6-29-2022

"I Got to Be Healthy for Me Beyond COVID": The Influence of the COVID-19 Pandemic on Hypertension Prevention among Black College Students: A Mixed Methods Study

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I GOT TO BE HEALTHY FOR ME BEYOND COVID: THE INFLUENCE OF THE COVID-19 PANDEMIC ON HYPERTENSION PREVENTION AMONG BLACK COLLEGE STUDENTS: A MIXED METHODS STUDY

A dissertation submitted in partial fulfillment of

the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

PUBLIC HEALTH

by

Talegria LaPresha Charnei Brown

2022

To: Dean Tomás R. Guilarte
Robert Stempel College of Public Health and Social Work

This dissertation, written by Talegria LaPresha Charnei Brown, and entitled I Got to Be Healthy for Me Beyond COVID: The Influence of the COVID-19 Pandemic on Hypertension Prevention among Black College Students: A Mixed Methods Study, having been approved in respect to style and intellectual content, is referred to you for judgment.

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Florida International University, 2022

DEDICATION

First giving honor to God as this dissertation would not have been possible without His strength and guidance throughout this journey. I dedicate this dissertation to my parents, Congria and Janice Brown, my siblings, DeVeonte, Domonique, and Tashungria Brown, my mentors Drs. Bastida, Barengo, Anastario, George, and Ibañez, my cohort, family, and friends.

ACKNOWLEDGMENTS

This dissertation would not have been possible without the support and guidance of my wonderful mentor, Dr. Elena Bastida. Thank you for the long conversations, great ideas, and motivation every time I felt like giving up. Your kind and wise words were just the push I needed to keep going every time I faced challenges. To the rest of my dissertation committee members, Drs. Barengo, Anastario, George, and Ibañez, thank you for your knowledge and expertise on chronic disease prevention, guidance through the questionnaire development and focus group training, patience with me during my statistical analysis, and most importantly all your time.

I would also like to acknowledge all the hard work put in by Stephanie Aristide, Mikayla Gurrier, Felicia Hallim, Courtney Vijil, and Srijana Acharya who helped me with participant recruitment, data collection, and data analysis. To the doctoral students of HPDP, thank you for all your love and support throughout this entire journey. Thank you for your encouragement and cheering me on as I was writing this dissertation. Special thanks to the Black Student Union for assisting me with participant recruitment. I would also like to thank the University Graduate School for the Graduate Student Research Support Award and the McKnight Dissertation Year Fellowship for the financial support.

Thank you for your guidance, prayers, words of encouragement, for being my biggest supporters, and providing much-needed financial help throughout my doctoral studies, mom and dad. Thank you to all of my family and friends who have listened to my difficulties and triumphs. Words can't explain how grateful I am to my wonderful family and friends. Finally, none of this would have been possible without God, who has been my strength, guidance, and peace throughout my doctoral journey.

ABSTRACT OF THE DISSERTATION

I GOT TO BE HEALTHY FOR ME BEYOND COVID: THE INFLUENCE OF THE COVID-19 PANDEMIC ON HYPERTENSION PREVENTION AMONG BLACK COLLEGE STUDENTS: A MIXED METHODS STUDY

by

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Professor Elena Bastida, Major Professor

Black college students are at an increased risk of developing hypertension resulting from their race, ethnicity, family history, and added stressors of college life. Hypertension is a risk factor for COVID-19 disease severity hence the need to investigate its impact on hypertension risk factors. The purpose of this mixed-methods explanatory study was to understand the influence of the COVID-19 pandemic on hypertension awareness among Black college students.

A cross-sectional, online survey was conducted to study the effect of knowledge, attitudes, and practices on hypertension risk factors among Black college students (Aim 1). The mean hypertension knowledge score was 7.54 (SD = 2.22) from a total of 14. Age was significantly associated with hypertension knowledge ($p = .008$) and hypertension practices ($p = .001$). Graduate students' knowledge was significantly higher than all other education levels ($p = .000$).

Focus group interviews were conducted to understand the unique experiences of Black college students during the time of the COVID-19 pandemic (Aim 2). Data for this aim were organized into three categories and subthemes: (1) the influence of COVID-19 on daily life, (2) the influence of the COVID-19 pandemic on hypertension risk factors,

and (3) the influence of the COVID-19 pandemic on hypertension preventative behaviors.

Surveys and focus group interviews were conducted to investigate the effect of COVID-19 pandemic on hypertension awareness among Black college students (Aim 3). Over half, 53.4%, expressed no increase in blood pressure monitoring since the pandemic. Although COVID-19 had little effect on their hypertension preventative behaviors or blood pressure monitoring, students discussed how the pandemic changed lifestyle behaviors, increasing their risk for hypertension development. Over half, 67.1%, agreed that hypertension leads to worse COVID-19 health outcomes and increased risk of heart attacks and strokes, infections, longer recoveries, and even death as consequences of COVID-19 on hypertensive patients.

Findings can be used by colleges and universities in designing programs to inform and increase knowledge on hypertension among susceptible Black college students, while also devising comprehensive plans to address the detriment the COVID-19 pandemic has taken on students as their physical and mental health and academic performance depend on it.

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CHAPTER 1: INTRODUCTION

BACKGROUND

The coronavirus disease 2019 (COVID-19) killed 932,894 American (Centers for Disease Control and Prevention, 2022b) as of February 22, 2022, with Black/African Americans being disproportionately impacted experiencing higher death rates. According to the (Centers for Disease Control and Prevention, 2022b), 92,075 non-Hispanic Blacks deaths were caused by COVID-19 making up 13.7% of all COVID-19 related deaths. Not only are Black/African Americans disproportionately impacted by the virus, but they also experience worse health outcomes, disease severity, and mortality (Khanijahani, 2021; Mackey et al., 2021; Mukherjee et al., 2020; Selden & Berdahl, 2020).

Cardiovascular disease has been the leading cause of death in America for the past few decades, hypertension being a major risk factor. Among cardiovascular diseases, hypertension is the most expensive component, causing the burden to grow faster than the ability to combat the disease. Hypertension was projected to cost Americans $119.1 billion in 2020 due to direct medical costs with a projected increase to $200.3 billion by 2030 (Heidenreich et al., 2011). African Americans have the highest prevalence of hypertension in the world (American Heart Association, 2015) and are diagnosed with hypertension at a faster rate than any other population group in the United States. Hypertension in African Americans can be severe to the extent that it may cause some medications to be ineffective (American Heart Association, 2022). About 108 million American adults have hypertension, when uncontrolled it can lead to serious and severe health problems (Centers for Disease Control and Prevention, 2021) such as severe COVID-19 complications (Du et al., 2021; Huang et al., 2020; Mehra et al., 2020; Pranata et al., 2020).

The COVID-19 health disparity in the Black community may be attributed to the disproportionate higher prevalence of diabetes and cardiovascular diseases. Compared to other racial and ethnic minorities, the Black community experiences structural racism that contributes to poor lifestyle behavior choices that lead to their higher rates of hypertension (Akintobi et al., 2020; Rodgers & Gibbons, 2020; Yancy, 2020). Several researchers have tracked the progress of COVID-19 progression in hypertensive patients, which has been associated with higher rates of disease severity and mortality rates from COVID-19 (Du et al., 2021; Huang et al., 2020; Mehra et al., 2020; Pranata et al., 2020), causing the US Surgeon General to speak out on how to control hypertension during the time of the COVID-19 pandemic (American Medical Association, 2020). The increase of risk for developing hypertension in the Black community may be attributed to COVID-19 protocols such as staying in, no longer going to the gym, and increasing their alcohol and tobacco use to cope with stressors of the COVID-19 pandemic (Berg, 2021).

Researchers have shown an increase in cardiovascular incidents following natural disasters such as Hurricane Katrina and Hurricane Sandy which may be attributed to the stress caused by such traumatic life events (Kario et al., 1997; Lenane et al., 2019; Swerdel et al., 2014). Members of the Black community are more likely to experience stressors, such as racial discrimination than non-Black people putting them at greater risk for developing hypertension (Dolezsar, 2014; Forde et al., 2020; Michaels et al., 2019). There is little to no research demonstrating whether or how the COVID-19 pandemic has impacted hypertension awareness among Black college students.

African American college students are at an increased risk of developing hypertension due to their race, ethnicity, family history, and the added stressors of being a college student (Wright et al., 2018). Compared to other racial/ethnic groups, non-Hispanic Blacks tend to underestimate their weight (Lee et al., 2018) and women, in

particular, report fewer dieting and exercise for the purpose of weight loss practices compared to Asians, Hispanics, and non-Hispanic whites. Non-Hispanic Blacks also reported more days of not getting enough sleep compared to other racial/ethnic groups (Lee et al., 2018), all of which are hypertension risk factors (American Heart Association, 2017). Non-Hispanic Black students are less likely to meet recommended fruit and vegetable consumption and more likely to have a diet high in sugary beverages, in comparison to non-Hispanic white students (Rupp et al., 2020). African American college students not only experience the stressors of being in college but also experience added stressors related to racial and ethnic backgrounds, such as racial prejudices (Greer et al., 2015). As Shearer et al., (2016) note, there is a strong association between stress and hypertension among college students but little is known about the knowledge, attitudes, and practices of Black college students related to hypertension prevention.

Significance

With cardiovascular disease, the leading cause of death in America in 2020 (Centers for Disease Control and Prevention, 2022a) and hypertension a major risk factor for COVID-19 disease severity, there is a great need for more effective hypertension prevention interventions. Approximately one in three American adults have been diagnosed with hypertension with college-aged adults (ages 18-24) making up 6.4% of the diagnosis (Kamara et al., 2019). Black college students are at high risk of developing hypertension, which can benefit from culturally tailored interventions aimed at decreasing their risks. Researchers have used universities as focal points for tailored interventions aimed at behavior changes in college students. The pilot study of Holland et al., (2014) tested a culturally tailored curriculum aimed at increasing cardiovascular disease risk awareness in African American college students. The intervention

succeeded in increasing the students' knowledge of cardiovascular disease risk factors, physical activity, diet, and stress management skills. Although this intervention was beneficial, it had limitations, including a small sample size and the use of only one university campus, which reduce its generalizability; therefore, needing further research with larger sample sizes.

Nazar et al., (2019) sought to improve cardiovascular disease health literacy among the local university students. Health literacy was regarded as awareness about hypertension related information and symptoms of stroke during the pretest assessment. After the completion of the intervention "questions about symptoms of stroke, complications of hypertension on kidneys and eyes, hypertension as a silent killer and taking stress as the most important cause of heart attack," awareness knowledge significantly increased. Adding to the existing literature of universities serving as a focal point of tailored interventions for increasing knowledge and behavioral change (Nazar et al., 2019).

It is expected that this study will contribute to the development of tailored hypertension prevention interventions. Using a mixed method approach, empirical data were collected on the experience of Black college students during the COVID-19 pandemic as it relates to hypertension awareness. The mixed method approach allowed for an enhancement of the survey findings through further discussion of the survey data in focus group discussions. If the proposed aims of this study are achieved, information to begin the process of designing tailored hypertension prevention interventions for Black college students will be available. Through the assistance of the data collected, I will have: (1) examined the source and accuracy of hypertension knowledge in Black college students, (2) explored Black college students' COVID-19 experiences, and (3)

investigated the influence of the COVID-19 pandemic on hypertension awareness among Black college students.

Gaps

Black college students are at an increased risk for developing hypertension early resulting from a combination of sociodemographic and health factors such as, race, ethnicity, family history, and the added stressors of being a college student (Wright et al., 2018). There is little or no research on the knowledge, attitudes, and practices regarding hypertension prevention in this population. By understanding Black college student's hypertension knowledge, public health professionals will gain deeper insight into the accuracy of hypertension knowledge in Black college students. Gaining insight to Black college students' attitudes towards developing hypertension will allow public health professionals to better tailor hypertension informational materials to educate this population of their high risk towards developing hypertension. Colleges and universities can use the collected data regarding Black college students' hypertension practices, as well as their knowledge and attitudes, to design tailored interventions to both increase hypertension awareness while also decreasing their risk for developing hypertension.

COVID-19 has disproportionately impacted the Black community with Black adults experiencing severe COVID-19 health outcomes more than white adults across all age categories (Selden & Berdahl, 2020). Hypertension also leads to worse health outcomes in COVID-19 patients (Du et al., 2021; Huang et al., 2020; Kreutz et al., 2021; Rodgers & Gibbons, 2020). Researchers have worked extensively on the impact of hypertension on COVID-19 health outcomes (Berg, 2021; Du et al., 2021; Huang et al., 2020; Kreutz et al., 2021; Parveen et al., 2020; Pranata et al., 2020) however, there is no research on the impact of COVID-19 on Black college students' attitudes regarding hypertension awareness and vaccination uptake. Research on the association between

COVID-19 and hypertension in Black college students is also lacking. Understanding the impact of the COVID-19 pandemic on Black college students will prepare colleges and universities on how to better assist their students' success as we deal with this pandemic and any other pandemics or other emergencies we may encounter in the future.

COVID-19 has disrupted everyone's lives due to safer at home movements and colleges and universities transitioning to online and remote learning (Coughenour et al., 2021). The COVID-19 pandemic shifted college students' daily routines causing them to spend more time at home, increasing their stress levels and food intake while decreasing their physical activity (Brito Silva et al., 2021; Coughenour et al., 2021), all of which are risk factors for developing hypertension (American Heart Association, 2017). Since compliance with COVID-19 protocols may have led to greater exposure to hypertension risk factors behaviors (Berg, 2021), it is important for public health professionals and colleges and universities to understand how the COVID-19 pandemic has impacted Black college students' physical and mental health.

Research Aims

Aim 1: Study the effect of psychosocial factors – knowledge, attitudes, and practices – on hypertension awareness among Black college students

Aim 2: Understand the unique experiences of Black college students during the time of the COVID-19 pandemic and its effect on hypertension risk factors

Aim 3: Investigate the influence of the COVID-19 pandemic on hypertension awareness among Black college students

Methods

Study Design

This study aimed to identify Black college students' 1) hypertension knowledge, attitudes, and practices and 2) the possible impact of COVID-19 protocol compliance on hypertension prevention and their risk for developing hypertension. This cross-sectional study incorporated an explanatory mixed methods approach including a survey and focus groups. The study included students who self-identify as Black. Faculty and staff with larger class enrollment were emailed the information of the study with electronic mailing to pass along to their students currently enrolled. The recruitment process began sending Florida International University professors, department heads, and office specialists with a request to distribute the details of the email to their students. The body of the email included a brief introduction to the study with a link to the survey. A flyer was also shared with the Black Student Union for inclusion in their weekly newsletter and shared with students around campus and those attending events put on by the Black Student Union. The flyer included a QR code, that when activated, took the participants to the direct link to the survey. No sensitive information or personally identifiable information was collected during the recruitment process.

Procedures

Data were collected from undergraduate and graduate students that were currently enrolled. The body of the email included a brief introduction to the study with a link to the survey (Merianos et al., 2020). Upon beginning the survey, a screen with a basic introduction to the study appeared. The following screen included questions to determine participants' eligibility. Once eligibility was established, participants reached a screen with a link to the informed consent form, which included consenting to participate in both the online survey and the focus group interviews. Participants gave their consent

to participate in both the online survey and focus group interview if they chose the yes option and proceeded to take the online survey. For aim 1, a questionnaire was used to assess the participants' knowledge, attitudes, and practices towards hypertension and the impact of COVID-19 on hypertension awareness. Aim 2 utilized focus groups to understand the impact of the COVID-19 pandemic in hypertension risk factors. Aim 3 utilized an explanatory mixed-method approach of both the survey and focus group to better understand the impact of COVID-19 on Black college students' hypertension awareness.

Measures

The internet-based questionnaire was developed by the research team to explore and identify Black college students' knowledge, attitudes, practices, and the impact of COVID-19 on hypertension prevention and their risk for developing hypertension. The questionnaire consisted of six sections. Section 1 asked participants demographic questions. Section 2 asked participants about their modifiable risk factors such as diet, physical activity, and weight management. Section 3 asked participants about their hypertension knowledge. Section 4 asked participants their most trusted source for information about hypertension. Section 5 asked participants about the impact of COVID-19 on their hypertension awareness. Section 6 asked participants about their willingness and intentions to get the COVID-19 vaccine.

Focus group questions were developed using a semi-structured interview guide. The questions were developed by the research team and aimed to identify factors influencing Black college students' knowledge and attitudes towards hypertension prevention. Questions included hypertension attitudes, COVID-19 impact on daily life, and beliefs regarding the impact of hypertension on COVID-19 disease severity. Questions were developed after conducting an extensive literature review and were pilot

tested with a group of six Black college students not taking part in the study. Since only minor changes were made after being pilot tested, the results from the pilot test were included in the study. Each focus group began with seven brief demographic questions. After each participant answered all the demographic questions, the audio recording began. The semi-structured question guide was arranged into three sections based on the constructs of The Theory of Planned Behavior. During focus groups, the moderator followed the interview guide and asked follow-up questions whenever necessary to obtain more in-depth information from the participants as suggested by Deliens et al., (2014).

Data Analysis

Descriptive statistics were performed for sociodemographic variables. SPSS version 25 was used for many of the analyses. Frequencies, percentages, and descriptive statistics were calculated for all variables. All continuous variables were checked for normality. Total mean scores of each variable were obtained. Independent samples t-tests were used to examine differences in knowledge, attitudes, and practices; demographic variables included race, ethnicity, gender, age, hypertension status, and diabetes status). Chi-square was performed to establish statistically significant associations between hypertension knowledge, attitudes, and practices and demographic variables (age, race/ethnicity, gender, and education classification). One-way between groups analysis of variance was conducted to explore the impact of year in school on hypertension knowledge, attitudes, and practices. Statistical significance was set as $p < 0.05$.

Focus groups were originally transcribed through the Zoom software. Research assistants went through and corrected any mistakes in the transcripts made by Zoom. To ensure data accuracy, the primary researcher listened to the recorded focus groups

and corrected the transcriptions, as necessary. After all the transcriptions were completed, the primary researcher read through each transcript and developed a detailed codebook based on similar themes. The research team became familiar with the data through transcriptions, reading the transcripts, and developing the codebook. As the analysis progressed, researchers developed codes based on themes developed from reviewing the transcript (Alexander et al., 2018). The research team used thematic analysis to analyze and organize the focus group data by generating codes for topics based on emergent themes and topics of interest (Peters et al., 2006). The NVivo software was used to organize the data for the development of the codebook and data analysis. Through consulting with the research team, the final codebook was established. The research team finalized the themes after reviewing the codebook and an extensive review of the literature. Final transcripts and codebooks were verified by all members of the research team.

Ethical Consideration

Florida International University's Institutional Review Board approved the study protocol (IRB-21-0049).

Aim 1

Black college students are at an increased risk for developing hypertension, hence there is a great need to better understand their hypertension knowledge, attitudes, and practices. Assessing Black college students' hypertension knowledge, attitudes, and practices, allows public health professionals to better understand the accuracy of the information Black college students are receiving as it pertains to hypertension.

There are many benefits to understanding hypertension knowledge. Some of which include an increase in hypertension prevention or its control and management

(Abu et al., 2018) and gaining information to tailor interventions (Ludescher et al., 1993; Valentine et al., 2012; Wright et al., 2018), which can aid in the alleviation of hypertension health disparity (Cooper et al., 2020). Abu et al., (2018) sought to examine the association between hypertension knowledge and preventative behaviors in a group of 385 hypertensive patients. They found that participants with greater hypertension knowledge had greater control and management of their hypertension. Hypertension knowledge was also associated with hypertension prevention behaviors. Patients with lower hypertension knowledge were less likely to make dietary changes such as eating less and decreasing salt consumption.

To better understand attitudes towards managing hypertension in young adults, Johnson et al., (2016), conducted two focus groups with 38 hypertensive young adults aged 18-39. In this study, the participants were asked a series of questions, some of which focused on attitudes regarding their hypertension diagnosis and the lifestyle changes needed to manage hypertension. Overall, participants in this study did not perceive themselves to be at risk of developing hypertension at such an early age, most of whom thought it would never happen. The researchers also found that participants' behaviors such as physical inactivity and alcohol and tobacco use were putting them at greater risk for developing cardiovascular disease even though they thought they were at low risk of developing cardiovascular disease.

There are many lifestyle behaviors that serve as risk factors for developing hypertension, with hypertension being a major risk factor for developing cardiovascular disease. Engaging in these practices may increase one's risk of developing hypertension leading to the development of cardiovascular disease. Being diagnosed with pre-hypertension or hypertension earlier in life can lead to chronic cardiovascular disease later in life (Kelley & Lowing, 1997). Covelli, (2007) investigated the prevalence of

cardiovascular disease and the practices that are serving as risk factors for the development of cardiovascular disease in a sample of African American adolescents. In this study, Covelli, (2007) conducted secondary data analysis on a sample of 48 African American adolescents aged 14-17. He found that 29% of the population had elevated blood pressure. Blood pressure measures of fourteen participants led to their classification as prehypertension or hypertensive on two separate occasions, increasing their risk for a later hypertension diagnosis. Participants also only averaged 2.4 servings of fruits and vegetables a day and 2.3 days of exercise per week.

Several researchers have mentioned the great need for tailored interventions for Black college students to increase their cardiovascular disease knowledge and awareness (Ludescher et al., 1993; Valentine et al., 2012; Wright et al., 2018). Valentine et al., (2012), conducted a study to assess cardiovascular risk factors in students attending a Historically Black College and University (HBCU). They found that African American college students are at an increased risk of developing cardiovascular disease through risk factors such as obesity, hypertension, family history, and lack of physical activity and urged for tailored hypertension interventions to decrease Black college students' risk for developing chronic diseases. Such interventions, the researchers suggest, can increase Black college students' health literacy, health behaviors, and lifestyle choices that are needed to improve behavioral changes to decrease their risk for developing hypertension (Valentine et al., 2012).

As noted above, the purpose of this aim was to examine Black college students' knowledge, attitudes, and practices regarding hypertension prevention. Specifically, this aim focused on the accuracy of Black college students' hypertension knowledge, Black college students' attitudes towards sources to provide correct information about hypertension, and the hypertension prevention practices they are most likely to engage

in. Data collected under this aim will fill the gap in the literature on the lack of knowledge, attitudes, and practices regarding hypertension prevention in this population while serving as a source to develop culturally tailored interventions to prevent hypertension in Black college students.

Aim 2

Hypertension is a major risk factor for COVID-19 disease severity stressing the great need to investigate its impact on hypertension awareness. About 103 million American adults have hypertension, which when uncontrolled can lead to serious and severe health problems (Zhang & Moran, 2017). Hypertension leads to worse health outcomes on COVID-19 patients creating a positive association with disease severity and ICU visits among hypertensive COVID-19 patients (Parveen et al., 2020). Living a sedentary lifestyle serves as a risk factor associated with hypertension. A diet too high in salt consumption, calories, and saturated and trans-fat adds to the risk of developing hypertension. Regular, heavy use of alcohol can also cause blood pressure to increase dramatically. These are just a few risk factors that when modified can help prevent hypertension (Oliveros et al., 2018). There are several risk factors associated with hypertension, some of which are hereditary and non-modifiable, while others are modifiable. Some hereditary risks include chronic kidney disease, family history, age, gender, and race (American Heart Association, 2017).

African Americans develop hypertension more often than any other type of racial or ethnic background groups in the United States, and experience more severe cases of hypertension than any other group which leads to some medications to be ineffective (American Heart Association, 2017). Despite not being able to choose your race or close relatives to prevent high blood pressure, there are some risk factors that can be modified to prevent its development. A few controllable risks factors include physical inactivity,

unhealthy diet, overweight or obesity, high alcohol consumption, sleep apnea, high cholesterol, diabetes, smoking and tobacco use, and stress (American Heart Association, 2017). A few lifestyle modifications can go great lengths in decreasing one's risks of developing hypertension. Becoming more physically active, decreases the risk of developing hypertension while also decreasing the risk of being overweight or obese, another controllable risk factor, are lifestyle behaviors that have been found effective in the decreased risk and control of hypertension. In a study conducted by Diaz et al., (2017), African Americans' risk for developing hypertension decreased by 15.8% if they engaged in at least 150 minutes of moderate physical activity a week or 75 minutes of vigorous physical activity a week compared to those that do not partake in any weekly physical activity. This application can also be used in reference to diet. By decreasing salt consumption, caloric intake, saturated and trans-fat, and sugar, one decreases the risk for developing hypertension along with the risk for being overweight or obese. The DASH (Dietary Approaches to Stop Hypertension) is a well-known diet known to be an important modifiable risk factor to lower blood pressure. In a study that utilized The DASH-Sodium diet, participants experienced lowered blood pressure within just a week of making such lifestyle change (Juraschek et al., 2017). Stress is a risk factor that not only impacts hypertension but too much stress can contribute to poor diet, physical inactivity, and being overweight or obese (American Heart Association, 2017). In a study conducted by Gawlik et al., (2019), participants that experienced high stress were 1.4 times more likely to have prehypertension or hypertension compared to those with low stress levels. There are well established practices to decrease the risk for hypertension, yet only 54.1% of United States adults with hypertension have it controlled (Mozaffarian et al., 2016). Although many risk factors are preventable, African Americans develop

hypertension earlier in life and have the highest prevalence with more than 40% of African Americans being hypertensive (American Heart Association, 2022).

African American college students are at an increased risk of developing hypertension due to their race, ethnicity, family history, and the added stressors of being a college student (Wright et al., 2018). According to a study conducted by Lee et al., (2018), when compared to other racial/ethnic groups, non-Hispanic Blacks tend to underestimate their weight and non-Hispanic Black women also report fewer dieting and exercise practices for the purpose of weight loss than Asians, Hispanics, and non-Hispanic whites. Additionally, non-Hispanic Blacks reported more days of sleep deprivation when compared to other racial/ethnic groups (Lee et al., 2018). In comparison to non-Hispanic white students, non-Hispanic Black students are less likely to meet recommended fruit and vegetable consumption and more likely to have a diet high in sugary beverages (Rupp et al., 2020). Black college students are more likely to experience stress due to their racial/ethnic backgrounds than non-Black college students, which further increase their vulnerability to behaviors that increase their risk for developing hypertension (Greer et al., 2015).

There is a clear association between stress and hypertension among college students (Shearer et al., 2016) however, little is known about the attitudes and beliefs of African American college students related to hypertension prevention and the impact of COVID-19. Assessing hypertension awareness, allows public health professionals to better understand the impact COVID-19 has on Black college students' attitudes towards developing hypertension. The purpose of this study was to explore Black college students' COVID-19 experiences, and its impact on their perceived risk of developing hypertension. Specifically, this study sought to explore the impact of COVID-19 on Black college students' hypertension awareness. The following questions were explored: 1)

How the COVID-19 pandemic has impacted daily life, 2) How the COVID-19 pandemic impacted hypertension risk factor behaviors, and 3) How perceived risks of COVID-19 progression has motivated hypertension preventative behaviors (Chen-Sankey et al., 2020).

Aim 3

Hypertension is a major risk factor for COVID-19 disease severity leading to the need to investigate its impact on hypertension. Adults with chronic diseases such as hypertension and diabetes are at an increased risk to develop severe complications from diseases for which vaccines exist. There are many benefits to adults suffering from chronic diseases to getting vaccinated against infectious diseases (Chow et al., 2020). Vaccinations are imperative in combating the COVID-19 pandemic by promoting herd immunity. Yet some are still hesitant when it comes to their willingness to be vaccinated for the COVID-19 virus. Black adults are disproportionately impacted by both hypertension and COVID-19, yet only 10% have received at least one dose of the vaccine, as of August 2021 (Ndugga et al., 2021). Black Americans have expressed hesitancy to getting the COVID-19 vaccine mainly due to their questioning its safety and efficacy and their lack of resources such as finances and health insurance (Callaghan et al., 2021). Assessing hypertension awareness allows public health professionals to better understand the impact of COVID-19 on the attitudes toward developing hypertension in Black college students. There are many benefits to understanding the impact of vaccination uptake among Black college students including herd immunity (Kwok et al., 2021), safely repopulating college campuses, and necessary resources for Black college students to increase vaccine uptake.

There is a lack of data on the impact of COVID-19 on hypertension awareness, especially in African American college students. Due to this gap in the literature, Kreutz

et al., (2021), sought to review the lifestyle and behavior changes likely to increase hypertension risk during the COVID-19 pandemic. They found that there were several factors that both increase and decrease blood pressure during the pandemic. As physical activity decreased and sitting time increased, both factors are indicative of the increase in blood pressure. Causing a substantial decline in steps after March 2020 compared to that same time during the previous year (Mirasol, 2020). Diet has also been negatively impacted by the pandemic through the increase of food consumption, snacking, and purchases of processed food. In a study conducted during the nationwide quarantine, researchers found that nearly 52% of participants reported eating and snacking more, causing almost 30% of participants to experience weight gain (Sidor & Rzymski, 2020). The COVID-19 pandemic also increased sleep duration and decreased work-related stress, both serving as protective factors of hypertension development (Kreutz et al., 2021).

Although work related stress decreased during the pandemic (Kreutz et al., 2021), daily life stress increased causing young adults to partake in more frequent alcohol consumption and cigar smoking (Chen-Sankey et al., 2020; Graupensperger et al., 2021) both of which are risk factors toward the development of hypertension (American Heart Association, 2017). In a study conducted by Graupensperger et al., (2021), they found that although young adults are drinking less per drinking occasion, they are in fact drinking more days a week. Participants reported that the cause of the shift in drinking patterns are attributed to the lack of social drinking due to COVID-19 restrictions. Causing them to now use alcohol to cope with the daily stressors of the pandemic. Pandemic related stressors were also attributed to an increase in cigar smoking in a group of Black young adults in a study conducted by Chen-Sankey et al., (2020).

It is highly recommended that adults with diabetes and cardiovascular disease get vaccinated annually against influenza due to the many benefits the vaccine provides for such a high-risk population (Loeb et al., 2019). In a retrospective study conducted with older adults, the influenza vaccine was associated with a 20% risk reduction in major adverse cardiovascular events (Chiang et al., 2017). In a nationwide cohort study conducted in Denmark, 134,048 heart failure patients' medical records were collected using nationwide registries. Modin et al., (2019), found that patients with heart failure, who annually receive the influenza vaccine, were less likely to die than those that did not receive that vaccine as frequently. The influenza vaccine proved to be very beneficial at increasing survival rates in patients with heart failure.

One way to understand Black college students' COVID-19 vaccination uptake is to look at their vaccination beliefs of previous pandemics. Marcell & Spurlock, (2020), sought to understand the beliefs and barriers towards the flu vaccine of students attending a Historically Black colleges and universities. A flu questionnaire was used to assess a total of 33 students' views towards the flu and its vaccine. Of the participants, 57.6% did not perceive themselves to be at risk of contracting the flu, even though college students are a vulnerable population due to their high interaction and close contact with others, especially students that live on campus housing. More than half, 69.7%, of the participants also believed that they would contract the flu from receiving the vaccine and the vaccine might have dangerous side effects. This misinformation regarding the flu vaccine may contribute to lower vaccination rates in this population serving as a barrier to getting vaccinated.

The purpose of this study was to investigate COVID-19 the impact of COVID-19 on Black college students' attitudes regarding hypertension awareness. I sought to

investigate COVID-19 vaccination uptake and the attitudes towards the risk of developing hypertension before and since the COVID-19 pandemic.

Theoretical Framework

Knowledge, attitudes, and practices studies have been used since 1976, when it was first introduced by Nancy Schwartz to examine nutritional knowledge, attitudes, and practices of Canadian Public Health Nurses (Schwartz, 1976). Since then, The Knowledge, Attitude, and Practices Model has been adapted and used in many studies to examine hypertension across many different participants (Buang et al., 2019; Ralapanawa et al., 2020; Rashidi et al., 2018). The Knowledge, Attitudes, and Practices Model was used to develop items to examine Black college students' knowledge, attitudes, and practices regarding hypertension prevention and the impact of COVID-19 on hypertension awareness in Black college students. This model served as the guiding framework when developing the questionnaire to evaluate participants.

The Theory of Planned Behavior has been used in many studies to identify and increase the understanding of attitudes towards hypertension across different populations. This theory identifies attitude, subjective norm, and perceived behavioral control to understand intention, perceived behavioral control, and intention that predict health behavior. This theory served as the guiding framework when developing the semi-structured question guide to collect focus group data.

Limitations

As with all studies this too had limitations. First, given that a portion of this study is qualitative, data were dependent on participants' opinions of hypertension practices. The questions and answers collected during the focus groups were subjective to the researchers' opinions during analysis. Second, the participants were asked to report on

their knowledge, attitudes, and practices regarding hypertension prevention subjecting to self-report bias.

Summary

There are three focus areas for innovation addressed in this project: concept, population, and age. With the novelty of the COVID-19 pandemic, there is little to no research on understanding its influence on hypertension awareness and how it impacts behaviors to prevent or ameliorate COVID-19. This lack of information creates challenges in developing specifically tailored hypertension prevention intervention programs. By exploring the impact of COVID-19 on hypertension awareness in such an at-risk population, this project expects to influence the way current research is designing hypertension prevention interventions and COVID-19 prevention practices. Targeting an at-risk population before developing hypertension will assist in reducing the health disparity of hypertension in the Black community.

A vast majority of hypertension research has primarily focused on hypertensive middle-aged adults. This project adds a different perspective to hypertension research through the novelty of a college student sample, drawing from the age 18 and above. Targeting a younger population adds to the knowledge of hypertension research by including a unique perspective to hypertension awareness in the wake of the COVID-19 pandemic. By addressing this population at such an early age in life, it can assist in the alleviation of health disparity of hypertension in Black/African Americans. Race and ethnicity, family history, stress, and poor diet are just a few risk factors for developing hypertension. The population in this study is unique given that they not only possess one risk factor but all four. This project explored the study population’s hypertension knowledge and the influence of the COVID-19 pandemic on hypertension awareness.

Upon reviewing the literature on hypertension prevention in Black college students, the lack of hypertension prevention studies in this population is not surprising. Hence, I expected findings from this explanatory research project to contribute to current gaps in population studies and intervention research related to college students. Data generated by this research should lay out the foundation for future hypertension intervention programs. An explanatory mixed methods approach was used to generate empirical data to better understand the knowledge, attitudes, beliefs, and practices of hypertension prevention as it relates to the COVID-19 pandemic. The study design included both a qualitative and quantitative component, implemented in two phases. The quantitative components implemented an online questionnaire sent to participants via email. The qualitative component implemented focus groups to expand on the survey findings. Data drawn from both research methods should contribute to the development of tailored hypertension prevention programs, while also identifying the impact of COVID-19 on Black college students' hypertension awareness.

Dissertation Goal

This project will add to existing literature of hypertension prevention and perceptions of developing hypertension among Black college students. Results from this project can be applied to developing tailored interventions for hypertension prevention. Data collected can aid colleges and universities to identify students' stressors, tailor resources available to students, and assist students to manage stress during the COVID-19 pandemic and other future emergencies.

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CHAPTER 2 – FIRST MANUSCRIPT

The effect of Psychosocial Factors – Knowledge, Attitudes, and Practices - on Hypertension Awareness among Black College Students

ABSTRACT

Background: Black college students are at an increased risk for developing hypertension due to their race, ethnicity, family history, and the added stressors of being a college student. There is little or no research on the knowledge, attitudes, and practices regarding hypertension prevention in this population. By understanding Black college students' hypertension knowledge, public health professionals will gain deeper insight into the accuracy of hypertension knowledge in Black college students. The purpose of this study was to examine the accuracy of Black college students' hypertension knowledge, their attitudes towards sources that provide correct information about hypertension, and the hypertension prevention practices they are participating in.

Methods: A cross-sectional, online survey was conducted among Black college students enrolled in at least 3 credit hours using the Qualtrics software. Participants were recruited using a convenient sampling method. Members of the research team developed a 40-item, self-administered questionnaire with items regarding students' demographics, hypertension knowledge, trusted sources of information about hypertension, and hypertension preventative behaviors. A total of 322 Black college students completed the survey.

Results: Slightly over half of participants identified as African American n = 171 (53.1%), were female n = 273 (73.6%), and undergraduate students (n = 274). The mean

hypertension knowledge score was 7.54 (*SD* = 2.22) out of 14. Graduate students' knowledge was statistically significantly higher than all other education levels. A majority of participants, 82.6%, had positive attitudes towards trusting their doctor or other health care professions “a great deal” to provide them with information regarding hypertension. Slightly under half of participants, 40.4%, reported never or rarely following a healthy eating plan. When asked how often they do at least 30 minutes of physical activity in the last 7 days, only 24.5% answered always.

Conclusion: There are several behavioral changes individuals can make to prevent the onset of hypertension. The assessment of hypertension knowledge, attitudes, and practices can aid in the development of culturally tailored interventions and educational materials to increase hypertension awareness to alleviate the health disparity. Although study participants had positive attitudes toward trusting doctors and governmental health organizations to provide them with correct information about hypertension, their hypertension knowledge was poor and preventative behaviors were low. Many participants do not practice healthy behaviors such as following a healthy diet or being physically active. Colleges and universities should encourage students to get screened for hypertension and other chronic diseases, always knowing their numbers, and live a healthy lifestyle.

INTRODUCTION

Hypertension is the leading cause of death in the Black community with 56% of Black people having a previous diagnosis of hypertension (Centers for Disease Control and Prevention, 2021). Many factors increase one's risk for developing hypertension among which are race and ethnicity, family history, poor diet, and physical inactivity (American Heart Association, 2017). Black college students are unique in that they exhibit all five of the above risk factors (Wright et al., 2018). Hypertension largely

contributes to overall Black mortality. Black college students experience elevated risk hence, it is imperative to understand the knowledge, attitudes, and practices of Black college students as it pertains to hypertension awareness and risk for developing hypertension.

Several researchers have contributed studies to improve understanding of Black college students' risk for developing cardiovascular disease. For example, Kelley and Lowing (1997) sought to assess the risk of cardiovascular disease in Black college students. To do so, 238 Black college students responded to a health risk survey assessing their knowledge of blood pressure, cholesterol levels, smoking habits, and physical activity engagement. They found that Black women college students reported low levels of physical activity. Thirty-two percent of participants had their blood pressure checked recently but could not even remember if their blood pressure fell in the low, normal, or high category. Wright et al. (2018) was interested in the relationship between mindfulness, perceived stress, and blood pressure in African American college students and had 20 students complete the Mindfulness Attention Awareness Scale and the Perceived Stress Scale and had their blood pressure taken. They discovered that all students had either systolic or diastolic blood pressure readings that fell in the hypertensive range and reported having a parent with two or more cardiovascular disease risk factors.

To better understand attitudes towards managing hypertension in young adults, Johnson et al. (2016), conducted two focus groups with 38 hypertensive young adults aged 18-39. In this study, participants were asked a series of questions, some of which focused on attitudes regarding their hypertension diagnosis and the lifestyle changes needed to manage hypertension. Overall, participants in this study did not perceive themselves to be at risk of developing hypertension at such an early age, most of them

thought it would never happen. The researchers also found that participants' behaviors such as physical inactivity and alcohol and tobacco use were putting them at greater risk for developing cardiovascular disease even though they perceived themselves as being at low risk of developing cardiovascular disease.

Many lifestyle behaviors serve as risk factors for its development. Hypertension is a major risk factor for developing cardiovascular disease. Partaking in these lifestyle practices may increase one's risk of developing hypertension leading to the development of cardiovascular disease. Being diagnosed with pre-hypertension or hypertension earlier in life can lead to chronic cardiovascular disease later in life (Kelley & Lowing, 1997). Covelli (2007) investigated the prevalence of cardiovascular disease and the practices that are serving as risk factors for the development of cardiovascular disease in a sample of African American adolescents. In this study, Covelli (2007) conducted secondary data analysis on a sample of 48 African American adolescents aged 14-17. He found that 29% of the population had elevated blood pressure. Fourteen of the participant’s blood pressure was classified as prehypertension or hypertensive on two separate occasions, increasing their risk of later being diagnosed with hypertension. Participants also only averaged 2.4 servings of fruits and vegetables a day and 2.3 days of exercise per week.

Black college students are at an increased risk for developing hypertension due to their race, ethnicity, family history, and the added stressors of being a college student (Wright et al., 2018). Previous researchers have shown a great need to increase the awareness of knowing your blood pressure to prevent hypertension and the need for tailored intervention to decrease hypertension risk in Black college students. There is little to no research on the knowledge, attitudes, and practices regarding hypertension prevention in this population. By understanding Black college students’ hypertension

knowledge, public health professionals will gain deeper insight into the accuracy of their hypertension. Insight and understanding of Black college students' attitudes towards developing hypertension will allow public health professors to better tailor hypertension informational materials to educate this population about their high risk for developing this health condition. Colleges and universities can use the data collected here regarding Black college students' hypertension practices, as well as their knowledge and attitudes, to design tailored interventions to both increase hypertension awareness while also decrease their risk for developing hypertension. The purpose of this aim was to examine Black college students' knowledge, attitudes, and practices regarding hypertension prevention. Specifically, this aim focused on the accuracy of Black college students' hypertension knowledge, their attitudes towards sources that provide correct information about hypertension, and the hypertension prevention practices Black college students are participating in. Findings can serve as a source to guide and develop culturally tailored interventions to prevent hypertension in Black college students.

Theoretical Framework

Knowledge, attitudes, and practices studies have been used since 1976 when it was first introduced by Nancy Schwartz to examine nutritional knowledge, attitudes, and practices of Canadian Public Health Nurses (Schwartz, 1976). Since then, The Knowledge, Attitude, and Practices Model has been adapted and used in many studies to examine hypertension across diverse populations (Buang et al., 2019; Ralapanawa et al., 2020; Rashidi et al., 2018). The Knowledge, Attitudes, and Practices Model was used to develop items to examine Black college students' knowledge, attitudes, and practices regarding hypertension prevention and the impact of COVID-19 on hypertension awareness in Black college students. This model served as the guiding framework when developing the questionnaire to evaluate participants.

Methods

Design

This study was designed as a cross-sectional survey of Black college students' knowledge, attitudes, and practices regarding hypertension awareness and their risk for developing hypertension. Florida International University's Institutional Review Board approved the study protocol (IRB-21-0049).

Sample

Black college students were recruited through an emailed delivered survey to faculty and staff at Florida International University. Three hundred seventy-three students participated in the study, fifty-one participants started the survey but did not complete it, hence were excluded from data analysis. Statistical analyses were conducted between students that completed the survey and those that did not. There were no statistical differences between sociodemographic variables between complete and incomplete survey participants. To be eligible for the study, students had to 1) identify as Black, 2) be over the age of 18, and 3) be enrolled in at least 3 credit hours. Participants' ages ranged from 18 to 77 years old. All were recruited through an email delivered survey. Instructions were emailed to provide students with relevant study information. The recruitment process began by sending university professors, department heads, and office specialists an introductory email with a request to distribute the details of the email to their students. The body of the email included a brief introduction to the study with a link to the survey. A flyer was also shared with the Black Student Union to include in their weekly newsletter and shared with students around campus and participants attending events put on by the Black Student Union. The flyer included a QR code that took student volunteers to the direct link to the survey. No

sensitive information or personally identifiable information was collected during the recruitment process.

Procedure

An exploratory, cross-sectional survey design was conducted to identify Black college students' hypertension knowledge, attitudes, and practices regarding hypertension prevention. Students were recruited through administrators who sent emails with details of the study, including a link to the survey. Participants were also recruited through flyers distributed across campus and at Black Student Union events, which included a summary of the research study and a QR code that directed students to the survey.

Once participants clicked on the survey link or scanned the QR code, participants were directed to a screen with a basic introduction to the study, similar to the recruitment email. After establishing eligibility, students were asked to provide their consent to participate in the research study and to continue with the survey. A $5 Amazon gift card was emailed to all participants who completed the survey and chose to provide an email address, which was the only identifiable information collected. This recruitment method respected potential participants' privacy since the recruitment process was only email and passing out flyers. No sensitive information or personally identifiable information was collected during the recruitment process.

The internet-based questionnaire was developed by the research team to better identify Black college students' knowledge, attitudes, practices, and the impact of COVID-19 on hypertension prevention and their risk for developing hypertension. The questionnaire consisted of five sections. Section 1 asked demographic questions. Section 2 asked about modifiable risk factors such as diet, physical activity, and weight management. Section 3 included questions on hypertension knowledge. Section 4 asked

about attitudes towards trusting sources for information about hypertension. Section 5 asked about the impact of COVID-19 on their hypertension awareness.

Measures

An internet-based questionnaire was developed by the research team to better identify Black college students' knowledge, attitudes, and practices, regarding hypertension awareness. Demographic questions were used to assess participants' age, African American identity, ethnic background, gender, year in school, hypertension diagnosis, and prediabetes/diabetes diagnosis.

Hypertension knowledge was assessed using the HELM Knowledge Scale (Schapira et al., 2012). Knowledge statements were coded as either correct or incorrect with unanswered questions marked as incorrect. A total of 14 knowledge questions were asked with sample questions including: "Most people can tell when their blood pressure is high because they feel bad." and "Most of the salt Americans eat is added with a salt shake." Scores ranged from 0 to 14 where correct answers were coded as 1 and incorrect answers as 0. The sum score was used to assess hypertension knowledge. Hypertension practices were assessed using the Hypertension - Self-care Activity Level Effects (H-Scale) (Warren-Findlow & Seymour, 2011). The H-Scale was culturally adapted for this study. Hypertension practices were broken down into the three sections low salt diet (5 items), physical activity (2 items), and weight management (10 items).

Questions on hypertension attitudes included 9 items drawn from the NIH Community Engagement Alliance (CEAL) Against COVID-19 Disparities: Common Survey (Rubin, 2021; Stevens et al., 2021). The CEAL survey was adapted for this study. Hypertension attitudes were assessed by asking participants who are their trusted sources of information about hypertension.

Data Analysis

Descriptive statistics were performed for sociodemographic variables. SPSS version 25 was used for many of the analyses. Frequencies, percentages, and descriptive statistics were calculated for all variables. All continuous variables were checked for normality. Total mean scores of each variable were obtained. Independent samples t-tests were used to examine differences in knowledge, attitudes, and practices; demographic variables included race/ethnicity (African American, African, Caribbean, South American, or other), gender (male, female, trans female, trans male, non-binary, prefer not to answer), age (age in years), hypertension status (yes or no), and diabetes status (yes or no). Pearson's chi-squared tests were performed to establish statistically significant associations between hypertension knowledge, attitudes, and practices and demographic variables (age, race/ethnicity, gender, and education classification. One-way between groups analysis of variance was conducted to explore the impact of year in school on hypertension knowledge, attitudes, and practices. Statistical significance was set as $p < 0.05$.

Results

Demographics

Three hundred seventy-three college students participated in the survey. Fifty-one students were excluded from data analysis due to completing less than 50% of the questionnaire, a total of 322 students were included in data analysis. All participants were enrolled in at least 3 credit hours during the semester in which they participated in the study. Slightly over half of participants identified as African American n = 171 (53.1%), Caribbeans accounted for 107 (33.2%) study participants, sixteen (5%) identified as African, eleven (3.4%) identified as South American, with sixteen (5%) study participants identified as Other. Most participants were female n = 273 (73.6%).

Most participants were undergraduate students (n = 274). Most participants, n = 296 (91.9%), did not have a previous diagnosis of hypertension, and most n = 300 (93.2%) did not have a previous diagnosis of pre-diabetes or diabetes. Participants were between the ages of 18 and 77 years of age, with a mean age was 23.98 (*SD* = 6.89), most participants were aged 18-24 (50.3%) and 23.9% were 25 and older. (See Table 1)

Hypertension Knowledge

A total of fourteen hypertension knowledge-related questions were analyzed. Knowledge scores ranged between 2 (0.9%) and 14 (0.6%), equaling a perfect score. (See Table 2) The mean hypertension knowledge score was 7.54 (*SD* = 2.22). Nearly all participants (82.9%) correctly answered the question of when a person is considered to be hypertensive. Slightly over half of participants (58.4%) correctly identified the following statement as false: “Most people can tell when their blood pressure is too high because they feel bad.” Only 23.7% of participants correctly answered that uncontrolled hypertension can lead to kidney failure. Slightly over half of participants (50.6%) correctly answered false when asked “Most of the salt Americans eat is added with a saltshaker.”

An independent sample t-test was performed to compare hypertension knowledge between racial/ethnic backgrounds. To conduct the t-test, the racial/ethnic variable was recoded as a binary variable. Study participants that self-identified as African American were labeled as “African American.” “Non-African American Black” was used to label participants that self-identified as Caribbean, African, South American, and Other. There was not a statistically significant difference in the overall hypertension knowledge score between African Americans and Non-African American Blacks; t (319) = -1.63, p = .104, 95% CI (-.89, .08). An independent sample t-test was performed to compare hypertension knowledge between males and females. There was not a

statistically significant difference in the overall hypertension knowledge score between males and females; *t* (313) = .268, *p* = .789, 95% CI (-.494, .650). An independent sample t-test was performed to compare hypertension knowledge between age groups, 18-24 and 25+. There was a statistically significant difference in the overall hypertension knowledge score between participants ages 18-24 and participants aged 25 and older; *t* (237) = -2.69, *p* = .008, 95% CI (-1.38, -2.25). An independent sample t-test was performed to compare hypertension knowledge between hypertensive participants and non-hypertensive participants. There was not a statistically significant difference in the overall hypertension knowledge score between hypertensive and hypertensive participants; *t* (318) = .527, *p* = .603, 95% CI (-.704, 1.19). An independent sample t-test was performed to compare hypertension knowledge between diabetic and non-diabetic participants. There was not a statistically significant difference in the overall hypertension knowledge score between diabetic and non-diabetic participants; *t* (320) = -.678, *p* = .499, 95% CI (-1.28, .614).

A one-way between groups analysis of variance was conducted to explore the impact of year in school on hypertension knowledge, as measured by the hypertension evaluation of lifestyle and management (HELM) scale. Participants were divided into five groups according to their classification (Group 1: freshman; Group 2: sophomore; Group 3: junior; Group 4: senior; Group 5: graduate student). There was a statistically significant difference at the $p < .05$ level in HELM scores for the five classifications: *F (*4, 316) = .367, *p* = .00. Post-hoc comparisons using Tukey HSD test indicated that the mean score for freshmen (*M* = 7.16, *SD* = 2.18) was significantly different from graduate student (*M* = 8.44, *SD* = 2.38). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for sophomores (*M* = 6.65, *SD* = 1.93) was significantly different from graduate students (*M* = 8.44, *SD* = 2.38). Post-hoc comparisons using

Tukey HSD test indicated that the mean score for juniors (*M* = 7.46, *SD* = 1.87) was significantly different from graduate student (*M* = 8.44, *SD* = 2.38). Post-hoc comparisons using Tukey HSD test indicated that the mean score for seniors (*M* = 7.45, *SD* = 2.34) was significantly different from graduate student (*M* = 8.44, *SD* = 2.38).

Pearson's chi-squared test was used to examine if any statistically significant associations exist between age and hypertension knowledge (See Table 2). Low knowledge was scored with a score of 8 or less and knowledge scores of 9 or greater were classified as high knowledge. A chi-square test for independence (with Yates' Continuity Correction) indicated a significant association between age and hypertension knowledge, $\chi 2$ (1, n = 239) = 7.98, p = .005, *phi* = .192.

A multiple linear regression was used to predict hypertension knowledge from gender, education classification, age, ethnicity, hypertension status, and diabetes status. (see Table 4) These variables significantly predicted hypertension status, F (6, 227) = 2.687, p = .015, R^2 = .066.

Hypertension Attitudes

A total of nine questions were used to assess hypertension attitudes. Hypertension attitudes scores ranged from 5 (.3%) to 36 (.3%), with a mean score of 27.65 (*SD* = 3.78). (See Table) Hypertension attitudes were broken down into three categories: trust in the government, trust in the media, and trust in your peers. Governmental trust was broken down into four questions ranging from 4 (.3%) to 16 (47.2%). Media trust was broken down into two questions with scores ranging from 2 (3.8%) and 8 (3.4%). Peer trust was broken down into three questions with scores ranging from 1 (.3%) and 12 (2.8%).

An independent sample t-test was performed to compare hypertension attitudes between African Americans and Non-American Blacks. There was not a statistically

significant difference in the overall hypertension attitude score between African Americans and Non-American Blacks; t (308) = 1.63, p = .103, 95% CI (-.14, 1.55). An independent sample t-test was performed to compare hypertension attitudes between age groups, 18-24 and 25+. There was a statistically significant difference in the overall hypertension attitude score between participants ages 18-24 and participants aged 25 and older; t (230) = 1.32, p = .189, 95% CI (-.143, 1.55). An independent sample t-test was performed to compare hypertension attitudes between males and females. There was not a statistically significant difference in the overall hypertension attitude score between male and female participants; t (308) = -.955, p = .340, 95% CI (-1.46, .51). An independent sample t-test was performed to compare hypertension attitudes between hypertensive participants and non-hypertensive participants. There was not a statistically significant difference in the overall hypertension attitude score between hypertensive and hypertensive participants; t (307) = -1.22, p = .222, 95% CI (-2.61, .61). An independent sample t-test was performed to compare hypertension attitudes between diabetic and non-diabetic participants. There was not a statistically significant difference in the overall hypertension attitude score between diabetic and non-diabetic participants; t (309) = -.557, p = .583, 95% CI (-2.12, 1.20).

A one-way between groups analysis of variance was conducted to explore the impact of year in school on hypertension attitudes. Participants were divided into five groups according to their classification (Group 1: freshman; Group 2: sophomore; Group 3: junior; Group 4: senior; Group 5: graduate student). There was not a statistically significant difference at the $p < .05$ level in hypertension attitude scores for the five classifications: F (4, 305) = 2.16, p = .073.

Pearson's chi-squared test was used to examine if any statistically significant associations exist between age and hypertension attitudes (See Table 3). Low trust was

scored with a score of 28 or less and trust scores of 29 or was classified as high trust. A chi-square test for independence (with Yates' Continuity Correction) indicated no significant association between age and hypertension attitudes, $\chi 2$ (1, n = 232) = 1.99, p = .158, phi = -.102.

A multiple linear regression was used to predict hypertension attitudes from gender, education classification, age, ethnicity, hypertension status, and diabetes status. These variables did not significantly predict hypertension status, F (6, 220) = 1.712, p = .119, R^2 = .045.

Trust in the Government

A total of four questions were used to assess how much study participants trust health professionals and the government to provide correct information about hypertension. Trust scores ranged from 4 (.3%) to 16 (47.2%). The mean trust score was 14.2 (SD = 2.42). When asked about their trust in their doctor or other health care professional, 1.2% (n = 4) answered I don't know, 1.2% (n = 4) answered not at all, 11.5% (n = 37) answered a little, and 82.6% (n = 266) answered a great deal. When it came to their trust in the Centers for Disease Control and Prevention (CDC), 4.7% (n = 15) responded I don't know, 5.3% (n = 17) responded not at all, 25.8% (n = 83) responded a little, and 60.6% (n = 195) responded a great deal. Participants were least trusting of the Food and Drug Administration (FDA), with 4.7% (n = 15) answering I don't know, 8.1% (n = 26) answering not at all, 28.6% (n = 92) answering a little, and 55% (n = 177) answering a great deal. When asked about their trust in the National Institutes of Health (NIH), 6.2% (n = 20) reported I don't know, 2.2% (n = 7) answered not at all, 18.9% (n = 61) reported a little, and 68.6% (n = 221) answered a great deal.

Trust in the Media

Two questions were used to assess participants' level of trust in the media to provide correct information about hypertension. Trust scores ranged from 2 (3.1%) to 8 (3.4%), with a mean score of 5.16 (*SD* = 1.26). Participants were not very trusting on their contacts on social media to provide them with correct information about hypertension, 4.3% (n = 14) answered I don't know, 52.5% (n = 169) answered not at all, 32.3% (n = 104) answered a little, and only 6.5% (n = 21) answered a great deal. When asked about their trust in news sources such as websites, newspapers, TV, or radio, 7.1% (n = 23) responded I don't know, 22.7% (n = 73) responded not at all, 52.5% (n = 169) responded a little, and 13.7% (n = 44) responded a great deal.

Trust in Peers

A total of three questions were asked to determine participants' level of trust in their peers to provide correct information about hypertension. Trust scores ranged from 1 (.3%) to 12 (2.8%), with a mean trust score of 8.3 (*SD* = 1.75). When asked about their trust in their religious or faith leaders, 8.7% (n = 28) responded I don't know, 43.2% (n = 139) responded not at all, 29.5 (n = 95) responded a little, and 15.2% (n = 49) responded a great deal. When asked about their trust in their close friends and family members, 4% (n = 13) answered I don't know, 14.9% (n = 48) answered not at all, 50.6% (n = 163) answered a little, and 26.4% (n = 85) answered a great deal. When asked about their trust in their coworkers, classmates, or other people they know, 5% (n = 16) reported I don't know, 25.2% (n = 81) reported not at all, 52.8% (n = 170) reported a little, and 13% (n = 42) reported a great deal.

Hypertension Practices

A total of fourteen hypertension practices related questions were analyzed. Hypertension practices ranged between 27 (.3%) and 60 (.6%), with a mean score of

44.17 (*SD* = 6.19). Hypertension practices were broken down into three categories: diet, physical activity, and weight management. Diet was broken down into 5 questions ranging from 7 (1.2%) and 20 (.3%). Physical activity was broken down into 2 questions with scores ranging from 2 (17.7%) and 8 (5.9%). Weight management was broken down into 10 questions with scores ranging from 10 (.6%) and 40 (.9%).

An independent sample t-test was performed to compare hypertension practices between African Americans and Non-American Blacks. There was not a statistically significant difference in the overall hypertension attitude score between African Americans and Non-American Blacks; t (319) = -.210, p = .834, 95% CI (-1.51, 1.22). An independent sample t-test was performed to compare hypertension attitudes between age groups, 18-24 and 25+. There was a statistically significant difference in the overall hypertension practice score between participants ages 18-24 and participants aged 25 and older; t (237) = -3.47, p = .001, 95% CI (-4.56, -1.26). An independent sample t-test was performed to compare hypertension practices between males and females. There was not a statistically significant difference in the overall hypertension practice score between male and female participants; t (313) = 1.74, p = .074, 95% CI (-.139, 3.01). An independent sample t-test was performed to compare hypertension practices between hypertensive participants and non-hypertensive participants. There was not a statistically significant difference in the overall hypertension practice score between hypertensive and hypertensive participants; t (318) = 2.99, p = .003, 95% CI (1.32, 6.39). An independent sample t-test was performed to compare hypertension practices between diabetic and non-diabetic participants. There was not a statistically significant difference in the overall hypertension practice score between diabetic and non-diabetic participants; t (320) = -.452, p = .672, 95% CI (3.31, 2.08).

A one-way between groups analysis of variance was conducted to explore the impact of year in school on hypertension practices. Participants were divided into five groups according to their classification (Group 1: freshman; Group 2: sophomore; Group 3: junior; Group 4: senior; Group 5: graduate student). There was not a statistically significant difference at the $p < .05$ level in hypertension practice scores for the five classifications: $F(4, 316) = 1.60$, $p = .174$.

The chi-square test was used to examine if any statistically significant associations exist between age and hypertension practices. Low practices were scored with a score of 45 or less and practices scores of 46 or greater were classified as high hypertension preventive practices. A chi-square test for independence (with Yates' Continuity Correction) indicated a significant association between age and hypertension practice, $\chi 2$ (1, $n = 239$) = .5.04, $p = .025$, *phi* = .154.

A multiple linear regression was used to predict hypertension practices from gender, education classification, age, ethnicity, hypertension status, and diabetes status. These variables significantly predicted hypertension status, $F(6, 227) = 3.173$, $p = .005$, $R^2 = .077$.

Diet

A total of five questions were analyzed to determine participants' diet scores. Diet scores ranged between 7 (1.2%) and 20 (.3%). The mean diet score was 12.41 (*SD* = 2.34). Slightly over half of participants 59.6% (n = 196), reported they always or frequently follow a healthy eating plan. When asked about their salt intake, 26.8% of participants add salt to their food at the table and 42.5% of participants always add salt to their food when cooking. Only 2.5% (n = 8) of study participants reported never eating fried food such as chicken, French fries, or fish in the last 7 days.

Physical Activity

Two questions were asked to assess participants' physical activity levels. Physical activity scores ranged from 2 (17.7%) and 8 (5.9%). The mean physical activity score was 4.35 (*SD* = 1.65). When asked how often they do at least 30 minutes of physical activity in the last 7 days, 79 (24.5%) answered always, 134 (41.6%) answered frequently, 85 (26.4%) answered never, and 24 (7.5%) answered rarely. Participants were also asked how many of the past 7 days did you “Do a specific exercise activity (such as swimming, walking, or biking) other than what you do around the house or as part of your work,” 86 (26.7%) of participants answered always, 120 (37.3%) answered frequently, 88 (27.3%) answered rarely, and 28 (8.7%) answered never.

Weight Management

A total of ten questions were answered regarding participants' weight management. Weight management scores ranged from 10 (.6%) to 40 (.9%). The mean weight management score was 27.41 (*SD* = 5.43). When asked how careful they are about what they eat, most of participants 69.5% (n = 224) reported always or frequently. When asked if they exercise to lose or maintain weight, 23.3% (n = 75) answered always, 39.8% (n = 128) answered frequently, 28.3% (n = 91) answered rarely, and 8.7% (n = 28) answered never. Participants were split when asked if they substitute healthier food for things that they used to eat with 39.1% (n = 126) answering rarely or never and 60.6% (n = 195) answering frequently or always. Only 10.2% (n = 33) reported stopping buying and bringing unhealthy food into their homes.

Table 2 shows the differences in knowledge, attitude, and practice scores between different demographic variables. Age was statistically significantly associated with hypertension knowledge (*p* = .008) and hypertension practices (*p* = .001). Table 7

shows the correlation coefficient between knowledge-attitude-practice scores and the results showed that there was a statistically significant correlation between knowledge and practice (p = .010).

Discussion

This study was conducted to assess the effect of psychosocial variables - knowledge, attitudes, and practices - on hypertension risk factors in Black college students. This study specifically examines the accuracy and extent of Black college students' hypertension knowledge, their attitudes towards receiving hypertension information, and their hypertension prevention practices. Although participants had low hypertension knowledge, they held positive attitudes toward trusting governmental organizations, such as the CDC and NIH, to provide them with accurate information regarding hypertension. Participants are unknowingly putting themselves at risk for developing hypertension through their poor diets, physical inactivity, and poor weight management.

Hypertension Knowledge

There is a need among public health professionals to understand hypertension knowledge in at-risk populations. Hypertension prevention or its control and management can increase by understanding hypertension knowledge (Abu et al., 2018). Thus, making it crucial for public health professionals to gain information for the development of tailored interventions (Ludescher et al., 1993; Valentine et al., 2012; Wright et al., 2018), which can aid in the alleviation of hypertension health disparities (Cooper et al., 2020).

Hypertension knowledge has been used as an outcome measure when designing interventions to prevent its development (Ludescher 1993, Valentine 2012, Wright, 2018). The study utilized the 14-item Hypertension Evaluation Lifestyle and

Management (HELM) knowledge scale to evaluate hypertension knowledge among Black college students. The study analyzed general hypertension knowledge, lifestyle and medication management, as well as measurement and treatment goals.

More than 80% of study participants successfully identified high blood pressure readings which is consistent with previous studies (Abu et al., 2018; Aghoja et al., 2017; Rashidi et al., 2018). However, only a few study participants were aware that hypertension is asymptomatic, which is in line with the results of Aghoja et al., (2017) but contradicts the results of Abu, (2018). This contradiction could be yielded by hypertensive participants knowing hypertension is asymptomatic. In Aghoja et al., (2017) study in which study participants were aware that hypertension is asymptomatic, all study participants were hypertensive.

Hypertension Attitudes

Public health professionals can benefit from understanding hypertension attitudes. Understanding individuals' attitudes towards hypertension can influence blood pressure control (Aparecida Moura Strelec & Pierin e Décio Mion Jr, 2003), also worth noting, higher trust in medical professionals has been associated with medication adherence (Elder, 2012).

Previous researchers have found conflicting results regarding participants' trust in where they source their medical information from. Study participants expressed a stronger trust in governmental sources than in the media or their peers when gathering information on hypertension. Specifically, participants had the most trust in doctors and healthcare professionals, with more than 80% reporting “a great deal” of trust which is in line with the results of previous studies (Fareed et al., 2021; Jackson et al., 2019). Only 13% of participants trusted their coworkers or classmates “a great deal,” making this group the least trusted source, contradicting Jackson et al., (2019) study in which

religious organizations were found to be the least trusted source. This contradiction could result from religion being important to the Black community (Taylor & Chatters, 2010; True et al., 2005). Participants also reported little trust in the media which is consistent with Fareed et al., (2021).

Trust was not as high for governmental agencies, such as the CDC (60.6%), FDA (55%), and NIH (68.6%), in which fewer participants reported trusting them “a great deal.” These findings were different from that of Fareed et al., (2021) in which they found participants’ trust in governmental agencies was a lot less and in another trust in governmental agencies was a lot higher (Jackson et al., 2019). The contradiction between the findings of the three studies could be due to the three different populations. In Jackson et al., (2019) study in which governmental agencies were the most trusted source, most participants were non-Hispanic white. Whereas in the present study, all study participants self-identified as Black. Several studies have been conducted showing the mistrust of Black Americans in governmental agencies yielding from racism and discrimination (Armstrong et al., 2008, 2013; LaVeist et al., 2000).

Hypertension Practices

African American college students are at an increased risk of developing hypertension through risk factors including unhealthy diet, physical inactivity, and obesity. Partaking in the above risk factors may increase one's risk of developing hypertension leading to the development of cardiovascular disease.

Slightly over half of study participants reported eating at least five servings of fruits and vegetables and following a healthy eating plan, which is slightly healthier than participants Robinson et al., (2019). Participants were also physically active, with about 60% reporting doing at least 30 minutes of physical activity a day, similar to the results of Robinson et al., (2019). Participants had high awareness about the foods they eat, but

only 10% reported that they stopped buying or bringing unhealthy foods into their homes.

Implications

The survey data allowed for the evaluation of psychosocial variables - knowledge, attitudes, and practices - on hypertension risk factors among Black college students. Data collected can aid in the development of culturally tailored interventions to increase hypertension knowledge while decreasing risk factor behaviors. Colleges and universities need to raise awareness of hypertension knowledge and risk factor behaviors college students are participating in. The results of this study can be used by colleges and universities to distribute materials to increase knowledge, provide education to change attitudes, and supply resources to improve hypertension preventative practices. Representatives from student health centers can speak at new student orientations on chronic disease prevention and the importance of screening and early detection. Identifying behavioral and physiological hypertension risk factors can aid in the improvement of the prevention of hypertension in the Black community, including improving hypertension screening in Black college students on campuses.

Limitations

As with all studies this too had its limitations. First, participants were recruited using a convenience sampling design consisting of a small sample size. Using a non-random sampling creates sample bias and the results are not generalizable. The small sample size limited the ability to compare differences in hypertension knowledge, attitudes, and practices across the different racial/ethnic backgrounds. Second, participants were restricted to a single university. Factors regarding hypertension may vary across geographic locations, limiting the generalizability of the survey findings.

Conclusion

There are several behavioral changes individuals can make to prevent the onset of hypertension. The assessment of hypertension knowledge, attitudes, and practices can aid in the development of culturally tailored interventions and educational materials to increase hypertension awareness to alleviate the health disparity. Although study participants had positive attitudes toward trusting doctors and governmental health organizations to provide them with correct information about hypertension, their hypertension knowledge was poor and preventative behaviors were low. Many participants do not practice healthy behaviors such as following a healthy diet or being physically active. Colleges and universities should encourage students to get screened for hypertension and other chronic diseases, always knowing their numbers, and live a healthy lifestyle.

TABLES

Table 1. Participants' Characteristics by Hypertension and Diabetes Status

Demographics	**Total**	**Non-Hypertensive**	**Diabetic/ Pre-Diabetic**	**Non-Diabetic**
	n (%)	**n (%)**	**n (%)**	**n (%)**
Age				
18-24	162 (50.3)	154 (70.3)	7 (50)	155 (68.9)
25+	77 (23.9)	65 (29.7)	7 (50)	70 (31.1)
Race/Ethnicity				
African American	171 (53.1)	159 (53.9)	11 (50)	160 (53.5)
Caribbean	107 (33.2)	97 (32.9)	7 (31.8)	100 (33.4)
African	16 (5)	15 (5.1)	2 (9.1)	14 (4.7)
South American	11 (3.4)	10 (3.4)	1 (4.5)	10 (3.3)
Other	16 (5)	14 (4.7)	1 (4.5)	15 (5)
Gender				
Female	237 (73.6)	222 (75.3)	14 (66.7)	223 (74.3)
Male	78 (24.2)	68 (23.1)	7 (33.3)	71 (23.7)
Other	6 (1.9)	5 (1.7)	—--------	6 (2)
Education Classification				
Freshman	49 (15.2)	46 (15.6)	1 (4.8)	48 (16)
Sophomore	37 (11.5)	36 (12.2)	4 (19)	33 (11)
Junior	87 (27)	80 (27.1)	5 (23.8)	82 (27.3)
Senior	74 (23)	68 (23.1)	6 (28.6)	68 (22.7)
Graduate Student	74 (23)	65 (22)	5 (23.8)	69 (23)

Table 2. The mean of knowledge, attitude, and practice scores

	Mean (*SD*)	**Minimum Score**	**Maximum Score**
Knowledge	7.60 (2.2)	2	14
Attitudes	27.65 (3.78)	5	36
Practice	44.1 (6.17)	27	60

Table 3. Cross-tabulations of demographic variables and hypertension knowledge			
	Hypertension Knowledge n (%)		
	High Knowledge	**Low Knowledge**	***p*-value**
Age			.003*
18-24	48 (29.6)	114 (70.4)	
25+	38 (49.4)	39 (50.6)	
Race/Ethnicity			.696
African American	58 (33.9)	113 (66.1)	
Non-African American Black	54 (36	96 (64)	
Gender			.952
Female	84 (35.1)	155 (64.9)	
Male	27 (35.5)	49 (64.5)	
Education Classification			.001*
Freshman	12 (10.7)	37 (17.7)	
Sophomore	6 (5.4)	31 (114.8)	
Junior	29 (25.9)	58 (27.8)	
Senior	26 (23.2)	48 (23)	
Graduate Student	39 (34.8)	35 (16.7)	
Note: p-value = chi-square test *Significant at the 0.05 level			

Table 4. Multiple linear regression of demographic variables on hypertension knowledge, attitudes, and practices total scores

Variables		***B***	**(95%) CI**	***p*-value**
Knowledge sum score				
	Age	.555	(-.1, 1.21)	.096
	Race/Ethnicity	.374	(-.18, .93)	.187
	Gender	-.155	(-.82, 51)	.648
	Education Classification	.721	(.002, 1.44)	.049*
	Hypertension Status	-.166	(-1.14, .91)	.825
	Diabetes Status	.916	(-.3, 2.14)	.140
Attitudes sum score				
	Age	-.944	(-2.05, .16)	.094
	Race/Ethnicity	-.969	(-1.92, -.02)	.046*
	Gender	.465	(-.67, 1.6)	.421
	Education Classification	.939	(-.28, 2.16)	.130
	Hypertension Status	.79	(-.94, 2.53)	.370
	Diabetes Status	.1	(-1.96, 2.16)	.924
Practices sum score				
	Age	2.284	(.46, 4.11)	.015*
	Race/Ethnicity	.142	(-1.42, 1.7)	.858
	Gender	-1.626	(-3.49, .24)	.087
	Education Classification	.854	(-1.16, 2.87)	.404
	Hypertension Status	-2.91	(-5.78, -.04)	.047*
	Diabetes Status	1.148	(-2.27, 4.56)	.508

Note: *B* = unstandardized beta; CI = confidence interval
*Significant at the 0.05 level

Table 5. Cross-tabulations of demographic variables and hypertension attitudes			
	Hypertension Attitudes n (%)		
	High Attitude	**Low Attitude**	***p*-value**
Age			.120
18-24	73 (47.1)	82 (52.9)	
25+	28 (36.4)	49 (63.6)	
Race/Ethnicity			.549
African American	75 (45.5)	90 (54.5)	
Non-African American Black	61 (42.1)	84 (57.9)	
Gender			.622
Female	100 (43.3)	131 (56.7)	
Male	34 (46.6)	39 (53.4)	
Education Classification			.065
Freshman	21 (15.4)	24 (13.8)	
Sophomore	8 (5.9)	29 (16.7)	
Junior	38 (27.9)	46 (26.4)	
Senior	33 (24.3)	39 (22.4)	
Graduate Student	36 (26.5)	36 (20.7)	
Note: p-value = chi-square test *Significant at the 0.05 level			

Table 6. Cross-tabulations of demographic variables and hypertension practices

Demographics	Hypertension Risk n (%)		
	High Hypertension Risk	**Low Hypertension Risk**	***p*-value**
Age			.017*
18-24	94 (58)	68 (42)	
25+	32 (41.6)	45 (58.4)	
Race/Ethnicity			.7
African American	96 (56.1)	75 (43.9)	
Non-African American Black	81 (54)	69 (46)	
Gender			.034*
Female	124 (51.9)	115 (48.1)	
Male	50 (65.8)	26 (34.2)	
Education Classification			.001*
Freshman	31 (17.6)	18 (12.4)	
Sophomore	28 (15.9)	9 (6.2)	
Junior	53 (30.1)	34 (23.4)	
Senior	36 (20.5)	38 (26.2)	
Graduate Student	28 (15.9)	46 (31.7)	

Note: p-value = chi-square test
*Significant at the 0.05 level

Table 7. Correlation between knowledge, attitude, and practice scores

Variables	**Correlation coefficient**	***p* value**
Knowledge-attitude	.093	.103
Knowledge-practice	.143	.010*
Attitude-practice	.069	.228

Note: *p*-value = Pearson correlation coefficient
*Significant at the 0.05 level

Table 8. Differences in knowledge, attitude, and practice scores across demographic variables

Demographics	Knowledge		Attitude		Practice	
	Mean (*SD*)	***p*-value**	**Mean (*SD*)**	**p-value**	**Mean (*SD*)**	**p-value**
Age		.008*		.156		.001*
18-24	7.42 (2.19)		27.92 (3.36)		43.34 (6.33)	
25+	8.22 (2.07)		27.19 (4.21)		46.25 (5.44)	
Race/Ethnicity		.039*		.470		.227
African American	7.36 (2.25)		27.99 (3.6)		44.09 (6.26)	
Caribbean	7.8 (2.14)		27.33 (4.06)		44.16 (6.52)	
African	7.5 (2.68)		27.87 (2.85)		42.69 (3.72)	
South American	6.36 (1.69)		26.91 (2.59)		42.73 (5.52)	
Other	8.69 (1.66)		26.69 (4.64)		47.31 (5.1)	
Gender		.298		.204		.192
Female	7.59 (2.24)		27.58 (3.96)		44.54 (6.12)	
Male	7.51 (2.17)		28.05 (3.04)		43.1 (6.17)	
Other	6.17 (1.6)		25.33 (5.01)		43.17 (8.93)	
Education Classification		.000*		.566		.174
Freshman	7.16 (2.18)		27.96 (3.64)		42.9 (5.62)	
Sophomore	6.65 (1.93)		27.46 (3.16)		41 (6.72)	
Junior	7.46 (1.87)		27.45 (4.32)		44.2 (5.52)	
Senior	7.45 (2.34)		27.24 (4.34)		44.47 (6.94)	
Graduate Student	8.45 (2.38)		28.19 (2.79)		46.24 (5.56)	

Note: *p*-value = T-test and ANOVA
*Significant at the 0.05 level

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CHAPTER 3 – SECOND MANUSCRIPT

"This is the New Normal": The Experiences of Black College Students during the time of the COVID-19 Pandemic and its impact on Hypertension Risk Factors

ABSTRACT

Background: Hypertension is a major risk factor for COVID-19 disease severity hence the need to investigate the impact of COVID-19 on hypertension awareness. However, there is a lack of evidence showing the impact of the COVID-19 pandemic on hypertension awareness in Black college students. The purpose of this study was to explore Black college students' COVID-19 experiences, and the impact it has had on their perceived risk of developing hypertension.

Method: Focus group interviews were conducted with Black college students to better understand the impact of the COVID-19 pandemic on hypertension awareness. Focus group questions focused on the impact of the COVID-19 pandemic on daily life, how the COVID-19 pandemic impacted hypertension risk factor behaviors, and how perceived risks of COVID-19 progression have motivated hypertension preventative behaviors. A total of seven focus groups were conducted with 30 self-identified Black college students. The NVivo software was used to organize the data for the development of the codebook and data analysis.

Results: A total of 30 Black college students participated in the focus groups. Almost all of the participants were female (n = 26) and were between the ages of 18 and 36 years of age, with a mean age of 24**.** Black college students' experiences during the COVID-19

pandemic were organized into three categories and subthemes: (1) the influence of COVID-19 on daily life, (2) the influence of the COVID-19 pandemic on hypertension risk factors, and (3) the influence of the COVID-19 pandemic on hypertension preventative behaviors. Students noticed increased stress as universities closed, forcing them to adjust to distant learning and, in some cases, relocation. Students' activity levels decreased as they were no longer permitted on campus, leaving them with few options since gyms and recreation centers were also closed. Dietary changes occurred as students mentioned an increase in stress and binge eating and food serving a coping mechanism. As a result of university housing closures, several students were required to return home. This presented a new difficulty for the students, as they were spending more time with their families and had lost control over the foods brought into the house. **Conclusion:** During the COVID-19 pandemic, students faced unusual difficulties. Because students' stress levels and symptoms of depression grew, universities should collaborate with students and community partners to promote awareness and improve mental health services.

INTRODUCTION

The COVID-19 pandemic caused major disruptions to everyone’s life across the globe (Majumdar et al., 2020). Safer at home movements, social isolation, and school closures were mitigation measures that disrupted people’s everyday lives (Benke et al., 2020; Tull et al., 2020). With more people staying indoors to decrease their risk of COVID-19, they were increasing their risk of hypertension (Mattioli et al., 2020). However, the COVID-19 pandemic also provided opportunities for individuals to spend more time with loved ones (Evans et al., 2020). With all the disruptions caused by the pandemic, perceptions of risk for COVID-19 disease severity was low in some populations (Shabu et al., 2021).

The COVID-19 pandemic has disproportionately impacted the Black community with Black adults experiencing worse disease severity when contracting the virus (Yancy, 2020). In Milwaukee County, African Americans accounted for 73 percent of COVID-19 deaths despite only making up 26% of the population and accounted for 70% of COVID-19 deaths while only making up 32% of the population in Louisiana (Thebault et al., 2020). This could be due to diabetes and cardiovascular disease health disparity in the Black community (Kullar et al., 2020; Thebault et al., 2020). Previous research has demonstrated an association between hypertension and COVID-19 disease severity (Du et al., 2021; Huang et al., 2020; Parveen et al., 2020; Pranata et al., 2020; Rodgers & Gibbons, 2020), leading to the US Surgeon General emphasizing the need to control hypertension, especially during the COVID-19 pandemic (American Medical Association, 2020).

However, COVID-19 mitigation efforts may lead to increased hypertension risk as people are staying home more, exercising less, and ordering out more to protect themselves from contracting COVID-19 (Berg, 2021). Researchers have shown an increase in cardiovascular disease diagnoses in the Black community after complex humanitarian emergencies such as Hurricane Katrina and Hurricane Sandy (Lenane et al., 2019; Swerdel et al., 2014). The increase can be contributed to the stress and uncertainty caused by such traumatic events (Kario et al., 1997; Lenane et al., 2019; Swerdel et al., 2014). Additionally, Black people are more likely to experience stress from traumatic life events compared to non-Black people, further increasing their risk of developing hypertension.

Black college students are at an increased risk of developing hypertension resulting from several risk factors including race, ethnicity, family history, and the added stressors of college demands (Wright et al., 2018). Compared to other racial/ethnic

groups, Black college students experience additional stressors due to experiencing racism and discrimination (Greer et al., 2015). The latter can contribute to poor lifestyle choices such as binge eating and physical inactivity (Bell, 2015; Lee et al., n.d.) and race-related stress which has been positively associated with increased alcohol use (Pittman et al., 2017). The multiple challenges Black college students face affect both their mental and physical health, increasing their risk of developing hypertension (Bell, 2015; Greer et al., 2015)

Cardiovascular disease is the leading cause of death in the United States (Centers for Disease Control and Prevention, 2021) and the leading cause of death for African Americans with more than 50% of Black adults having a previous diagnosis of hypertension (Centers for Disease Control and Prevention, 2022). African Americans have the highest prevalence of hypertension in the world. Each year hypertension costs the United States $131 billion and was the contributing factor in 516,955 deaths in 2019 (Centers for Disease Control and Prevention, 2021). Yet, several researchers suggest that many of these deaths can be reduced by decreasing hypertension risk through modifying its risk factors (Joseph et al., 2017; Rippe, 2019; World Health Organization, 2009).

Hypertension is a major risk factor for COVID-19 disease severity hence the need to investigate the impact of COVID-19 on hypertension awareness. However, there is a lack of evidence showing the impact of the COVID-19 pandemic on hypertension awareness in Black college students. Assessing hypertension awareness, allows us as public health professionals to better understand the impact COVID-19 has on the attitudes toward developing hypertension in Black college students. The purpose of this study was to explore Black college students' COVID-19 experiences, and the impact it has had on their perceived risk of developing hypertension. Specifically, this study

sought to explore the impact of COVID-19 on Black college students' hypertension awareness. The following questions were explored: 1) How the COVID-19 pandemic has impacted daily life, 2) How the COVID-19 pandemic impacted hypertension risk factor behaviors, and 3) How perceived risks of COVID-19 progression has motivated hypertension preventative behaviors (Chen-Sankey et al., 2020).

Theoretical Framework

The Theory of Planned Behavior has been used to detect and improve understanding of attitudes regarding hypertension in various populations. To comprehend intention, perceived behavioral control, and intention that predicts health behavior, this theory distinguishes attitude, subjective norm, and perceived behavioral control. This theory guided the development of the semi-structured interview instrument that was used to collect data from focus groups.

Method

Design

Using a qualitative study design, focus group interviews were conducted with Black college students to better understand the impact of the COVID-19 pandemic on hypertension awareness in Black college students. Florida International University's Institutional Review Board approved the study protocol (IRB-21-0049).

Qualitative focus group interviews are an effective method at collecting group data while exploring experiences in a group setting (Nyumba et al., 2018). Given the study design, focus groups were found to be the most adequate design since it allows for the collection of group data. Focus groups enable researchers to collect ideas and opinions from small groups of people in one setting. Experiencing other participants with similar issues provides a level of comfort among all participants. Participants will additionally be able to hold one another accountable and call one another out when not

being truthful (Austin & Sutton, 2014; Nyumba et al., 2018). Consequently, collecting data in group settings permits participants to bounce ideas off each other and expound on each other's ideas. Focus groups enable researchers to explore phenomena that have not yet been explored, such as this study's topic and to add to the understanding of themes that later may be developed into measures (Austin & Sutton, 2014; Nyumba et al., 2018). Through focus groups, group data will be collected to give a broader perspective of Black college students' COVID-19 experiences, and the impact it has had on their perceived risk of developing hypertension.

Consideration was given to categorizing the methods as group interviews as opposed to focus groups given the number of participants in the smaller groups. However, the interviews still followed the procedures of focus groups through the focus group moderator not only listening to the individuals but also the group (Brown & Edmunds, 2011). The focus group moderator also encouraged participants to interact with one another despite the number of participants in each focus group, which is not done in group interviews (Brown & Edmunds, 2011). There were no differences in data collected in larger groups versus smaller groups.

Sample

As part of a larger mixed-methods study, participants were purposively selected through their completion of Phase I of this study, survey collection. Upon beginning the survey, a screen with a basic introduction to the study appeared. The following screen included questions to determine participants' eligibility. Once eligibility was established, participants reached a screen with a link to the informed consent form, which included consenting to participate in both the online survey and the focus group interviews. Participants gave their consent to participate in both the online survey and focus group interview if they chose the yes option and proceeded to take the online survey. At the

end of the questionnaire, students were asked if they would like to participate in a focus group that will further expand on the survey findings. If willing, students were asked to leave an email address and were contacted on the next steps to participating in the focus groups. Participants were contacted via email which included a confidential doodle poll link to sign up for a day and time to participate in the focus group. A total of seven focus groups were conducted among a sample of 30 self-identified Black college students. Participants were recruited through an email delivered survey. Data were collected from undergraduate and graduate students. Eligibility criteria included: (1) self-identify as Black or African American; (2) at least 18 years old; (3) currently enrolled in school.

Focus Group Structure

Focus group interviews were used to better understand the experiences of Black college students during the COVID-19 pandemic and its impact on their hypertension awareness and daily lives. Each focus group began with seven brief demographic questions. After each participant answered all the demographic questions, the audio recording began. The semi-structured question guide was arranged into three sections based on the constructs of The Theory of Planned Behavior. The first section asked the participants about their attitudes towards COVID-19 and its impact on both their lives and their risk for developing hypertension. The second section asked participants about their subjective norms towards hypertension and the beliefs of their family members and friends regarding hypertension prevention behaviors. The last section focused on perceived behavioral control regarding COVID-19 severity in hypertensive patients, causes of hypertension, and consequences of a hypertensive patient catching COVID-19.

Data Collection

The focus group research team consisted of the primary researcher who was trained in qualitative methods and four focus group assistants. All research assistants were trained in the focus group guide, participated in a practice focus group, and thoroughly reviewed the focus group questions. All training and pilot testing took place before the onset of data collection. The focus group moderator and a research assistant attended each focus group interview. The moderator led each focus group discussion while the research assistant took field notes and kept participants focused on the research questions. Due to the focus group taking place via Zoom with restricted camera access, nonverbal communication was not able to be documented. All focus groups were audio recorded to ensure data accuracy.

The semi-structured interview was developed using a qualitative approach that was both inductive and deductive. The deductive approach allowed us to use theory to inform our research questions (Fereday & Muir-Cochrane, 2006). The Theory of Planned Behavior was the guiding theory when developing the semi-structured interview guide. The questions were based on the theory's main constructs: attitude, subjective norms, and perceived behavioral control (Ajzen, 1991). The inductive approach allowed us to use results from focus group data to elicit themes in response to the overarching research question (Fereday & Muir-Cochrane, 2006).

Focus groups took place via Zoom with restricted video access. Each focus group began by thanking the students for their participation and briefly reviewing the purpose of the study. Participants were informed about practices to secure confidentiality. In addition, they were reminded that participation in the focus group was voluntary with the right to leave the focus group at any time. Participants were reminded that the focus group would be audiotaped and asked about their preference for

audiotaping, they could not participate in the study. Participants were asked to discuss the impact of the COVID-19 pandemic on their daily life, hypertension prevention risk factor behaviors, the impact of COVID-19 on hypertension risk factor behaviors, and the perceived risk of contracting COVID-19. A $20 Amazon gift card was emailed to all participants who participated in the focus group.

Data analysis

Focus groups were originally transcribed through the Zoom software. Research assistants went through and corrected any mistakes in the transcripts made by Zoom. To ensure data accuracy, the primary researcher listened to the recorded focus groups and corrected the transcriptions, as necessary. After all the transcriptions were completed, the primary researcher read through each transcript and developed a detailed codebook based on similar themes. The research team became familiar with the data through transcriptions, reading the transcripts, and developing the codebook. As the analysis progressed, researchers developed codes based on themes like the actual words of the participants (Alexander et al., 2018). The research team used thematic analysis to analyze and organize the focus group data by generating codes for topics based on emergent themes and topics of interest (Peters et al., 2006). The NVivo software was used to organize the data for the development of the codebook and data analysis. Through consulting with the research team, the final codebook was established. The research team finalized the themes after reviewing the codebook and an extensive review of the literature. Final transcripts and codebooks were verified by all members of the research team.

Rigor of Results

To ensure the data collected was trustworthy, the following procedures were followed. Credibility was addressed by running the focus groups until saturation was

reached (Deliens et al., 2014). To minimize any biases among moderators running the focus group, there was peer debriefing at the end of each focus group. Participants were diverse, which added variety to the data collected and increased the dependability of the data. Consistency in the data collection protocol and a thorough critique of the team member's data analysis and interpretation also added to the dependability of the results. All focus groups were audio-recorded with written field notes that were transcribed with themes coded using NVivo (Peters et al., 2006).

Results

Participant Characteristics

A total of 30 students participated in the focus groups. Almost all of the participants were female (n = 26) and were between the ages of 18 and 36 years of age, with a mean age of 24. All participants were enrolled in at least 3 credit hours during the semester in which they participated in the focus group. The majority of the participants were undergraduate students (n = 21). No participant had any previous diagnosis of hypertension, pre-diabetes, or diabetes. (see Table 1)

Theme 1: The influence of the COVID-19 pandemic on daily life

When asked how the COVID-19 pandemic impacted their daily lives, almost every student reported disruptions due to the stay-at-home order at the beginning of the COVID-19 pandemic. Almost every student discussed spending more time indoors and having limited social interactions outside of the people inside their homes. Several students also mentioned that they had to move off-campus and back home as the dorms had shut down.

So when I was just forced to be in the house, I resorted and just literally laying in bed watching TV. Things like that I didn't really expect to see myself doing just being very idle with my time and not being able to do very much so I was just staying in my room all day really not having a lot of social interaction, besides social media. But I wasn't having any like direct communication or like facetime or anything or is really just kind of going on social media texting my friends and just staying home and making use of my time by seeing what people were doing and how they're living their lives really. [FG 5, Female, 19]

Students discussed the difficulties of now returning home and spending more time with family. Safer at home movements also posed challenges to study participants financially.

I'm going to go next. When the pandemic actually, I was here on campus because I live on campus and they kicked us out like I think two days after they told us we couldn't stay on campus so. All of my family members were at home, and one thing I like is the separation from family is even when we're together it's fine, but after weeks it just becomes annoying so I say a lot of relationships are tested in that time and Because I wasn't working because my mom she's a little older I just pull back from that I lost a lot of income opportunities at that time. So that kind of made me like not I couldn't go out anyway, but now it's just knew when things will pick up again I wouldn't be able to afford a lot of things that I could previously. And so what happened is like now, what I do, I have a job I'm working to make up for what I lost in that in that period so it's school and work and school and work and then I'm back to my room. [FG 5, Female, 21]

Students also discussed having to adapt to the sudden changes and the impacts it had on their wellbeing.

I would say that COVID affected me significantly as well just because there was a lot of changes that were made, you know at school and at work, it was a lot to adapt to and a really short timeframe. There were a lot of changes, you know experiences that were missed and opportunities as well, I mean, eventually, of course, we all had to adapt to those changes, but if I would say, was a little bit difficult for the first few months. [FG 2, Male, 25]

One study participant spoke about how not getting enough Vitamin D caused her physical health to suffer.

OK, I just wanted to make sure. For me, the pandemic really affected me in terms of I realized how much I need sun and just like to be out in nature. Because I learned over the pandemic that African American women, particularly, are like higher to be vitamin D deficient. And we need more vitamin D than like the average person, so I learned during that time, because I would feel very sluggish and tired, kind of just like not wanting to do anything. And that's when I learned it because I was lacking vitamin D, because I just like wasn't out in the world as much so that was the main thing and then also. Just realizing how much of a people person I am like I need to be interacting with people. Because I used to think like oh like I'm very like introverted, I don't want to be around people, but because of the pandemic I realized, I actually do like being around people like I need those human interactions and connections to be able to thrive. So I'll say, those are the two main things that really affected me during the pandemic. And also, I

didn't get to walk at my graduation because I graduated with my bachelor's but because of the pandemic we didn't have any ceremonies happening at that time, but I'm going to walk for my masters so that's all I'm concerned with. [FG 5, Female, 23]

The influence of COVID-19 on school

When asked about the impact of COVID-19 on their daily life, almost all the participants mentioned the impact COVID-19 had on their school. School transitioning to remote learning and life shutting down caused major disruptions for many of the participants.

After three months COVID hit basically everywhere and I lost the experience of actually going to FIU, since I couldn't actually step into the school for a year and a half. So I did lose the experience, however, I did get a full fledged experience of interacting with people online. How it shifts immensely from a, from a classroom environment and you really have to really put in your full effort, since you're not in person, you have to deal with people's availability, people's schedule, their work schedule and with priorities and whatnot so it affected me significantly [FG 2, Male, 25]

As huge gatherings were halted, study participants described how they were missing out on once-in-a-lifetime opportunities.

I'll go next. So, for me, the pandemic affected me. I was just completing my undergraduate internship at the time, so when the pandemic happened, my internship was stopped, and I was actually delayed from completing my internship and graduating. So as far as personal, it didn't really affect anything personal, just academic. [FG1, Female, 30]

I didn't get to walk at my graduation because I graduated with my bachelor's but because of the pandemic we didn't have any ceremonies happening at that time, but I'm going to walk for my masters so that's all I'm concerned with. [FG 5, Female 23]

Most discussed the difficulty of having to transition to remote learning and now having to take classes via Zoom. Many expressed that this transition made classes more difficult, and their teachers became less available to offer assistance.

Most semesters I had classes still maybe one I didn't take any classes, but I think I had classes that whole time. And they were like 90% harder. They were pushing way more work, because it was a remote, for me, so I regretted taking certain classes during then. [FG 5, Female, 19]

Participants in the study talked about balancing competing demands including taking online classes for the first time, social isolation, classwork with little instruction, and returning home.

I would say it was kind of weird and different because I had to transition into online classes, which I didn't really have experience with much experience with that before, and then you have to isolate yourself from, like social interactions so it could feel like, I guess sometimes lonely, it could feel overwhelming with the class work because the teachers aren't really there, so you have to like basically manage yourself, which I'm good at, but, you know, when you're home it's like you're not in the environment, the same environment or the same space to learn [FG 4, Female, 19]

COVID-19's influence on participant's mental health

Almost all participants mentioned some mental health challenges faced during the COVID-19 pandemic. Most experienced an increase in stress due to several factors, among the most relevant were the transition to remote learning and the impact of being inside due to the shutdown.

Okay, so I guess, since it started when I was in my senior year of high school, the end so that was more approaching the summertime and I'm from Pennsylvania, I mean we're usually inside all winter and then during the summers we would go out. And so I always obviously looking forward to that, and when the pandemic started I couldn't really be as outside as I would have wanted and I kind of go through like seasonal depression, so the summertime is something that I always look forward to, and having to stay inside for. Most of the summer and not really getting to go out as much kind of affected my mental health [FG 5, Female, 19]

The uncertainty of the pandemic, combined with the demands of being a full-time student and working full-time, prompted some study participants to have mental health concerns.

I'll go to the next. For me I thought at first it was literally going to be like a two week thing so I was like "Oh, two weeks is going to be just a breeze" and then, once the two week became a month, and then turned into a year. Um, my mental health went from Okay, I have to change. I have to force my brain to say Okay, this is the new normal had to change I had to change the way I do different things, especially in the morning but, as you know, it got worse and the country went more of a shut down my mental health got

affected to where I'm like okay I'm taking more responsibility. On top of that I'm going to school full time and I'm going to work full time so I had to really play it like really safely, as if I was walking on eggshells of my mental health, so that I don't go, you know go crazy, because of that we all have to be inside and, on top of that had school and work, I have to respond to. [FG 5, Female, 29]

Students also expressed feelings of depression because of the way their bodies were feeling due to unhealthy diets and their sedentary behaviors. The increase in mental health challenges and stress levels also caused a decrease in motivation for many of the students.

Wow, it's definitely been difficult for me. I think what it had to take was realizing that I cannot continue like this, I cannot continue in this just survivalist mentality that, like, okay I can just eat whatever I want that makes me feel like everything is okay and I can just, like, hold off on the exercise until everything is over because, you know, I just can't wait on that anymore. I think I definitely had to realize that, okay wait, if you continue on this path, like, it is going to seriously negatively affect your health. So, for me, I don't smoke, but I think that, you know, just kind of realizing that, okay wait, I can't keep doing this, like looking at my body, just looking at the way I was gaining weight, looking at, um, the way my bad diet habits were affecting my energy levels that it also I was feeling really depressed just because of the way I was looking, the way I was feeling, and I think we really need to actively say 'okay, no, get yourself together', and I think that really led to me, you know, taking hypertension preventative measures such as eating better, and um, also exercising more. [FG 1, Female, 18]

Participants in the study lost motivation to exercise as their schedules became more hectic as they tried to balance school and work amid the pandemic.

For me, I guess, it was like the complete opposite, like because you're not allowed to like I guess. When we first heard about it, we weren't allowed to do anything, a lot of gyms are closed, and a lot of things that you would usually do. Basically, I got postponed so I basically didn't feel any motivation to work out, I was honestly too busy to work, I had too much homework, too much chores, too much things going on in my life, and you know. I didn't want that to be another concern and I guess like I don't know about other people, but COVID has correlated with a lot of people gaining weight because they're not really doing much they're just you know sitting down, while they're doing homework, or they don't really have anywhere to like go while they're doing it like before. [FG 4, Female, 19]

Theme 2: The influence of the COVID-19 pandemic on hypertension risk factor

With classes transitioning to remote learning, most students mentioned how the COVID-19 pandemic affected their hypertension risk factor behaviors. Students noticed changes in their diet, they were participating in less physical activity, their stress levels increased, and some reported feelings of changes in their overall well-being.

And it was a lot of reasons, it was more stressful but especially not being active or like outside as much in nature was really hard for me mentally and physically. Like mentally I felt it but didn't realize it as much but physically I was having so much more like headaches and body aches and just issues in general during that whole time that's like completely gone now. [FG 5, Female, 19]

Well, so for me, I think because, in the, hmm. Because, during the pandemic, my you know...I would try, I you know be more active, and I'd be like outside, in my classes, but I think definitely in response to like, the lockdown like I said before, that, I feel like that increased my hypertension risk and kind of, like, decreased, like, how, um, I guess, aware I was of how much I was at risk for hypertension, and that I wasn't like watching the content of my food, and like the like, for example, the salt levels, the sugar levels, the fat levels, I wasn't really looking so much at the nutritional value of the food as I should have been, or as I would have been before COVID. [FG 1, Female, 18]

Subtheme 1: Changes in diet due to COVID-19

Several students discussed an increase in their eating habits during the midst of the COVID-19 pandemic. Several students reported that food served as a coping mechanism to deal with the stressors of the COVID-19 pandemic and the ease of ordering fast food delivery to avoid leaving the house.

So I haven't really been preventing it as much like prior to COVID I've been working out and eating more healthy but because of COVID, you know you don't really want to go out to dinner and do things of that nature, so you get fast food or you try to cook something fast, so you can go back to your work and stay at home and it's just I haven't been doing it that much to prevent it, I would say. [FG 4, Female, 19]

Because they are much closer to their kitchens, study participants reported an increase in snacking as food became more accessible.

I agree with that as well and not only that, but the accessibility to snacks. Now I'm like a few feet away from my kitchen, when at work, I would have to, like, go to, like, a different floor to get to the kitchen and get a snack. So, I would say that, like, now I kind of just go to Walmart or, like, Publix and just buy everything, and then I'm just snacking all the time, and eating stuff that are not necessarily good for me. [FG 1, Female, 24]

The ease of ordering food through apps was mentioned by study participants as a reason for eating out more.

I can honestly say that my stress levels have been through the roof, even now as a year, almost 2 later. Um, my eating habits, like everyone else, um, you know, Uber eats, GrubHub, you know, it's been the easy thing to do, you know? [FG 1, Female, 36]

Food was used as a coping mechanism to cope with the stress of living in the midst of a pandemic.

I love my Caribbean food, and I used it as a form to destress during the pandemic. [FG 1, Female, 24]

As a result of the pandemic, study participants reported more stress eating and boredom eating.

And then I think I personally like eat a lot when I'm bored or even if, like I'm stressing, I tend to stress eat a lot as well. So I think the pandemic impacted that a lot, because I

mean I was just in the bed so just watching movies, or you know just the lack of like activity was just making me binge eat. [FG 5, Female, 19]

Subtheme 2: Changes in physical activity due to COVID-19

Several students mentioned a decrease in physical activity due to the COVID-19 pandemic, especially during the early months of the pandemic. This shift in physical activity levels was contributed by the stay-at-home orders causing students to stay inside more, move less and became “couch potato[es].”

And physical activity, even though you can work out at home it’s kind of. For me at least it's kind of not as encouraging as the gym. Because at your House there's not many places where you would feel comfortable working out [FG 4, Female, 19]

I went back home, I pretty much stayed inside the whole time because my family is also very immune compromised. It was very stressful because it went from me being usually pretty active to like completely sedentary. [FG 5, Female, 19]

For me in the beginning it was just like I wasn't really active like I didn't do anything, it was just like wake up watch TV and go to sleep in that routine for a while [FG 5, Female 23]

Subtheme 3: Changes in stress levels due to COVID-19

When asked about how the COVID-19 pandemic affected their hypertension risk factors, there was a consensus that almost every participant experienced an increase in their stress levels at some point during the COVID-19 pandemic. The two main

contributors to the increase in stress levels were school related stressors and the uncertainty of living through a pandemic.

The stress of, like, the academics, you know, I was taking my organic chemistries and that really like and you know, pile on that, doing on virtual was impossible. I was like I was depressed, I was so sad, and I just like I just, like, stopped everything, you know, I relapsed, on, you know, ordering out again, even though I said before, I lost 20 lbs successfully, then I just gained back on because you know, I was just I was just done with life and that- that- during that time, it was like, ridiculous [FG 1, Female 21]

As study participants were no longer able to use the gym as a coping mechanism, their stress levels rose, prompting them to consume more alcohol.

For me, it was very stressful, that time period. Like I said, like I usually use the gym as, like, a form to destress, and I actually turned into from like a social drinker to like a at home glass of wine drinker, I would find like many excuses to just have a glass of wine,so I definitely saw it as, like, affecting, my stress levels and my mood so I think it, like, highly affected me. [FG 1, Female 24]

I am happy to talk immediately, so I can say it has been extremely difficult, without a doubt. I mean like I said, finding time to go to the gym, right? And then I also found like my stress levels were through the roof. I don't know how I could have you know. Thank God, I don't have hypertension right. I think that's because I've set myself with a diet, so that I prevent it but for anyone who does have it through the pandemic and was in a situation like me it's impossible. It, there's no way. [FG 7, Female 32]

Theme 3: The influence of the COVID-19 pandemic on hypertension preventative behaviors

The COVID-19 pandemic impacted the students' hypertension preventative behaviors due to them realizing the behaviors they were participating in were not only putting them at risk for developing hypertension but also impacting their overall wellbeing.

I was saying, for me personally, the way I perceive things and what I've done is over the pandemic I started doing yoga just as like a way to like get myself moving and be active, just because hypertension does run in my family, so I want to try to take like preventative measures as much as I can. I also have an air fryer so like to avoid fried foods. I use the airfryer instead or like the oven so just little things to help me take preventative measures, since I know that's something that does run in my family. [FG 5, Female, 23]

First of all, same, number 11. Um, to be quite honest, I didn't even think about hypertension when corona, like, first started and even all of that. I was sad, I ate, I ate a bunch of junk food, I wasn't going out as much. I didn't, it wasn't until I was taking my physiology courses that I realized, like, just how connected everything was and how eating bad, eating late, not taking care of yourself, not exercising, not, you know, doing proper breath work and just like, opening yourself up to like good habits and how that can impact your life, and it wasn't until then that I started thinking about hypertension and doing preventative measures in my 20s, so in my 40s and 50s, like, I'm not like many of my family members now. [FG 1, Female, 21]

Realizing I need to go to the gym. I mean I used to be an athlete so I know what working out is, I know how to make healthy choices, but in the brink of COVID, when there's multiple factors affecting your mental health, you start getting into a pattern of not doing much during the day, not exercising, snacking a lot because you're at home all day. You get used to being in the house a long period of time, you become like a recluse almost and you're not getting much contact from other people. So I'm trying to come out of that dark hole a little bit, trying to start going back to the gym, getting active again, eating better, making better choices, because it may not necessarily be COVID, but you should just always try to live a healthy lifestyle to prevent something like hypertension, and to extend your life as much as you can. That way, if you do get COVID,and you get a variant that's mutating, you're healthy enough to where your body- if it's able to, can fight off virus. You don't want to allow yourself to get into a state of, you don't want, you want to help your body out as much as you possibly can. [FG 4, Female, 22]

The students recognized the negative effects of a lack of exercise and unhealthy eating habits and wanted to improve their mental and physical health, so they made lifestyle modifications that are also hypertension protective factors.

I concur, uh, stress definitely increased, would say, about ten fold. Um, you guys were drinking wine, I was drinking something a lot stronger, and often. Just kind of, like I said, I wasn't really thinking too much about, like, diet and health, in terms of, you know, trying to live longer and be one of those old people that could still be active. But it was like, coming out of COVID that I started eating and incorporating more fruits and veggies and having healthier habits, um, but that was more for my mental health than for my physical health [FG 1, Female, 21]

Students used home workouts not just as a coping mechanism, but also to stay active since the gyms were no longer operating.

For me, mental health wise, I found myself getting agitated more like any little thing would just set me off so thankfully Apple came out with their um with their workout stuff and it was enough for me to work my frustration out so that I don't take my frustration out from somebody who had nothing to do to do with it. But at first, I was a little bit lazy and then, once I realized that I was getting more and more agitated and every little thing like ticked me off, I started becoming more active and then. That's when I really have to train my brain that, okay, you no longer can go to the gym because it's closed, so you have to find some way to motivate yourself at home. So, before I was increasing my risk, but after a while recognizing the issue I was able to bring it back down [FG 5, Female, 29]

For me, it was kind of like, um, a rollercoaster from the beginning to, like, the end of 2020. I went from going to the gym 5 times a week to, like, having the gyms close down and not going at all, and my work, like I had to go work remotely, so I spent a lot of time just sitting and like not really moving around, um, at the beginning, and then I noticed changes in my health. Um, I felt sluggish, and just, um, it was definitely, like, a change, like half way through 2020, and then I decided to just, like, work out at home and, like, pay attention to what I was eating because I too was ordering in and just not really caring about, um, just, my health in general. [FG1, Female, 24]

A few participants even mentioned participating in hypertension preventative behaviors as a means of building their overall immunity to fight against COVID-19 and to prepare for any future variants or pandemics.

Well, since COVID began, I would say that I go to the gym at a pretty decent clip as is but I made sure I monitor the what I eat nowadays more so than I did in the past, just because I, you know who knows what's to come down the line, God willing, I live long enough to hopefully, not see another pandemic, but if there is one, it is what it is, but to try to like take precautionary measures as far as making sure I'm as healthy as possible, so in the event, I can you know fight whatever's coming and have the antibodies to fight it. [FG 2, Female, 20]

Students altered their diets to strengthen their immune systems so that they could fight against COVID-19 infection.

Before the pandemic. I was very or like thinking seriously into veganism and I'm not a vegan now I'm still like transitioning but during the pandemic, I will say I try just try it out like a little more so, incorporating more vegetables and plant based meals in my diet. And I still today like still continue the same habits, because, like I said I want to eventually become vegan whether that's the next two, five, ten years. So during the pandemic just knowing that you know I should at least try to eat a little healthier, since it does attack the immune system it's just respiratory everything like that I didn't think that that would be the perfect opportunity to start and so those were like just the small steps that I made in just dietary changes and Like I said I didn't go out much, but when I could I did start going outside and like just walking for 20 minutes 30 minutes, so, in addition to

that, I incorporated like exercise so collectively thought that that might have helped us some way preventively for me. [FG 5, Female, 19]

Theme 4: Perceived risk of COVID-19 disease severity

Most students believe that they were far from experiencing severe health consequences from COVID-19.

I think my risk is pretty low. Um, just on the basis of, you know, I'm young, I'm healthy. Um, I do work in an environment with children, um, but I don't feel like, um, that would make me sick or anything like that. [FG 1, Female, 30]

Study participants attributed their low risk of COVID-19 infection to their good health and physical activity.

For me, I would say the same thing. Um, I have a very low chance because I'm quite healthy, I exercise, um, and I haven't really gotten sick in the last, um, two years, so I would say that it's pretty low. [FG 1, Female, 24]

During the pandemic as well, I wasn't out as much but now since I'm vaccinated and I don't have any other pre-existing conditions, my risk is considered to be low. [FG 6, Females, 22]

Although students did not perceive themselves to be at increased risk for COVID-19 progression, in general they worried about contracting COVID-19 and giving it to friends and family members that were at an increased risk.

I would say that I never got it, thankfully and I wasn't worried about how it would affect me per se, but I was worried about because I was living with my parents all the time I was worried about. What would happen if I did get it, and what would affect them because they're pretty old and they do have like as your studies going on about like hypertension and stuff so I was really aware of it, and I mean pretty safe and I knew that if I got it like I wasn't too worried about myself I knew I'd be fine. [FG 3, Female, 22]

Despite their low risk, participants expressed their love for their families as a motivating reason to take COVID-19 seriously.

I'm going to go next, my mom has like a heart condition and I have my all my older brother, he has asthma and some lung issues, so when the pandemic did like come close to home because my mom's considered an essential worker she kind of got a whole load of mask and I think we were the first just just go out and walk with them before everyone else and the CDC said Oh, you have to put them on So um I'm not very high risk, but I did take it very seriously, because I do love my family, especially my mom and I knew that she couldn't just stop working So she did have to come to contact, a lot of people, I just wanted to make sure like when she came home she wouldn't catch anything from us, at least, especially me so that was that was a rough time but I mean I love herself so [FG 5, Female, 21]

Those who perceived themselves to be at a high risk of having severe health consequences said it was due to their immunocompromised status.

I am immunocompromised. I have a chronic illness so like I'm a lot I guess you could say like I'm a lot more susceptible to retrieving COVID-19, so I think that's why my family was a lot more like taking a lot more precautions because of that reason. [FG 5, Female, 19]

For me, because I am immunocompromised and also like my family, we took the pandemic very seriously in terms of like making sure we stay in the house. We try to avoid interactions in large crowds as much as possible. Because we didn't want to take any chance of catching anything so we really didn't leave the House [FG 5, Female, 23]

Discussion

This study was conducted to better understand how the COVID-19 pandemic impacted Black college students and its impact on their perceived risk for developing hypertension. Specifically, I wanted to explore the impact of COVID-19 on Black college students' hypertension awareness. Participants discussed several challenges they faced resulting from the COVID-19 pandemic. Initially, as the above quotes suggest, the COVID-19 pandemic negatively affected Black college students' lives. It caused major school disruptions, especially the stay-at-home orders took a toll on participants' mental health. While trying to protect themselves and their loved ones from contracting COVID-19, participants were increasing their hypertension risk factors. Nearly all of the participants had a challenging time adjusting to living with the new COVID-19 protocols. Students experienced increased stress, while trying to make mitigation adjustments. Physical inactivity and unhealthy eating habits caused several participants to lose motivation and became displeased with the way their bodies looked and felt, which led to depression among some. However, participants did not remain at risk when realizing

their poor health behavior, they made lifestyle changes, thus decreasing their risks for hypertension.

Disruptions Caused by the COVID-19 Pandemic

The COVID-19 pandemic took a toll on Black college students' daily lives, especially their school lives and mental health. With the world shutting down and going virtually, students faced unique challenges. Particularly, campus evacuations resulted in class transitions to remote learning which led students to move back home with family (Grubic et al., 2020). These unexpected transitions posed a great challenge to study participants, who expressed a liking for the benefits of living away from family, but who had to return home due to the pandemic mitigation strategies (Yorguner et al., 2021).

Study participants at the time they returned home were unaware of the major disruptions that the COVID-19 pandemic would cause to their schoolwork. Not only did they suffer from the transition to remote learning, but also, they were missing other once-in-a-lifetime experiences, such as the transition from high school to college, cancelations of their graduations and internships to the stay-at-home orders and the avoidance of large gatherings. Study findings are similar to those recently repeated on the effect of COVID-19 on college students' lives (Cleofas, 2020). Participants experienced a series of school disruptions when classes switched to remote learning which not only caused classes to become harder, but professors also became less available (Schiff et al., 2021; Tasso et al., 2020).

The challenges posed by remote classes and stay at home experiences which limited social interactions were among the reasons participants experienced mental health challenges during the COVID-19 pandemic. Social isolation and limited human interaction while also being forced to stay indoors caused many students to express feelings of depression which support results of previous studies (Coughenour et al.,

2021; Gupta et al., 2021; Tasso et al., 2020). A few study participants spoke to their previous diagnoses of seasonal depression which they said was exacerbated by the stay-at-home orders in place right before the summer. These sudden changes affected the students overall mental wellbeing which led to students feeling less motivated to engage with their schoolwork and activities they once enjoyed (Tasso et al., 2020).

Changes in Hypertension Risk Factors

As previously noted, COVID-19 protocols contributed to lockdown and stay-at-home orders which cause the participants to spend more time inside and led to an increase in their eating, decrease in physical activity, and an increase in stress levels. As students were spending more time at home to prevent COVID-19 infection, they were increasing their hypertension risks. These findings are in line with the results of recent research about the effect of COVID-19 protocols on lifestyle factors that increase hypertension risk factors (Kreutz et al., 2021).

Study participants noted several reasons for the changes in their dietary habits. Several participants expressed that food served as a coping mechanism that enabled them to deal with the stressors that came with living during a pandemic. They also reported that ordering fast food served as an easy alternative to avoiding leaving the house to get food. Snacking increased as study participants spent more time at home as they were closer to the kitchen and could obtain snacks more easily. Many of the students that moved off campus and returned home with their families expressed how this move impacted their dietary choices. As they no longer were doing the grocery shopping and cooking. Their food choices were now left to their parents. Many participants discussed just eating whatever was available, whether choices were healthy or not. Their experiences parallel those indicated by Powell et al., (2021) when studying the impact of COVID-19 on college students' food choices.

Even when staying on campus, students' physical activity levels decreased as they spent more time in their rooms, since campuses were closed and classes were switched to remote learning (Gallo et al., 2020). Participants also expressed going days without leaving the house and spending a great deal of time in bed. Students realized how much walking they had done in the past when just spending time on campus which contributed to their changes in physical activity levels (Bertrand et al., 2021). For the students that remained active during the COVID-19 pandemic, they were also faced with the challenge of the gym closing and having restrictions making it that much harder to remain physically active (Bertrand et al., 2021; Gallo et al., 2020).

Almost every participant mentioned an increase in their stress levels during the pandemic resulting from difficulty with classes, now held remotely and not knowing what will happen next with the COVID-19 pandemic, which is in line with results of previous studies (Elsharkawy & Abdelaziz, 2021; Grubic et al., 2020). Changes in body image from increases in food consumption and decreases in physical activity also caused participants to feel stressed and unmotivated, as indicated by Robertson et al., (2021). Students also expressed increased stress from concerns about not knowing what life would have in store once out of the pandemic similar to what Schiff et al., (2021) indicated.

Positive Outcomes from COVID-19 Pandemic

After a prolonged period of physical inactivity, unhealthy eating habits, and increased stress, participants realized they needed to make lifestyle changes to better both their mental and physical health. Students expressed how their current behaviors were causing their bodies to look and feel bad. Students mentioned their current behaviors during the COVID-19 pandemic were having detrimental effects on both their physical and mental health. Several students also expressed experiencing more

headaches and body aches and constant feelings of sluggishness and tiredness. As noted by participants, such feelings were just the motivation they needed to make changes to improve their health and wellbeing.

With spending more time at home and not being pleased with the look or feel of their bodies, participants took this as an opportunity to make some positive lifestyle changes. Participants expressed cooking more food at home and trying a variety of healthy recipes given increased time at home (Filimonau et al., 2021). A study conducted by Bennett et al., (2021) found positive changes in dietary habits such as an increase in fresh produce and cooking at home and a decrease in eating comfort foods and alcohol consumption.

Participants began to find creative ways to increase their physical activity such as joining the “YouTube exercise movement” and going for walks and getting fresh air. Increase in physical activity (Bertrand et al., 2021). These findings differ from results showing a decrease in physical activity minutes as stay-at-home orders were implemented (Coughenour et al., 2021). Some students also mentioned wanting to make lifestyle changes to boost their immunity to combat COVID-19 and any of its future variants as well as being strong enough to fight off any other future pandemics. As a result, this led participants to partake in hypertension preventative behaviors.

The above findings can be interpreted in several ways. First, the focus groups took place a year into the pandemic which gave the participants a chance to reflect on their experiences over the course of a year. Allowing participants to reflect on their experiences at different points during the pandemic rather than at one point in time. Second, as time passed people began to realize the pandemic was not going anywhere anytime soon and “this is the new normal” which caused them to have to change the way they were behaving during the early stage of the stay home period. Another

interpretation is that as time passed participants learned to adjust and live with the pandemic and they returned to earlier behaviors, they were accustomed to participating in pre-pandemic just with a few modifications since life was not fully back to normal. This study's results were also in line with those of previous studies indicating that students experienced some positive outcomes from the COVID-19 pandemic resulting from having more time to better themselves (Bennett et al., 2021; Cleofas, 2020).

COVID-19 Risk

Overall, study participants perceived themselves to be at low risk of COVID-19 disease severity based on their youth and good health. Despite perceiving themselves of being at low risk for COVID-19 disease severity, students expressed taking the pandemic seriously out of concern of contracting COVID-19 and spreading the virus to a family member or loved one that was at a higher risk (Schiff et al., 2021; Tasso et al., 2020). The few participants that reported being at high risk expressed such as due to being immunocompromised.

Implications

Focus group data collected in this study allowed for in-depth explanations of patterns of hypertension risk factor behaviors among Black college students during the COVID-19 pandemic. Findings from this study can aid in the development of informational materials for future public health crises, such as the COVID-19 pandemic. Colleges and universities need to prioritize counseling services and materials since the COVID-19 pandemic had a major impact on student's mental health and school performance. It is the responsibility of college administrators to keep students safe and protected. In doing so to slow the spread of COVID-19, there were negative implications on the students' physical and mental health. College administrators can use the results of this study coupled with the lived experience of the COVID-19 pandemic to prepare to

meet all the students' needs in case of future pandemics or other public health emergencies.

Limitations

As with all studies this too had limitations. First, the study's sample was regional and most of the participants reside in south Florida. The impact of the pandemic may differ across the country leading to differences in opinions and experiences as related to the COVID-19 pandemic. Second, focus groups were conducted at various stages of the COVID-19 pandemic. The participants of the study opinion may have differed based on the COVID-19 restrictions that were in place at the time of participating in the study. Third, the experiences and opinions of other college students may differ based on campuses repopulating and courses being back taught in person. Our results may not reflect the experiences of college students after repopulation and COVID-19 restrictions being lifted. Lastly, the pandemic was still in progress at the completion of this article and the findings of this study may only reflect the experiences and opinions of the participants at a single point rather than the entirety of the COVID-19 pandemic.

Conclusion

Protocols put in places to slow the spread of COVID-19 increased the risk of hypertension development further contributing to hypertension health disparity. As universities shut down, students experienced an increase in stress while having to adjust to the transition of remote learning and in some instances relocating. No longer being allowed on campus caused a major decrease in students' activity levels leaving them limited options such as gyms and recreational centers shut down. Some students were forced to move back home as universities closed residential housing. This posed a unique challenge to the students as they are spending more time with their families and have lost control of the foods that are being brought into the home.

College students faced unique challenges during the COVID-19 pandemic. Universities need to work together with students and community partners to raise awareness and improve mental health services provided to students as their stress levels and feelings of depression increased during the COVID-19 pandemic. College administrators should devise comprehensive plans to recognize the detriment the COVID-19 pandemic has taken on students as their physical and mental health and academic performance depends on it.

TABLES

Table 1. Participants' Characteristics	
Demographics	**N (%)**
Age	
18-24	19 (63.33%)
25-36	11 (36.66%)
Race/Ethnicity	
African American	23 (76.66%)
Caribbean	5 (16.66%)
Hispanic	2 (3.33%)
Middle Eastern	1 (3.33%)
Gender	
Female	26 (86.66%)
Male	4 (13.33%)
Education Classification	
Freshman	1 (3.33%)
Sophomore	3 (10%)
Junior	6 (20%)
Senior	11 (36.66%)
Graduate Student	8 (26.66%)
Other	1 (3.33%)

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CHAPTER 4 – THIRD MANUSCRIPT

“I’m young, I’m healthy”: The Influence of the COVID-19 Pandemic on Hypertension Awareness among Black College Students

ABSTRACT

Background: Hypertension is a major risk factor for COVID-19 disease severity leading to the need to investigate its impact on hypertension. The impact of COVID-19 on hypertension awareness, particularly among Black college students, is unknown. The goal of this study was to see if COVID-19 affected Black college students' perceptions of hypertension development and vaccination uptake. Before and during the COVID-19 pandemic, the aim was to investigate how Black college students perceived the risk of developing hypertension.

Methods: An explanatory, mixed-methods study design, surveys and focus group interviews, were conducted to investigate the impact of COVID-19 on attitudes regarding hypertension awareness among Black college students. Members of the research team developed the ten-item self-administered questionnaire and the semi-structured focus group guide to assessing the impact of COVID-19 on attitudes towards the risk of developing hypertension as well as their risk of testing positive for or exposing others to COVID-19. Three hundred twenty-two Black college students participated in the survey and 30 participated in the focus groups.

Results: Slightly over half, 53.4%, of participants expressed no increase in blood pressure monitoring since the onset of the pandemic. Although the COVID-19 pandemic had little to no effect on participants’ hypertension preventative behavior of blood

pressure monitoring, students discussed how the pandemic changed lifestyle behaviors increasing their risk for hypertension development. There was a statistically significant difference between worrying about testing positive for COVID-19 and worrying about exposing others to COVID-19, $p = .019$. Students mentioned taking the COVID-19 pandemic seriously from a concern of spreading the virus to loved ones with underlying health conditions including hypertension. Slightly over half, 67.1%, of participants agreed that hypertension leads to worse COVID-19 health outcomes. Increased risk of heart attack, stroke, infections, having a harder time recovering from COVID-19, and even death were all mentioned as consequences of the COVID-19 virus on hypertensive patients.

Conclusion: While the COVID-19 pandemic decreased hypertension awareness it increased hypertension risk behaviors among Black college students. The COVID-19 virus was not a concern for the students, they were instead concerned with protecting others yielded by their awareness of the severity of COVID-19 on hypertensive individuals. Colleges can utilize the information gathered to create and implement initiatives that teach students how to adopt healthy habits, prevent chronic diseases, and slow the spread of COVID-19.

INTRODUCTION

Hypertension is the leading cause of death in the United States and a major risk factor for COVID-19 disease severity (Centers for Disease Control and Prevention, 2021). Being the third leading cause of death in the Black community, (Centers for Disease Control and Prevention, 2022a) resulted in 96,120 deaths (Centers for Disease Control and Prevention, 2022b). However, Black individuals are the least vaccinated of all the different ethnic/minority groups in the United States (Ndugga et al., 2021). Hypertension serves as a risk factor for COVID-19, and they are disproportionately

affected by both hypertension and COVID-19. There is an urgency in understanding hypertension awareness and vaccination uptake in the Black community.

Adults with chronic diseases, which include hypertension and diabetes are at an increased risk to develop severe complications from diseases that have vaccines. Vaccinations are important in countering the COVID-19 pandemic through promoting herd immunity. However, some are still hesitant to be vaccinated against the COVID-19 virus because of medical mistrust, effectiveness, side effects, fear, and lack of information (Bateman et al., 2022; Kwok et al., 2021; Momplaisir et al., 2021; Purnell et al., 2022).

The COVID-19 health disparity can be attributed to the high rates of pre-existing health conditions of hypertension and diabetes in the Black community (Moore et al., 2020). According to the National Urban League (2020), African Americans are three times more likely to contract COVID-19 and experience worse COVID-19 health outcomes (Selden & Berdahl, 2020). Of the 955,135 COVID-19 deaths in the United States, members of the Black community accounted for 13.7% while only making up 12.5% of the United States population (Centers for Disease Control and Prevention, 2022b). As of August 2021, only 10% of Black people have received at least one dose of the COVID-19 vaccine (Ndugga et al., 2021).

Balasuriya et al., (2021) found it necessary to understand the vaccination beliefs within the Black community and understand why vaccination rates are so low. They conducted focus groups with Black and Latinx participants in March 2021. The history of mistreatment in these communities led to distrust and structural barriers including supply and insurance concerns which contributed to COVID-19 vaccination hesitancy. Messages coming from reliable community sources, choices in the vaccination received, and diversity at the vaccination site increased participants' trust in the COVID-19

vaccine. Momplaisir et al. (2021) found that medical mistrust contributed to vaccination hesitancy in the Black community when conducting focus groups with Black barbershop and salon owners in areas with high COVID-19 rates, they found that the speed of the development of the vaccine and limited data on side effects associated with vaccination hesitancy. During the first wave of the pandemic, despite New Jersey's high rates of COVID-19, vaccination hesitancy was high among Black registered nurses (Grafova et al., 2022).

When examining COVID-19 vaccination hesitancy in Black college students, Purnell et al. (2022) found that Black college students were not hesitant to receive the vaccine. Eighty-seven percent of participants had either received at least one dose or were planning to get vaccinated while slightly over half, 54%, had already received at least one dose of the vaccine. Of those who were hesitant, the most common reasons were medical mistrust and distrust in the government resulting from past mistreatment of African Americans.

It is highly recommended that adults with diabetes and cardiovascular disease get vaccinated annually against influenza (Loeb et al., 2019). In a retrospective study conducted with older adults, the influenza vaccine was associated with a 20% risk reduction in major adverse cardiovascular events (Chiang et al., 2017). In a nationwide cohort study conducted in Denmark, Modin et al., (2019) collected medical records for 134,048 heart failure patients' using nationwide registries. They found that patients with heart failure who annually receive the influenza vaccine were less likely to die than those that did not receive that vaccine as frequently. The influenza vaccine proved to be beneficial in increasing survival rates among patients with heart failure.

Assessing hypertension awareness allows public health professionals to study the impact that COVID-19 has on Black college students' attitudes regarding

hypertension development. One of the benefits of understanding the impact of vaccination uptake among Black college students is herd immunity (Kwok et al., 2021). I explored how subjective norms and perceived behavioral control impacted Black college students' attitudes towards hypertension awareness during the COVID-19 pandemic.

Method

Design

A mixed-methods study design, surveys and focus group interviews, were conducted to investigate the impact of COVID-19 on Black college students' attitudes regarding hypertension awareness and COVID-19 vaccination uptake. Florida International University's Institutional Review Board approved the study protocol (IRB-21-0049).

Sample

Black college students were recruited through an emailed delivered survey. Three hundred seventy-three students participated in the study, fifty-one participants started the survey but did not complete it, hence were excluded from data analysis. Statistical analyses were conducted between students that completed the survey and those that did not. There were no statistical differences between sociodemographic variables between complete and incomplete survey participants. To be eligible for the study, students had to 1) identify as Black, 2) be over the age of 18, and 3) be enrolled in at least 3 credit hours. Participants' ages ranged from 18 to 77 years old. All were recruited through an email delivered survey. Instructions were emailed to provide students with relevant study information. (see Appendix A) The recruitment process began by sending university professors, department heads, and office specialists an introductory email with a request to distribute the details of the email to their students. The body of the email included a brief introduction to the study with a link to the survey.

A flyer was also shared with the Black Student Union to include in their weekly newsletter and shared with students around campus and participants attending events put on by the Black Student Union. The flyer included a QR code that took student volunteers to the direct link to the survey. No sensitive information or personally identifiable information was collected during the recruitment process.

At the end of the questionnaire, study participants were asked to volunteer to participate in a focus group that will further expand on survey findings. If willing, students were asked to leave an email address and were contacted on the next steps to participating in the focus groups. Volunteers were emailed a confidential doodle poll link to sign up for a focus group. A $20 Amazon gift card was emailed to all participants who participated in the focus group. A total of seven focus groups were conducted among a sample of thirty self-identified Black college students. Data were collected from undergraduate and graduate students. Eligibility criteria included: (1) self-identify as Black or African American; (2) at least 18 years old; (3) currently enrolled in school.

Procedure

An exploratory, cross-sectional survey design was conducted to study the influence of the COVID-19 pandemic on hypertension awareness among Black college students. Students were recruited through administrators who sent emails with details of the study, including a link to the survey. Participants were also recruited through flyers distributed across campus and at Black Student Union events, which included a summary of the research study and a QR code that directed students to the survey.

Upon beginning the survey, a screen with a basic introduction to the study appeared. The following screen included questions to determine participants' eligibility. Once eligibility was established, participants reached a screen with a link to the informed consent form, which included consenting to participate in both the online survey and the

focus group interviews. Participants gave their consent to participate in both the online survey and focus group interview if they chose the yes option and proceeded to take the online survey. A $5 Amazon gift card was emailed to all participants who completed the survey and chose to provide an email address, which was the only identifiable information collected. This recruitment method respected potential participants' privacy since the recruitment process was only email and passing out flyers. No sensitive information or personally identifiable information was collected during the recruitment process.

The internet-based questionnaire was developed by the research team, as part of a larger research study. The questionnaire was broken down into seven sections. For this study, only sections 1, section 6, and section 7 were used. Section 1 excluded participants that were eligible to take part in the study. Section 6 asked participants about the impact of COVID-19 on their hypertension awareness. Section 7 asked participants about their willingness and intentions to get the COVID-19 vaccine.

Focus group interviews were used to better understand the experiences of Black college students during the COVID-19 pandemic and its impact on their hypertension awareness and daily lives. Each focus group began with seven brief demographic questions. After each participant answered all the demographic questions, the audiotaping began. The semi-structured question guide was arranged into three sections based on the constructs of The Theory of Planned Behavior. The first section asked the participants about their attitudes towards COVID-19 and its impact on both their lives and their risk for developing hypertension. The second section asked participants about their subjective norms towards hypertension and the beliefs of their family members and friends regarding hypertension prevention behaviors. The last section focused on their perceived behavioral control regarding COVID-19 severity in hypertensive patients,

causes of hypertension, and consequences of a hypertensive patient catching COVID-19.

Measures

An internet-based questionnaire was developed by the research team to better identify Black college students' hypertension awareness. Demographic questions were used to assess participants' age, African American identity, ethnic background, gender, year in school, hypertension diagnosis, and prediabetes/diabetes diagnosis.

Ten items were used to assess the impact of COVID-19 on hypertension awareness. The items were developed by the research team after extensively reviewing the literature. The items assessed the impact of COVID-19 on attitudes towards the risk of developing hypertension as well as their risk of testing positive for or exposing others to COVID-19. Attitudes were assessed using 10 items scored on a 5-point Likert scale ranging from strongly agree to strongly disagree.

The focus group research team consisted of the primary researcher who was trained in qualitative methods and four focus group assistants. All research assistants were trained in the focus group guide, participated in a practice focus group, and thoroughly reviewed the focus group questions. All training and pilot testing took place before the onset of data collection. The focus group moderator and a research assistant attended each focus group interview. The moderator led each focus group discussion while the research assistant took field notes and kept participants focused on the research questions. Due to the focus group taking place via Zoom with restricted camera access, nonverbal communication was not able to be documented. All focus groups were audiotaped to ensure data accuracy.

The semi-structured interview was developed using a qualitative approach that was both inductive and deductive. The deductive approach allowed us to use theory to

inform our research questions (Fereday & Muir-Cochrane, 2006). The Theory of Planned Behavior was the guiding theory when developing the semi-structured interview guide. The questions were based on the theory's main constructs: attitude, subjective norms, and perceived behavioral control (Ajzen, 1991). The inductive approach allowed us to use results from focus group data to elicit themes in response to the overarching research question (Fereday & Muir-Cochrane, 2006).

Data Analysis

Quantitative Data

Descriptive statistics were performed for sociodemographic variables. SPSS version 25 was used for many of the analyses. Frequencies, percentages, and descriptive statistics were calculated for all variables. All continuous variables were checked for normality. Total mean scores of each variable were obtained. Independent samples t-tests were used to examine differences in knowledge, attitudes, and practices; demographic variables included race, ethnicity, gender, age, hypertension status, and diabetes status). Chi-square was performed to establish statistically significant associations between hypertension knowledge, attitudes, and practices and demographic variables (age, race/ethnicity, gender, and education classification). One-way between groups analysis of variance was conducted to explore the impact of year in school on hypertension knowledge, attitudes, and practices. Statistical significance was set as $p < 0.05$.

Qualitative Data

Focus groups were originally transcribed through the Zoom software. Research assistants went through and corrected any mistakes in the transcripts made by Zoom. To ensure data accuracy, the primary researcher listened to the recorded focus groups and corrected the transcriptions, as necessary. After all the transcriptions were

completed, the primary researcher read through each transcript and developed a detailed codebook based on similar themes. The research team became familiar with the data through transcriptions, reading the transcripts, and developing the codebook. As the analysis progressed, researchers developed codes based on themes developed from reviewing the transcript (Alexander et al., 2018). The research team used thematic analysis to analyze and organize the focus group data by generating codes for topics based on emergent themes and topics of interest (Peters et al., 2006). The NVivo software was used to organize the data for the development of the codebook and data analysis. Through consulting with the research team, the final codebook was established. The research team finalized the themes after reviewing the codebook and an extensive review of the literature. Final transcripts and codebooks were verified by all members of the research team.

Theoretical Framework

Knowledge, attitudes, and practices studies have been used since 1976, when it was first introduced by Nancy Schwartz to examine nutritional knowledge, attitudes, and practices of Canadian Public Health Nurses (Schwartz, 1976). Since then, The Knowledge, Attitude, and Practices Model has been adapted and used in many studies to examine hypertension across many demographics of participants (Buang et al., 2019; Ralapanawa et al., 2020; Rashidi et al., 2018). The Knowledge, Attitudes, and Practices Model was used to develop items to examine Black college students' knowledge, attitudes, and practices regarding hypertension prevention and the impact of COVID-19 on hypertension awareness in Black college students. This model served as the guiding framework when developing the questionnaire to evaluate participants.

The Theory of Planned Behavior has been used in many studies to identify and increase the understanding of attitudes toward hypertension across different

populations. This theory identifies attitude, subjective norm, and perceived behavioral control to understand intention, perceived behavioral control, and intention that predict health behavior. This theory served as the guiding framework when developing the semi-structured question guide to collect focus group data.

Results

Demographics of Survey Participants

Three hundred seventy-three college students participated in the survey. Fifty-one students were excluded from data analysis due to completing less than 50% of the questionnaire, a total of 322 students were included in data analysis. All participants were enrolled in at least 3 credit hours during the semester in which they participated in the study. Slightly over half of participants identified as African American n = 171 (53.1%), Caribbeans accounted for 107 (33.2%) study participants, sixteen (5%) identified as African, eleven (3.4%) identified as South American, with sixteen (5%) study participants identified as Other. Most participants were female n = 273 (73.6%). Most participants were undergraduate students (n = 274). Most participants, n = 296 (91.9%), did not have a previous diagnosis of hypertension, and most n = 300 (93.2%) did not have a previous diagnosis of pre-diabetes or diabetes. Participants were between the ages of 18 and 77 years of age, with a mean age was 23.98 (*SD* = 6.89), most participants were aged 18-24 (50.3%) and 23.9% were 25 and older. (See Table 1)

Demographics of Focus Group Participants

A total of 30 students participated in the focus groups. Almost all of study participants were female (n = 26) and were between the ages of 18 and 36 years of age, with a mean age of 24. All participants were enrolled in at least 3 credit hours during the semester in which they participated in the focus group. The majority of the participants

were undergraduate students (n = 21). No participant had any previous diagnosis of hypertension, pre-diabetes, or diabetes. (See Table 2)

The Impact of COVID-19 on Hypertension Awareness

A total of seven questions were used to examine the impact of COVID-19 on hypertension awareness. Scores ranged from 6 (.6%) to 35 (1.6%) with the higher scores equaling more hypertension awareness. The mean hypertension awareness score was 18.86 (*SD* = 6.17).

The COVID-19 pandemic had little to no effect on participants' behaviors of screening for hypertension. When asked if they check their blood pressure more frequently since the COVID-19 pandemic, 20.5% responded strongly disagree, 32.9% responded disagree, 26.1% responded neither agree nor disagree, 13.7% responded agree, and only 3.7% strongly agreed. An independent sample t-test was conducted to compare the increase in blood pressure monitoring for hypertensive and non-hypertensive participants. There was a significant difference in blood pressure monitoring for hypertensive (*M* = 3.09, *SD* = .733) and non-hypertensive (*M* = 2.4, *SD* = 1.09; *t* (30.39) = 4.14, *p* = .000). An independent sample t-test was conducted to compare the increase in blood pressure monitoring for diabetic/pre-diabetic and non-diabetic participants. There was a significant difference in blood pressure monitoring for pre-diabetic/diabetic (*M* = 3.15, *SD* = 1.14) and non-diabetic (*M* = 2.4, *SD* = 1.07; *t* (310) = 2.99, *p* = .003).

A one-way between-groups analysis of variance was conducted to explore the impact of the COVID-19 pandemic on blood pressure monitoring. Participants were divided into five groups according to their classification (Group 1: freshman; Group 2: sophomore; Group 3: junior; Group 4: senior; Group 5: graduate student). There was a statistically significant difference at the $p < .05$ level in blood pressure monitoring for the

five education classification groups: F (4, 306) = 2.6, p = .035. Post-hoc comparisons using Tukey HSD test indicated that the mean score for juniors (M = 2.81, SD = 1.23) was statistically different from graduate students (M = 2.29, SD = .91).

A paired t-test was conducted to evaluate the impact of the COVID-19 pandemic on awareness of hypertension risk factors. There was a statistically significant decrease in awareness of hypertension risk factors from before the COVID-19 pandemic (M = 3.35, SD = 1.27) to since the COVID-19 pandemic (M = 3.18, SD = 1.24), t (309) = 2.05, p = .041. There was not a statistically significant difference in worrying about developing hypertension before and since COVID-19 pandemic (p = .890, 95 % CI (-.085, .098)) and perceived risk for developing hypertension before and since the COVID-19 pandemic (p = .265, 95% CI (-.045, .161)).

The COVID-19 pandemic had little to no effect on participants' hypertension preventative behaviors such as checking their blood pressure. Having a history of hypertension in the family did in fact increase awareness of hypertension.

My view in my precaution started before the pandemic just because my parents are at risk, and they do have it [hypertension] so it's kind of like a family thing. So because they have it, they don't want their kids to have it so they're really cautious of what we eat…when we go to my family doctors and stuff they're like "Oh your parents have it." We have be really cautious so I've always been cautious about it. [FG 3, Female 22, Senior]

Study participants expressed taking preventative measures as a result of having a family history of hypertension.

The way I perceive things and what I've done is, over the pandemic I started doing yoga just as like a way to like get myself moving and be active. Just because hypertension

does run in my family, so I want to try to take preventative measures as much as I can. I also have an air fryer to avoid fried foods, I use the airfryer instead of like the oven so just little things to help me take preventative measures, since I know that's something that does run in my family. [FG 5, Female 23, Graduate Student]

One participant shared learning more about hypertension and its complications after her mom was diagnosed with hypertension.

My mom has, she experienced hypertension, so my perceived risk of COVID-19 would motivate me to read more about hypertension prevention and about a lot of behavior risk factors that we did not think about until the complication happens. For example, obesity, physical inactivity, smoking and unhealthy food habits, our salt in our food. So that's made me realize how this affects our body and may make the virus more worse, so I just realized, to reduce the salt and sugar in our diets and also to include like Mediterranean diet, increase the healthy fat oils and do physical activity in home. We don't have to go to the gym. [FG 7, Female 32, Graduate Student]

The COVID-19 pandemic decreased participants' awareness of hypertension risk factors while at the same time increasing their hypertension risk factor behaviors.

The lockdown like I said before, I feel like that increased my hypertension risk and kind of decreased how aware I was of how much I was at risk for hypertension, and that I wasn't like watching the content of my food. For example, the salt levels, the sugar levels, the fat levels, I wasn't really looking so much at the nutritional value of the food as I should have been, or as I would have been before COVID. [FG 1, Female 18, Senior]

Students expressed how the COVID-19 pandemic changed their lifestyle behaviors increasing their risk for hypertension development.

So I haven't really been preventing it as much like prior to COVID. I've been working out and eating more healthy but because of COVID, you know you don't really want to go out to dinner and do things of that nature, so you get fast food or you try to cook something fast, so you can go back to your work and stay at home and it's just I haven't been doing it that much to prevent it, I would say. [FG 4, Female 19, Junior]

One student spoke on becoming less active and changes in diet as a result of the COVID-19 pandemic.

As far as like lifestyle habits, like dieting and also exercising, that's something that I haven't been doing as often because of COVID. It kind of made me kind of like sedentary. [FG 6, Female 21, Senior]

COVID-19 Awareness

A total of two questions were used to examine COVID-19 awareness. COVID-19 awareness scores ranged from 2 (5.9%) to 10 (18.6%) with a mean score of 7.09 (*SD* = 2.28). When asked about worrying about testing positive for COVID-19, 23% strongly agreed, 32.6% agreed, 17.4% neither agreed nor disagreed, 14.6% disagreed, and 9% strongly disagreed. When asked about worrying about exposing others to COVID-19, 26.7% strongly agreed, 34.5% agreed, 14.3% neither agreed nor disagreed, 13.7% disagreed, and 7.5% strongly disagreed. A paired sample t-test was conducted to evaluate the difference between worrying about testing positive for COVID-19 and worrying about exposing others to COVID-19. There was a statistically significant difference between worrying about testing positive for COVID-19 (*M* = 3.48, *SD* = 1.26) and worrying about exposing others to COVID-19 (*M* = 3.61, *SD* = 1.24), *t* (310) = -2.35, *p* = .019. An independent sample t-test was conducted to compare the worry about exposing others to COVID-19 between hypertensive and non-hypertensive participants.

There was a statistically significant difference in worry for hypertensive (M = 3.04, SD = 1.15) and non-hypertensive (M = 3.66, SD = 1.24; t (307) = -2.31, p = .021. Participants' views during the focus group directly matched their responses to the survey. Participants were more concerned with exposing others to COVID-19 than catching the virus themselves.

I wasn't worried about how it would affect me per se, but I was worried about. Because I was living with my parents all the time I was worried about what would happen if I did get it, and what would affect them because they're pretty old and they do have like as your studies going on about like hypertension and stuff so I was really aware of it, and I mean pretty safe and I knew that if I got it like I wasn't too worried about myself I knew I'd be fine. [FG 3, Female 22, Senior]

My family I live with do have issues. I live with my grandmother, two younger siblings. And my mom has an autoimmune disease so I definitely was making sure to be careful, still making sure to be careful. Thank God, I have not caught COVID throughout this whole thing. So I think my risk is definitely a lot lower compared to them, but I still treat it as if it is high. [FG 5, Female 19, Junior]

Study participants expressed taking the COVID-19 pandemic seriously from a concern of spreading the virus to loved ones who are immunocompromised.

My mom has a heart condition and I have my all my older brother. He has asthma and some lung issues…So I'm not very high risk, but I did take it very seriously, because I do love my family, especially my mom. [FG 5, Female 21, Senior]

I knew my risk was very low because I'm pretty active person myself, but I was more so concerned for my mom since she has {inaudible} because she is immunocompromised because of her heart condition. [FG 5, Female 29, Graduate Student]

The Impact of Hypertension on COVID-19 Disease Severity

One question was used to assess the impact of hypertension on COVID-19 disease severity. Scores ranged from 1 (1.6%) to 5 (96%) with a mean score of 3.98 (*SD* = .94). Participants were very aware of the impact of hypertension on COVID-19 disease severity.

When asked about their belief of hypertension leading to worse COVID-19 outcomes, most participants either strongly agreed, 107 (33.2%), or agreed, 109 (33.9%). While 77 (23.9%) neither agreed nor disagreed, 11 (3.4%) disagreed, and only 5 (1.6%) participants strongly disagreed.

An independent sample t-test was performed to compare the impact of hypertension on COVID-19 disease severity between different demographic variables. There was not a statistically significant difference in the overall impact of hypertension score between age groups (*p* = .875, 95% CI (-.267, .228)), gender (p = .848, 95% CI (-.309, .177)), ethnicity (p = .174, 95% CI (-.371, .051)), and hypertension status (p = .819, 95% CI (-.417, .387)).

There was a collective agreement among participants that hypertension increases your risk of experiencing worse COVID-19 disease severity.

I'd say weaken your immune system, if anything, since having high blood pressure determines a lot of what your body is capable of, or rather how it affects your body. So if anything it might double or triple your chances of getting a heart attack or heart problems, maybe a stroke and increases the chances of you potentially dying from either hypertension, or even COVID itself. [FG 2, Male 25, Other]

If someone did have that and they did catch COVID I feel like their risk goes up but um but by how much that just depends on how they live their lifestyle and what they did prior to you know, contracting COVID. [FG 5, Female 29, Graduate Student]

Students expressed their views on the consequences of a hypertensive patient catching COVID-19.

It would be a whole lot harder for them to kind of like process COVID and hypertension, at the same time, because not only is their heart affected, their lungs are also affected. [FG 6, Female 21, Senior]

You're most likely to experience a rough time. Because the possibility of having high blood pressure and COVID-19 is like not good. You know the highest chances. You may live but you may, but you also might die. [FG 7, Female 31, Senior]

COVID-19 Vaccination Uptake

Two questions were used to determine participants' vaccination uptake. COVID-19 vaccination uptake scores ranged from 2 (11.2%) to 8 (55.3%), with a mean score of 6.16 (*SD* = 2.31). When asked about their willingness to get the COVID-19 vaccine, 14.6% were not willing, 18.9% were somewhat willing, 5.9% were very willing, and 57.1% were already vaccinated. When asked about their likelihood to get the COVID-19 vaccine, 15.2% were unlikely, 18.9% were somewhat likely, 6.8% were very likely, and 55.6% were already vaccinated.

An independent sample t-test was conducted to compare the willingness to get vaccinated demographic variables. There were no statistically significant differences in willingness to get vaccinated for age groups (p = .117, 95% CI (-.066, .582)), gender (p = .267, 95% CI (-.458, .128)), ethnicity (p = .297, 95% CI (-.404, .124)), hypertension status (p = .585, 95% CI (-.657, .371)), and diabetes status (p = .155, 95% CI (-1.1, .187)). An independent sample t-test was conducted to compare the likeliness to get

vaccinated demographic variables. There were no statistically significant differences in willingness to get vaccinated for age groups (p = .130, 95% CI (-.075, .579)), gender (p = .667, 95% CI (-.377, .242)), ethnicity (p = .499, 95% CI (-.357, .174)), hypertension status (p = .671, 95% CI (-.628, .405)), and diabetes status (p = .078, 95% CI (-1.23, .07)).

A chi square test for independence indicated no statistically significant association between vaccination status and age (p = .393), education classification (p = .270), ethnicity (p = .593), hypertension status (p = .985), and diabetes status (p = .376). A chi square test for independence indicated no statistically significant association between vaccination hesitancy and age (p = .387), education classification (p = .567), ethnicity (p = .756), hypertension status (p = .938), and diabetes status (p = .146).

When asked about barriers to getting vaccinated against COVID-19 and the causes of COVID-19 vaccination hesitancy, almost every participant mentioned mistrust and limited access. Participants discussed a lack of information, politicization of the COVID-19 pandemic, misinformation, and history of mistreatment of Black people in the medical field as all causes of both barriers and vaccination hesitancy.

I think one of the biggest barriers would be the false news, just the level of misinformation. I think factors that affect hesitancy, would be just a lot of uncertainty. As a previous participant said, the government and CDC, they're just kind of learning things and just releasing information as they go and a lot of people- so there's no firm foundation of knowledge, necessarily, to answer all the questions because everybody's still kind of figuring things out as it continues to progress. And I think that forced a sizable number of people. It's kind of like 'hmm, you know, that makes me hesitant', and,

like, also, I think, the fact that you have some people who are on the front lines, some healthcare workers, some doctors, some nurses, who themselves are like, 'I don't want to take the vaccine', and I think that causes a lot of hesitancy in the general public, for example, because I guess it kind of like brings the question 'well, you know, you'd like to think the front line workers, more than anyone, would like understand the urgency and importance of the vaccine. So if they don't want to take it, like, is there something they know that we don't know, like, you know what I mean? Like, raising those kinds of questions. {inaudible}. [FG 1, Female 18, Junior]

Study participants expressed how the history of mistreatment of Black people in the United States has led to vaccination hesitancy.

The reason I think people are hesitant, specifically Black people, is because there has been a history with the medical profession and like tests being done on Black people. Them thinking we don't have the same pain threshold as like Caucasians and that whole thing. So I think that was a big reason that a lot of people were hesitant about getting the vaccine and still are, is because we just don't know if we're being test dummies for future generations or like future experiments that they want to do, or are they actually looking out for our health and safety. So I would say just from what my family has talked about, and just like talking to other Black people, that is a major thing. It's just, we've seen this in history so many times so is this just another example of that or is this something that they're actually using for the first time to be beneficial to us? So I think that unknown is playing a big part in people's hesitancy to get the vaccine. [FG5, Female 23, Graduate Student]

A student explained how she learned through a college-level science class how viruses and vaccines work which showed her just how little knowledge people have regarding science, viruses, and vaccines.

I think it was around before the pandemic started..is when I first started learning deeply about viruses in one of my science classes…If you just graduate high school you're not going to learn about viruses and how they work or vaccines for viruses…You really have to get to a college level to start learning about stuff like viruses and stuff and take a biology class…It just made me realize people just don't really know that much about virus. Not a lot of people understand the purpose of the vaccine and how it works…So I think lack of education and that would make sense especially in you know the Black community too because I mean most of us are usually like first generation students most of our parents probably didn't go to college or something like that. So I had to do a lot of informing the people around me myself when I learned more about like science and things like that. So I feel like that's a big factor of hesitancy for a lot of people. [FG 5, Female 19, Junior]

Discussion

This study was conducted to investigate the effect of the COVID-19 pandemic on hypertension awareness among Black college students. Specifically, investigating the attitudes toward the risk of developing hypertension before and since the COVID-19 pandemic. Since the onset of the COVID-19 pandemic, hypertensive and diabetic participants reported an increase in monitoring of their blood pressure. Seniors had the greatest increase in blood pressure monitoring while graduate students had the least. Study participants' hypertension risk factors awareness decreased since the onset of the COVID-19 pandemic. Demographic variables, age, ethnicity, gender, education

classification, hypertension status, diabetes status, and vaccination status made no difference in hesitancy, willingness, and likelihood to get vaccinated.

Impact of the pandemic on hypertensive patients

Several health care professionals have emphasized the importance of monitoring your blood pressure during the COVID-19 pandemic (American Medical Association, 2020; Zarefsky, 2020). Hypertension awareness increased as hypertensive and diabetic study participants began monitoring their blood pressure more frequently. The greatest increase in blood pressure monitoring occurred in juniors while graduate students had the smallest increase. These findings can be interpreted in several ways. Juniors had the largest group of female study participants (n = 64, 27%) while graduate students had the largest group of male study participants (n = 21, 26.9%). Several studies have demonstrated that women have higher levels of hypertension awareness than men (Everett & Zajacova, 2015; Reckelhoff, 2018) and are more likely to monitor blood pressure than men (Rahman et al., 2017). Second, graduate students had the largest group of hypertensive participants (n = 9, 37.5%). With graduate students having a previous diagnosis of hypertension, blood pressure monitoring could have already been high, causing no need for an increase. Third, slightly under half of study participants over the age of 25 (n = 36, 46.8%) were graduate students, which could have also contributed to the likelihood of blood pressure monitoring prior to the onset of the COVID-19 pandemic.

Awareness of hypertension risk factors

Since the onset of the pandemic, students reported a significant decrease in awareness of hypertension risk factors. These findings can be interpreted in several ways. First, as a participant stated during a focus group, “The lockdown…kind of decreased how aware I was of how much I was at risk for hypertension.” The onset of

the COVID-19 pandemic may have brought realization to study participants on how unaware they were of hypertension risk factors. Second, the participants may have thought they were aware of hypertension risk factors prior to the onset of the COVID-19 pandemic. More awareness was brought about hypertension risk factors, as it became a major risk factor for COVID-19 disease severity, showing participants they were not as aware of hypertension risk factors as they had previously believed.

Despite the COVID-19 pandemic decreasing participants' awareness of hypertension risk factors, having a hypertensive close family member increased awareness of hypertension and its risk factors. During the focus groups, study participants discussed the impact of having a close family member diagnosed with hypertension, usually a parent. Students expressed how once the family member received a diagnosis, they were more interested in hypertension while also working as a family to keep everyone's blood pressure under control, causing an increase in awareness of hypertension preventative behaviors, thus being mindful of the foods they eat (Barksdale & Metiko, 2010). As a result of their increased awareness of family hypertension risk factors, study participants with a positive family history of hypertension were more involved in hypertension risk factor behaviors.

Although family history increases hypertension awareness, the COVID-19 pandemic increased participants' hypertension risk factor behaviors. During the focus groups, participants expressed the difficulties of remaining healthy during a global pandemic. Restrictions, gym closures, and spending a great deal of time indoors contributed to such difficulties. Participants were eating more to cope and out of boredom (Sidor & Rzymski, 2020), moving less from spending more time indoors (Kreutz et al., 2021), and stressing more from classes transitioning to remote learning and the

uncertainty of what the future may hold (Black Thomas, 2022; Chen-Sankey et al., 2020).

COVID-19 Awareness

Study participants felt stronger about exposing others to the COVID-19 virus than testing positive themselves. Students felt they were at low risk of COVID-19 disease severity. Study participants expressed if they caught the COVID-19 virus they would be fine, as a participant stated, “I'm young, I’m healthy.” These results support earlier findings that young adults do not perceive themselves to be at high risk for COVID-19 disease severity (Prasad Singh et al., 2020). Although participants would be fine if they caught the COVID-19 virus they were concerned about what may happen if they spread the virus to a loved one. Students returned home to family members who were immunocompromised or had underlying health conditions, putting them at greater risk of COVID-19 disease severity (Dyregrov et al., 2021).

Impact of Hypertension on COVID-19 Disease Severity

More than 60% of participants believe that hypertension leads to worse COVID-19 health outcomes, which is consistent with previous studies showing the impact of hypertension on COVID-19 disease severity (Du et al., 2021; Huang et al., 2020; Mehra et al., 2020). The students explained during the focus groups they believe serious complications would happen if a hypertensive individual were to catch the COVID-19 virus. Consequences mentioned included increased risk of heart attack, stroke, infections, and having a harder time recovering from COVID-19. Study participants even expressed that they believed the consequence could be as serious as death.

COVID-19 Vaccination Uptake

Understanding vaccination uptake can influence a person’s likelihood of getting vaccinated and provide more insight into barriers to getting vaccinated and causes of

vaccination hesitancy. There were no differences in vaccination status, vaccination hesitancy, willingness to get vaccinated, and the likelihood of getting the COVID-19 vaccine between ethnic background, age, gender, education classification, hypertension status, or diabetes status. Vaccination hesitancy was also low, which is similar to the result of Purnell et al., (2022), who assessed vaccination hesitancy in Black college students. Given that the sample was enrolled in higher education increases health literacy (Uğraş et al., 2021). Previous researchers have also found that those with higher education are more likely to get vaccinated (Funk & Tyson, 2021). Study participants discussed mistrust and access as barriers to getting vaccinated and causes of vaccination hesitancy (Momplaisir et al., 2021). Similar to the findings of Bateman (2022) whose participants' top contributors to vaccination hesitancy were mistrust, fear, and lack of information (Balasuriya et al., 2021)

Implications

This explanatory mixed-method study design investigated the influence of the COVID-19 pandemic on hypertension awareness among Black college students. Data collected can provide information, education, and resources concerning the COVID-19 pandemic and its potential consequences. Findings could help college administrators rethink care delivery strategies to better meet the pressing concerns of students with chronic conditions. Student Health Centers at universities can use data collected to develop and implement campaigns to convey information on how to adopt healthy habits, prevent chronic diseases, and maintain control of COVID-19.

Limitations

This study, like all others, has significant limitations. First, a convenience sampling design was used to enroll individuals, with a modest sample size. Non-random sampling results in sample bias and results that are not generalizable. Because of the

small sample size, researchers were unable to assess variations in hypertension knowledge, attitudes, and practices among racial/ethnic groups. Second, participants may only attend one university. Factors affecting hypertension may differ by geographic region, limiting the survey's generalizability. Third, the study's participants were mostly from south Florida, and the sample was regional. Different levels of awareness of the pandemic may exist across the country, resulting in differing perspectives and experiences. Fourth, data was collected at various times during the COVID-19 pandemic. Because of the COVID-19 restrictions in effect at the time of participation in the study, the opinions of the study participants may have differed. Finally, because the pandemic was still ongoing at the time of publication, the findings of this study may only reflect the participants' experiences and perspectives at a single moment in time rather than the full COVID-19 pandemic.

Conclusion

While this study adds to our understanding of the pandemic's impact on blood pressure and vaccination uptake, if you already have hypertension, you should consult your doctor and follow lifestyle guidelines. Even amid the pandemic, monitoring your blood pressure and hypertension risk factors is critical. Regular exercise, a nutritious diet, stress management, and blood pressure monitoring are all recommended.

By examining hypertension awareness, public health professionals can better understand the influence COVID-19 has on Black college students' attitudes toward developing hypertension. Herd immunity (Kwok et al., 2021), safely repopulating college campuses, and tools for Black college students to improve vaccine uptake are just a few of the advantages of understanding the impact of vaccination uptake among Black college students. The goal of this study was to see how COVID-19 affected Black college students' attitudes toward hypertension awareness and vaccination with COVID-

19. During the COVID-19 pandemic, I investigated how subjective norms and perceived behavior control influenced Black college students' views on hypertension awareness. In particular, looking into people's perceptions of the risk of acquiring hypertension before and during the COVID-19 pandemic.

TABLES

Table 1. Survey Participants' Characteristics by Hypertension and Diabetes Status

Demographics	**Total**	**Non-Hypertensive**	**Diabetic/ Pre-Diabetic**	**Non-Diabetic**
	n (%)	**n (%)**	**n (%)**	**n (%)**
Age				
18-24	162 (50.3)	154 (70.3)	7 (50)	155 (68.9)
25+	77 (23.9)	65 (29.7)	7 (50)	70 (31.1)
Race/Ethnicity				
African American	171 (53.1)	159 (53.9)	11 (50)	160 (53.5)
Caribbean	107 (33.2)	97 (32.9)	7 (31.8)	100 (33.4)
African	16 (5)	15 (5.1)	2 (9.1)	14 (4.7)
South American	11 (3.4)	10 (3.4)	1 (4.5)	10 (3.3)
Other	16 (5)	14 (4.7)	1 (4.5)	15 (5)
Gender				
Female	237 (73.6)	222 (75.3)	14 (66.7)	223 (74.3)
Male	78 (24.2)	68 (23.1)	7 (33.3)	71 (23.7)
Other	6 (1.9)	5 (1.7)	—--------	6 (2)
Education Classification				
Freshman	49 (15.2)	46 (15.6)	1 (4.8)	48 (16)
Sophomore	37 (11.5)	36 (12.2)	4 (19)	33 (11)
Junior	87 (27)	80 (27.1)	5 (23.8)	82 (27.3)
Senior	74 (23)	68 (23.1)	6 (28.6)	68 (22.7)
Graduate Student	74 (23)	65 (22)	5 (23.8)	69 (23)

Table 1. Focus Group Participants' Characteristics	
Demographics	**N (%)**
Age	
18-24	19 (63.33%)
25-36	11 (36.66%)
Race/Ethnicity	
African American	23 (76.66%)
Caribbean	5 (16.66%)
Hispanic	2 (3.33%)
Middle Eastern	1 (3.33%)
Gender	
Female	26 (86.66%)
Male	4 (13.33%)
Education Classification	
Freshman	1 (3.33%)
Sophomore	3 (10%)
Junior	6 (20%)
Senior	11 (36.66%)
Graduate Student	8 (26.66%)
Other	1 (3.33%)

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CHAPTER 5 – CONCLUSION

Summary

Due to a combination of sociodemographic and health factors such as race, ethnicity, family history, and the added stressors of being a college student, Black college students are at an increased risk of developing hypertension early (Wright et al., 2018). There is little or no research on the knowledge, attitudes, and practices of this community when it comes to hypertension prevention.

COVID-19 has had a disproportionately negative impact on the African American community, with Black adults reporting more severe COVID-19 health outcomes than white individuals of all ages (Selden & Berdahl, 2020). In COVID-19 patients, hypertension also has a negative impact on their health (Du et al., 2021; Huang et al., 2020; Kreutz et al., 2021; Rodgers & Gibbons, 2020). There has been extensive research on the impact of hypertension on COVID-19 health outcomes (Berg, 2021; Du et al., 2021; Huang et al., 2020; Kreutz et al., 2021; Parveen et al., 2020; Pranata et al., 2020), but no research on the impact of COVID-19 on Black college students' attitudes toward hypertension awareness (Berg, 2021; Du et al., 2021).

Due to safer at home movements and colleges and universities transitioning to online and remote learning, COVID-19 has disrupted everyone's lives (Coughenour et al., 2021). The COVID-19 pandemic shifted college students' daily routines, causing them to spend more time at home, increasing stress and food intake while decreasing physical activity (Brito Silva et al., 2021; Coughenour et al., 2021), all of which are risk factors for hypertension (American Heart Association, 2017). As a result, the purpose of my dissertation was to fill up these three gaps to better understand the influence of the COVID-19 pandemic on Black college students' hypertension awareness, which has the potential to enhance their mental and physical health.

Three main aims were set for this research study. Particularly, the study assessed the effect of psychosocial factors - knowledge, attitudes, and practices - on hypertension risk factors among Black college students in south Florida, using the Hypertension Evaluation of Lifestyle and Management (HELM) Knowledge Scale and the Hypertension - Self-care Activity Level Effects (H-Scale). As well also seeking to understand the unique experiences of Black college students during the time of the COVID-19 pandemic and its effect on hypertension awareness, using focus group interviews. Lastly, using survey questions developed by the research team and focus group interviews, the study investigated the impact of the COVID-19 pandemic on hypertension awareness among Black college students.

Participants ranged in age from 18 to 77 years old, with an average age of 24 years (SD = 6.89), the majority of whom were between the ages of 18 and 24, and 23.9 percent of whom were 25 and older. A total of 171 individuals identified as African American, which is slightly more than half of the total (53.1%). Almost all of the participants were female, n = 273 (73.6%). Many of the participants (n = 274) were college students. Most individuals, n = 296 (91.9%), had never been diagnosed with hypertension, while most participants, n = 300 (93.2%), had never been diagnosed with pre-diabetes or diabetes.

The focus groups included a total of 30 students. Almost all of the participants (n = 26) were female, and the average age of the participants was 24. The participants ranged in age from 18 to 36 years old. During the semester in which the focus group took place, all participants were enrolled in at least 3 credit hours. Most of the participants (n = 21) were undergraduate students. No one in the study had ever been diagnosed with hypertension, pre-diabetes, or diabetes.

Manuscript 1 aimed to study the effect of knowledge, attitudes, and practices on hypertension risk factors among Black college students, using an internet-based questionnaire. Findings indicated that age was the only variable that had significant difference when it came to hypertension knowledge, attitudes, and practices. The older students were more knowledgeable, explaining the significant difference in hypertension knowledge between graduate students and freshmen, sophomores, juniors, and seniors. On the other hand, the younger students (18-24) were more trusting when it came to receiving information regarding hypertension. Overall, the students viewed doctors and healthcare professionals as a reliable source and viewed coworkers or classmates as untrustworthy at providing them information regarding hypertension. The younger students (18-24) were at a higher risk of developing hypertension through their lack of participation in hypertension preventative behaviors. The results of this study show the great need to increase hypertension knowledge as it will also increase hypertension prevention, control, and management. One implication of this study is to increase hypertension education on risk factors and how to prevent hypertension in at risk populations.

Manuscript 2 aimed to understand the unique experiences of Black college students during the time of the COVID-19 pandemic and its impact on hypertension awareness, using focus group interviews. Four major themes emerged from the data collected during the focus group interviews. Theme 1: The influence of the COVID-19 pandemic on daily life. Students experience major interruptions in school life because of the COVID-19 pandemic and experience an increase in mental health challenges. Theme 2: The influence of the COVID-19 pandemic on hypertension risk factors. During the onset of the pandemic, students experienced an increase in unhealthy eating habits, decrease in physical activity, and increase in stress levels. Theme 3: The influence of

the COVID-19 pandemic on hypertension preventative behaviors. The increase in hypertension risk factors because of the COVID-19 pandemic affected participants' physical and mental health resulting in participants making lifestyle changes which led to an increase in hypertension preventative behaviors. Theme 4: Perceived risk of COVID-19 disease severity. Most of the students perceived themselves to be at low risk of COVID-19 severe health consequences due to them being young and healthy, and those that did perceive them to be at higher risk were immunocompromised. These findings draw attention to how COVID-19 protocols increased the risk of hypertension development. College administrators should develop comprehensive programs to acknowledge the effects of the COVID-19 pandemic on students' physical and mental health, as well as their academic performance.

Manuscript 3 investigated the influence of COVID-19 pandemic on hypertension awareness among Black college students, using an internet-based questionnaire and focus group interviews. In particular, looking into perceptions of the risk of developing hypertension before and during the COVID-19 pandemic. Participants who were hypertensive or diabetic reported an increase in blood pressure monitoring since the start of the COVID-19 pandemic. Seniors were the ones who checked their blood pressure the most, while graduate students were the ones who checked it the least. Since the start of the COVID-19 pandemic, participants' awareness of hypertension risk factors has decreased. There were no differences in vaccination status, hesitancy, willingness, or likelihood to get vaccinated based on age, ethnicity, gender, education classification, hypertension status, or diabetes status. The data gathered in this study can inform and educate to help people learn more about COVID-19 and its potential effects. The findings could aid college officials in rethinking care delivery systems to better address the pressing issues of students with chronic diseases. University Student

Health Centers can use the information gathered to build and run campaigns on how to adopt healthy habits, prevent chronic diseases, and maintain and control COVID-19.

Strengths and Limitations

This research had several strengths. The study's uniqueness was a notable strength, as few researchers have previously focused on the influence of the COVID-19 pandemic on hypertension awareness among Black college students, filling gaps in the literature on this critical public health issue. This was probably one of the first study to investigate hypertension knowledge, attitudes, and practices among Black college students, as far as we know. T The impact of the COVID-19 pandemic on hypertension awareness among Black college students was also investigated for the first time during this study. The study's utilization of a mixed methods technique, which included survey evaluation and focus group interviews, was another important strength. The use of an explanatory mixed method approach provided for a more in-depth examination of the effect of the COVID-19 pandemic on student hypertension, with the results of the qualitative study explaining the results that were found during the quantitative study.

As with all studies this too had its limitations. First, participants were recruited using a convenience sampling design consisting of a small sample size. Using a non-random sampling creates sample bias and the results are not generalizable. The small sample size limited the ability to compare differences in hypertension knowledge, attitudes, and practices across the different racial/ethnic backgrounds. Second, participants were restricted to a single university. Factors regarding hypertension may vary across geographic locations, limiting the generalizability of the survey findings. Third, the study’s sample was regional and most of the participants reside in south Florida. The impact of the pandemic may differ across the country leading to differences in opinions and experiences as related to the COVID-19 pandemic. Fourth, focus groups

were conducted at various stages of the COVID-19 pandemic. The participants of the study opinion may have differed based on the COVID-19 restrictions that were in place at the time of participating in the study. Fifth, the experiences and opinions of other college students may differ based on campuses repopulating and courses being back taught in person. Our results may not reflect the experiences of college students after repopulation and COVID-19 restrictions being lifted. Sixth, because of the pandemic, focus groups took place virtually limiting the analysis of the qualitative data since expressions and body language were not able to be observed. Lastly, the pandemic was still in progress at the completion of this article and the findings of this study may only reflect the experiences and opinions of the participants at a single point rather than the entirety of the COVID-19 pandemic.

Future Implications

The findings of this novel study can be used to design culturally tailored programs that raise hypertension awareness while reducing risk factor behaviors. Colleges and universities must raise awareness of hypertension information and practices that put students at risk of developing hypertension. Colleges and universities can use the findings of this study to offer educational materials, conduct education to change attitudes, and provide resources to promote hypertension prevention practices. Representatives from student health centers can speak on chronic illness prevention and the need for screening and early detection at new student orientations. Identifying behavioral and physiological hypertension risk factors can help with hypertension prevention in the Black community, such as increasing hypertension screening among Black college students on campus.

The current study lays the groundwork for the creation of educational materials in the event of future public health crises such as the COVID-19 pandemic. Because the

COVID-19 pandemic had such a significant impact on college students' mental health and academic performance, colleges and universities must prioritize counseling services and resources. College administrators are responsible for keeping students safe and secure. The college students' physical and mental health suffered as a result of their efforts to limit the spread of COVID-19. In the event of future pandemics or other public health emergencies, college administrators can use the findings of this study, as well as the lived experience of the COVID-19 pandemic, to prepare to satisfy all the students' concerns.

The COVID-19 pandemic and its potential repercussions will be the subject of information, education, and resources based on the findings of this innovative research project. The findings could aid college officials in rethinking care delivery systems to better address the pressing concerns of college students with chronic illnesses. University Student Health Centers can use the information gathered to create and conduct campaigns to teach college students about healthy practices, how to avoid chronic diseases, and how to keep COVID-19 under control.

Researchers in the future should employ a larger sample size and collect data from college students from various colleges and universities. More representation across racial/ethnic backgrounds and gender identities will be achieved with a larger sample size. Future studies with college students from more universities across the country could provide useful information to colleges and universities nationwide. The long-term effects of the COVID-19 pandemic on Black college students should be investigated by future researchers. Administrators at colleges and universities should create comprehensive initiatives to recognize the impact of the COVID-19 pandemic on college students' physical and mental health, as well as their academic performance.

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APPENDICES

Appendix A: Survey Questionnaire

	Variables	Questions	Measures
Sociodemographic Variables (Independent Variables)	Hypertension status	Have you ever been diagnosed with hypertension?	1= yes, 2=no
	Diabetes status	Have you ever been diagnosed with pre-diabetes or diabetes?	1=yes, 2=no
	Height	What is your height?	In feet and inches
	Weight	What is your weight?	In pounds
	Age	Age	Age in years
	Race	Which best describes your ethnic background?	1=African American, 2=African, 3=Caribbean, 4=South American, 5=Other
	Gender identity	Gender	1=male, 2=female,
	Educ	Year in school	1=freshman, 2=sophomore, 3=junior, 4=senior, 5=graduate student
Hypertension Practices	Low Salt Diet	Follow a healthy eating plan?	1=always, 2=frequently, 3=rarely, 4=never
		Eat ≥5 servings of fruits and vegetables?	1=always, 2=frequently, 3=rarely, 4=never
		Salt your food at the table?	1=always, 2=frequently, 3=rarely, 4=never
		Add salt to food when you're cooking?	1=always, 2=frequently, 3=rarely, 4=never
		Eat fried food such as chicken, french friends, or fish?	1=always, 2=frequently, 3=rarely, 4=never
Hypertension Practices	Physical Activity	Do at least 30 minutes total of physical activity?	1=always, 2=frequently, 3=rarely, 4=never

		Do a specific exercise activity (such as swimming, walking, or biking) other than what you do around the house or as part of your work?	1=always, 2=frequently, 3=rarely, 4=never
	Weight Management	I am careful about what I eat	1=always, 2=frequently, 3=rarely, 4=never
		I read about food labels when I grocery shop	1=always, 2=frequently, 3=rarely, 4=never
		I exercise in order to lose weight	1=always, 2=frequently, 3=rarely, 4=never
		I have cut out drinking sugary sodas and sweet tea	1=always, 2=frequently, 3=rarely, 4=never
		I eat smaller portions or fewer portions	1=always, 2=frequently, 3=rarely, 4=never
		I have stopped buying and bringing unhealthy foods into my home	1=always, 2=frequently, 3=rarely, 4=never
		I have cut out or limit foods that I like but that are not good for me	1=always, 2=frequently, 3=rarely, 4=never
		I eat at restaurants or fast food places less often	1=always, 2=frequently, 3=rarely, 4=never
		I substitute healthier foods for things that I used to eat	1=always, 2=frequently, 3=rarely, 4=never
		I have modified my recipes when I cook	1=always, 2=frequently, 3=rarely, 4=never
Hypertension Knowledge	Hypertension Evaluation of Lifestyle and Management (HELM) Scale	A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic blood pressure is 90 on two separate occasions.	1=True 2=False
		Most people can tell when their blood pressure is too high because they feel bad.	2=True 1=False
		Uncontrolled hypertension can lead to which of the following:	1=Kidney failure 2=Lung cancer

Hypertension Knowledge			3=High cholesterol 4=Diabetes
		Which of the following increases your risk of having hypertension?	2=Weight lifting 3=Drinking > 2 cups of coffee a day 4=Smoking a pack of cigarettes <u>1=Gaining 15 pounds</u>
		People with hypertension do not need to take medicine if they exercise regularly	2=True <u>1=False</u>
		Which of the following statements about taking blood pressure medicine is TRUE?	<u>1=More than one type of blood pressure medicine can be taken at the same time</u> 2=Blood pressure medicine should always be taken with food 3=Blood pressure medicine works best if it is taken at bedtime 4=Blood pressure medicine should not be taken if a person drank alcohol that day
		Most of the salt Americans eat is added with a salt shaker.	<u>1=False</u> 2=True
		There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular coke	<u>1=True</u> 2=False
		An overweight 60-year-old man has hypertension. He drinks one bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which of the following changes is the most likely to lower his blood pressure?	<u>1=Lose 10 pounds</u> 2=Stop drinking alcohol 3=Switch to decaffeinated coffee 4=Switch to sea salt
		Which of the following changes to your diet is most likely to lower your blood pressure	<u>1=Eat more fruits, vegetables, whole grains, and low-fat dairy products</u> 2=Eliminate spicy foods 3=Drink one glass of red wine daily 4=Drink herbal tea instead of coffee

		Which of the following statements about exercise and blood pressure is TRUE?	1=Exercising for 30 minutes every day lowers your blood pressure more than exercising for 30 minutes, 3 days a week 2=People who are on their feet most of the day will not benefit from more exercise 3=Weight lifting should be avoided by people with high blood pressure 4=When exercising, you must raise your heart rate to at least 100 beats to improve blood pressure
		A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in his family doctor's office, and 132/74 mm Hg when he checks it at home. Which of the following statements is true?	1=It is common for blood pressure readings to vary like this 2=The highest blood pressure is the correct one 3=The lowest blood pressure is the correct one 4=He can be reassured that his blood pressure is normal
Hypertension Knowledge		When measuring your blood pressure at home you should:	1=Take two reading, a minute or 2 apart, and write down the average value 2=Always take your readings before you take your blood pressure medicine 3=Take several readings, a minute or 2 apart, and record the lowest one 4=Take your blood pressure right after exercising and at least 2 hours after a meal
		Blood pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper/lower. If someone is told that their goal	1=When the upper is below 126, and the lower is below 76 2=When the upper is below 176, even if the lower is over 76

		blood pressure is 126/76, when have they reached their goal?	3=When the lower is below 76 even if the upper is over 126 4=When the average of the upper and lower is <100
Hypertension Attitudes	How much do you trust each of these sources to provide correct information about hypertension?	Your doctor or other health care professional	1=not at all, 2=a little, 3=a great deal, 4=don't know
		Your religious or faith leader	1=not at all, 2=a little, 3=a great deal, 4=don't know
		Your close friends and members of your family	1=not at all, 2=a little, 3=a great deal, 4=don't know
		Your coworkers, classmates, or other people you know	1=not at all, 2=a little, 3=a great deal, 4=don't know
		News sources (websites, newspapers, TV, or radio)	1=not at all, 2=a little, 3=a great deal, 4=don't know
		Your contacts on social media (Facebook, Twitter, or others)	1=not at all, 2=a little, 3=a great deal, 4=don't know
		The Centers for Disease Control and Prevention (CDC)	1=not at all, 2=a little, 3=a great deal, 4=don't know
		The Food and Drug Administration (FDA)	1=not at all, 2=a little, 3=a great deal, 4=don't know
		The National Institutes of Health (NIH)	1=not at all, 2=a little, 3=a great deal, 4=don't know
Impact of COVID-19 on Hypertension Awareness	COVID-19 Awareness	I believe hypertension leads to worse COVID-19 health outcomes	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Since COVID-19, I check my blood pressure more frequently	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Before COVID-19, I worried about developing hypertension	1=strongly agree, 2=agree, 3= neither agree nor disagree,

			4=disagree, 5=strongly disagree
		Since COVID-19, I worry about developing hypertension	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Before COVID-19, I was aware of hypertension risk factors	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Since COVID-19, I am now aware of hypertension risk factors	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Before COVID-19, I believed I was at risk for developing hypertension	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Since COVID-19, I now believe I am at risk for developing hypertension	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Since COVID-19, I worry about testing positive for COVID-19	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
		Since COVID-19, I worry about exposing others to COVID-19	1=strongly agree, 2=agree, 3= neither agree nor disagree, 4=disagree, 5=strongly disagree
Vaccination Uptake	Willingness to get a COVID-19 vaccine	How willing are you to get an approved COVID-19 vaccine when it becomes available?	1=Not willing, 2=Somewhat willing, 3=Very willing, 4=Already vaccinated
	Intention to get a COVID-19 vaccine	How likely are you to get an approved COVID-19 vaccine when it becomes available?	1=Very likely, 2=Somewhat likely,3=Very unlikely, 4=Already vaccinated

Appendix B: Focus Group Guide

IN-DEPTH FOCUS GROUP GUIDE

INTRODUCTION:

Thank you and purpose: Thank you all for agreeing to participate in this study. As you know, this study is about learning how the COVID-19 pandemic impacted Black college students and their views towards hypertension. We are specifically interested in Black college students' COVID-19 experiences and the impact of COVID-19 on Black college students' perceived risk for developing hypertension. Our goal is to understand if Black college students tried to control/prevent hypertension to avoid having progressed COVID-19 health outcomes?

Confidentiality: We will summarize the answers of all the focus groups in this study. Your individual answers will not be shared with anyone outside of this focus group. I want to be sure that you are comfortable with this process, and that you understand you may leave this focus group at any time or refuse to answer any question. All the information you share will be completely confidential. To keep things confidential, we will remove all names that may come up during the interview. Given this focus group is taken remotely, please feel free to use your Zoom reactions whenever someone says something you agree with, find funny, or in any way you deem fit.

Audiotaping: You gave your consent to be audiotaped. If you wish to be audiotaped, you may not be a part of this study.

INTERVIEWER: [Start recording]

Theory of Planned Behavior

Attitude

1. How did the COVID-19 pandemic impact your daily life?
2. How does your risk of having severe health outcomes from the coronavirus compare to the risk of other people?
3. How has your perceived risks of COVID-19 progression motivated your hypertension prevention behaviors?
4. How has the COVID-19 pandemic impacted your hypertension risk factor behaviors such as your diet, physical activity, smoking, drinking, and stress levels?
5. What do you think are the most common factors that stop Black Americans from engaging in these behaviors to prevent high blood pressure?
6. What resources/opportunities do you need to be healthy?

Subjective Norms

1. How difficult have you found it to participate in hypertension preventative behaviors such as eating a healthy diet, increasing physical activity, decreasing smoking and drinking, and managing stress levels during the pandemic?

2. How much do your family and friends participate in hypertension preventative behaviors?
3. What is or would be the reaction from your family and friends if you were to engage in all the behaviors you just described to prevent high blood pressure?
4. What are some things that can be done to change your family and friends' hypertension prevention behaviors?

Perceived Behavioral Control

1. What do people around you think causes hypertension?
2. What do you think happens to someone who has high blood pressure that catches COVID-19?
3. What kinds of things can be done to prevent someone from experiencing worse COVID-19 symptoms that have high blood pressure?
4. What are some barriers to getting vaccinated? What causes vaccination hesitancy?

Appendix C: Recruitment Flyer

Talegria Brown, Doctoral Candidate
Department of Health Promotion
and Disease Prevention

WOULD YOU LIKE TO EARN $25?!

WE ARE LOOKING FOR BLACK COLLEGE STUDENTS TO PARTICIPATE IN A RESEARCH STUDY OPPORTUNITY

Doctoral Dissertation

Better understand the influence of the pandemic on hypertension awareness among Black college students.

Purpose

Inform health researchers, practitioners, and policy makers on how the pandemic may exacerbate hypertension-related health disparities.

Students will receive a **$5.00 Amazon gift card** upon completion of the survey, and a **$20.00 Amazon gift card** after participating in a follow up focus group.

If you have any questions or concerns, please contact Talegria Brown at **tbrow169@fiu.edu**

Appendix D: Recruitment Email

Hello XXX,

My name is Talegria Brown, a fourth-year doctoral candidate in the Department of Health Promotion and Disease Prevention. For my doctoral dissertation, I am conducting a research study to better understand the influence of the pandemic on hypertension awareness among Black college students, which is critical since hypertension has profoundly contributed to Black and white differences in health disparity outcomes and life expectancy in the United States. The purpose of this study is to inform health researchers, practitioners, and policy makers on how the pandemic may exacerbate hypertension-related health disparities.

To that end, I am emailing to request that you forward this survey to your students, if so interested so that the students can participate if they choose to.

As a thank you, the students will receive a $5 Amazon gift card upon competition on the survey and a chance to participate in a follow up focus group and receive a $20 Amazon gift card.

The link to the confidential survey is
here: https://fiu.qualtrics.com/jfe/form/SV_a4ySBu1RyJ57kWO

Thank you in advance,
Talegria Brown

Appendix E: FIU IRB Approval Letter

FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Elena Bastida

CC: Talegria Brown

From: Elizabeth Juhasz, Ph.D., IRB Coordinator

Date: February 12, 2021

Protocol Title: **"The impact of COVID-19 on African American college students' knowledge, attitudes, beliefs, and practices regarding hypertension prevention"**

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-21-0049 **IRB Exemption Date:** 02/12/21

TOPAZ Reference #: 109908

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: All human subject research activities involving in-person interactions are required to have an ORED approved mitigation plan in place.

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

EJ

VITA

TALEGRIA BROWN

2013-2017	B.S., Psychology Boise State University Boise, Idaho
2015-2017	Teaching Assistant Department of Psychology Boise State University, Boise, Idaho
2015-2017	Research Assistant Department of Psychology Boise State University, Boise, Idaho
2017-Present	Doctoral Candidate Florida International University Miami, Florida
2017-2019	McNair Graduate Fellow Florida International University Miami, Florida
2019-Present	Graduate Research Assistant Health Promotion and Disease Prevention Florida International University, Miami, Florida
2020-Present	Graduate Teaching Assistant Health Promotion and Disease Prevention Florida International University, Miami, Florida
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2021-Present	McKnight Dissertation Year Fellow Florida International University Miami, Florida

PUBLICATIONS AND PRESENTATIONS

Brown, T. Blair, Z., Brown, M., Cooke, T.Y., Darrow, W., Dormveil, E., Felder, D., Garcia, & J., Guzman, M. (July 2018). *Implementation of "Getting 2 Zero" in Miami: A Progress Report*. Poster presented at the 22 nd International AIDS Conference (AIDS 2018), Amsterdam, Netherlands.

Darrow, W., Brown, T., Blair, Z., Brown, M., Cooke, T.Y., Dormveil, E., Felder, D., Garcia, J., & Guzman, M. (June 2018). *Getting 2 Zero-Miami: Filling the Gap between Program Practice and Program Science*. Poster presented at the International Union Against Sexually Transmitted Infections World & European Congress, Dublin, Ireland.

Fenton, T., & Brown, T. (October 2021). *Public Health Students Experiences in Contact Tracing during the COVID-19 Pandemic of 2020*. Poster presented at the 2021 American Public Health Association Annual Meeting and Expo, Virtual Conference

Fenton, T., Brown, T., & Hooks, D. (March 2022). *Repopulating College Campuses: Awareness, Perceptions, and Mental Health*. Poster presented at the Society of Public Health Education 2022 Annual Digital Conference, Virtual Conference

Brown, T., & Bridewell, A. (March 2022). *Is It Worth it? Black College Students' Views on the COVID-19 Vaccine*. Poster presented at the Society of Public Health Education 2022 Annual Digital Conference, Virtual Conference

Brown, T. (March 2022) *The impact of COVID-19 on Hypertension Awareness in Black College Students*. Poster presented at the 2022 USF FL-AGEP Research Symposium, Tampa, FL

Brown, T., Acharya, S., Al Khoury, W., Fenton, T., & Bastida, E. *"This is the New Normal": The Experiences of Black College Students during the time of the COVID-19 Pandemic and its impact on Hypertension Risk Factors.* Abstract submitted to the 2022 APHA Annual Meeting

Brown, T., Al Khoury, W., Acharya, S., Bastida, E., George, F. *The Effect of Psychosocial Factors – Knowledge, Attitudes, and Practices - on Hypertension Awareness among Black College Students.* Abstract submitted to the 2022 APHA Annual Meeting

Brown, T., Fenton, T., Acharya, S., Al Khoury, W., Bastida, E. *"I'm young, I'm healthy": The Influence of the COVID-19 Pandemic on Hypertension Awareness among Black College Students.* Abstract submitted to the 2022 APHA Annual Meeting

Fenton, T., Brown, T. (Under Review). Public Health Students Experiences in Contact Tracing during the COVID-19 Pandemic of 2020. *Health Education Journal*.

Brown, T., Bastida, E., George, F., Barengo, N., Anastario, M. (Under Review) The Effect of Psychosocial Factors – Knowledge, Attitudes, and Practices - on Hypertension Awareness among Black College Students. *Journal of College Student Development*.

Brown, T., Bastida, E., Barengo, N., Anastario, M. (Under Review) "I'm young, I'm healthy": The Influence of the COVID-19 Pandemic on Hypertension Awareness among Black College Students. *Journal of Immigrant and Minority Health*.