canned foods that are loaded with salt. Many grocery stores with produce departments within the Detroit city limits have closed and become “Pac-n-Save” stores that offer inexpensive canned foods. The only grocery store remaining in the city limits of Detroit is located on the eastern outskirts of the city catering to the more affluent neighboring suburbs. Many participants would need to drive a substantial distance to suburban areas surrounding Detroit to obtain foods recommended to control or prevent high BP. Although an open market is available in the center of the city, public transportation is slow, unpredictable, and largely unavailable as the market is open to the public only on Saturdays in the spring and summer months.

Physical Activity

Participation in the recommended number of minutes per week of moderate, hard, or very hard physical activity was not related to BP for the present study. The majority of participants in the present study did not meet the recommendation of 30 minutes of moderate, hard, or very hard physical activity each day. One of the stipulations of eligible “physical activity” in this study was the exclusion of physical activity during working hours. A variety of explanations have been offered regarding reasons that most study participants did not complete the recommended minutes of physical activity. Physical activity for many participants may have been misconstrued to mean time spent working out in the gym or engaging in work-out classes at school or in private clubs. High recorded pulse pressure rates among both sample groups may partially reveal poor fitness levels. The average age of the girls in this study were school age ($M = 11.03$, $SD = 6.04$) and attended public schools. Many public schools in the recruitment area did not offer gym classes or physical activity as part of the school curriculum. Some schools were located in unsafe areas and girls were not allowed to participate in outside activities during recess. Sidewalks were also absent in many neighborhood school areas, with schools built adjacent to the street, forcing residents and their children to walk in the streets. Residents walking in these areas place themselves in danger of being hit by automobiles and becoming victimized by criminals. Detroit was ranked as the most dangerous city in America in 2007 (Infoplease, 2008). Therefore, many girls may not be able to participate in physical activities, unless they are a part of indoor extra-curricular organized sports.

Costs associated with working-out in commercial athletic clubs, attending work-out classes, purchasing exercise equipment, etc., may have lead to the low minutes of physical activity participation reported by mothers. Many mothers ($n = 16$, 45.7%) in the study had annual incomes less than \$40,000.00 and were responsible for the care of their dependent daughters. As gym memberships may range from \$200.00 (Powerhouse Gym) to \$2,000.00 (Fitness USA) annually, these parents may lack financial resources to meet this demand. In addition to cost of gym memberships, many study participants were single women who require childcare resources during their scheduled workout periods. Costs associated with gym memberships and childcare, as well as safety of school neighborhood and lack of physical activity curriculum in schools were some of many barriers to meeting physical activity requirements for urban mothers and daughters.

Limitations of the Study

The study was limited to AA female participants. As a result, findings may not be applicable to mothers/daughters of other ethnic or racial groups or males of any ethnic or racial group. A small segment of a large Midwestern urban area was used to recruit mothers/daughters for the study. Mothers/daughters from other geographic areas (suburban and rural) may have different health outcomes that are unrelated to the present study. The sample size may have been a limitation of the study. While a sample size of 70 provides sufficient data to obtain preliminary results on the relationships among blood pressure readings and health indicators (See Table 3), additional research is needed with a larger sample to examine these relationships. Another limitation of the study is the use of self-report surveys. The participants may have over-reported or under-reported their responses in an attempt to be socially acceptable. Although this type of bias is inherent in self-report measures, it is typically accepted in research as relatively accurate.

Nursing Practice Recommendations

Hypertension continues to be a concern for AA females. Existing programs are neither identifying people with high BP nor effectively helping those who have been diagnosed to maintain or improve their lifestyle behaviors. Nurses who work with mothers and daughters need to be aware of early risks and unhealthy lifestyle behaviors on BP. Once mothers and daughters understand the influence of specific behaviors on their health, they can begin to implement lifestyle changes that could help reduce the risk of high BP. Some suggestions that could be considered include the following: Nurses should examine both mothers and daughters when developing plans of care and prevention for AAs at risk for high BP. Nurses need to involve girls in the plan of care to reduce risks for high BP. Involving youth can promote hypertension interventions for mothers and prevention for daughters. Nurses need to act as educators for the entire family, especially in terms of nutrition and exercise to create a family system that works to protect the health of all members. Referral of families to appropriate networks (i.e., nutritionists, physical activities, and support groups, etc.) for early intervention and prevention is essential for those at risk of developing high BP.

Lifestyle behaviors among mothers and daughters were examined to determine predictors of risk for high BP among girls and their mothers. These findings indicate that daughters and mothers should be monitored together to determine early risks for developing high BP. If mothers can be diagnosed earlier, the daughters also benefit from implementing the recommended healthy lifestyle behaviors. If healthy lifestyle behaviors are begun in childhood, the likelihood of developing high BP could be diminished, particularly among children with a family history of hypertension.

Recommendations for Further Research

Further studies using a gene-environment approach to examining BP among daughters and their mothers are currently underway to provide insight into early risks for hypertension. Studies including genetic, environmental, and intervention components are needed to reduce health disparities related to hypertension among AA women and girls.

The present study was an initial attempt to develop a knowledge base about precursors for hypertension among undiagnosed AA mothers and daughters. Based on results of the present study, additional research is needed to develop possible nursing interventions that can help parents/children identify risk factors early prior to a diagnosis of hypertension. The statistic revealing that over half the daughters in the present study had BP readings diagnostic of hypertension reflects the need for preemptive health care. Early and frequent screening is important to prevention and detection of high BP. However, just as the previously described

sociodemographic factors contribute to blood pressure among African American mothers and daughters in Detroit, MI, these similar obstacles may affect other urban African American females. Steps must also be made to augment physical activity as well as dietary opportunities for this at risk demographic.

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Table 1

Demographic Characteristics – Mother and Daughters (N = 70)

Demographic Characteristics	Relationship					
	Mother (n = 35)			Daughter (n = 35)		
	N	%		N	%	Total
						N
						%
Educational Level						
Less than high school	1	2.9		26	74.3	27
High school/GED	6	17.1		5	14.3	11
Some college	14	40.0		4	11.4	18
Associate degree	2	5.7		0	0.0	2
Bachelor degree	4	11.4		0	0.0	4
Master degree	8	22.9		0	0.0	8
Household Income						
Less than \$10,000	6	17.1		13	38.2	19
\$10,000 to \$20,000	3	8.6		3	8.8	6
\$20,001 to \$30,000	0	0.0		2	5.9	2
\$30,001 to \$40,000	7	20.0		4	11.8	11
\$40,001 to \$60,000	8	22.9		7	20.6	15
\$60,001 to \$80,000	6	17.1		1	2.9	7
\$80,001 and higher	5	14.3		4	11.8	9
Missing				1		1
Marital Status						
Married	15	42.9		0	0.0	15
Single	9	25.7		34	100.0	43
Divorced	10	28.6		0	0.0	10
Separated	1	2.9		0	0.0	1
Missing				1		1

Table 2

Health-related Characteristics (N = 70)

Health-related Characteristics	Relationship					
	Mother (n = 35)			Daughter (n = 35)		
	N	%		N	%	Total N %
Health insurance						
Yes	30	85.7		32	94.1	62 89.9
No	5	14.3		2	5.9	7 10.1
Missing				1		1
Family diagnosis of HBP						
Yes	29	82.9		30	85.7	59 84.3
No	6	17.1		5	14.3	11 15.7
Smoke cigarettes						
Yes	1	2.9		0	0.0	1 1.4
No	34	97.1		35	100.0	69 98.6
Blood pressure						
Normal	13	37.1		12	34.3	25 35.7
Prehypertensive	13	37.1		4	11.4	17 24.3
Hypertensive	9	25.7		19	54.3	28 40.0
Body Mass Index (CDC Classification)						
Underweight	1	2.9		1	2.9	2 2.9
Healthy	3	8.6		13	37.1	16 22.9
At risk for overweight	0	0.0		4	11.4	4 5.7
Overweight	8	22.9		14	40.0	22 31.4
Obese	23	65.7		3	8.6	26 37.1

Table 3

Descriptive Statistics – Health Indicators by Mother and Daughter (N = 70)

Health Indicator	Number	Mean	SD	Median	Minimum	Maximum
<u>Age</u>						
Mother	35	39.63	10.43	39.00	21.00	61.00
Daughter	35	11.03	6.04	13.00	1.00	20.00
<u>Hours worked in a typical week</u>						
Mother	26	39.12	7.64	40.00	20.00	50.00
Daughter	6	19.33	11.98	21.00	4.00	30.00
<u>Average systolic blood pressure</u>						
Mother	35	125.87	14.34	124.00	106.33	172.67
Daughter	35	122.00	17.89	120.00	91.33	162.67
<u>Average diastolic blood pressure</u>						
Mother	35	80.38	11.11	79.33	61.00	104.67
Daughter	35	76.51	15.24	73.00	47.67	119.00
<u>Pulse pressure</u>						
Mother	35	45.49	11.95	45.00	14.67	72.00
Daughter	35	45.48	13.38	43.00	23.00	89.67
<u>Sodium (mg)</u>						
Mother	26	3203.42	1207.56	3033.22	1158.29	5777.42
Daughter	25	3311.66	1151.64	3210.85	1147.46	5105.51
<u>Potassium (mg)</u>						
Mothers	26	1500.48	1168.98	1426.17	146.28	5247.28
Daughters	25	1475.63	1312.20	1163.06	105.00	6510.37
<u>Physical activity (minutes per week)</u>						
Mothers	23	58.26	103.60	0.00	0.00	440.00
Daughters	25	50.30	102.61	0.00	0.00	490.00

Table 4

Intercorrelations Between Age, BMI, Blood Pressure, Sodium, Potassium, and Physical Activity among Mothers, Daughters, and Total Sample (N = 70).

Measure	1	2	3	4	5	6	7
1. Age							
Mother							
Daughter	----	----	----	----	----	----	----
Total							
2. BMI							
Mother	-.13						
Daughter	.67**	----	----	----	----	----	----
Total	.45**						
3. Systolic BP							
Mother	.52**	-.10					
Daughter	.004	.29	----	----	----	----	----
Total	.25*	.17					
4. Diastolic BP							
Mother	.45**	-.34*	.59**				
Daughter	-.11	.19	.69**	----	----	----	----
Total	.22	.05	.65**				
5. Sodium							
Mother	.17	.44*	-.05	-.16			
Daughter	.20	-.01	-.33	-.33	----	----	----
Total	.04	.13	-.2	-.26			
6. Potassium							
Mother	.30	-.23	.25	-.01	.27		
Daughter	.14	.37	.55**	.36	-.55**	----	----
Total	.12	.14	.41**	.22	-.15		
7. Physical Activity							
Mother	.11	-.18	-.06	-.08	.15	.08	
Daughter	.01	-.19	-.05	.02	-.19	0	----
Total	.07	-.14	-.05	-.01	-.03	.03	

* $p < .05$,

** $p < .01$,

*** $p < .001$.