University of Wales
Trinity Saint David
BIRMINGHAM

Sefydliad Dysgu Canol Dinas /

Institute of Inner-City Learning

MSc Public Health and

Social Care in Practice

DISSERTATION

Disclaimer

This document was correct at the time of publication. The Module Coordinator reserves the right to modify any statement, if necessary, make variations to the content or methods of delivery of programmes of study, discontinue programmes, or merge or combine programmes if such actions are required by UWTSD (University of Wales Trinity Saint David). Every effort will be made to keep disruption to a minimum and to give as much notice as possible. An electronic copy of this handbook for the module can be found on the Moodle page.

University of Wales
Trinity Saint David
BIRMINGHAM

Risk factors associated with the outcome of hypertension among Afro-Caribbean ethnic groups in the United Kingdom: a systematic review

Omeneke Yusuf (2009232)

Dr Junaid Shaikh (Supervisor)

The dissertation was submitted as part of the MSc Public Health and Social Care in Practice Health and Social Care.

05/2025

Table of Contents

Declaration

I, Omeneke Yusuf, declare that I have composed this dissertation independently. The work presented here is entirely my own, except where explicitly indicated otherwise in the text. Furthermore, I confirm that this dissertation has not been submitted, either in whole or in part, for any other degree or qualification, except as specified.

Signature: .....

Date: ……13/05/2025…….....

Acknowledgement

I want to express my heartfelt gratitude to my friend and family, especially my children—Angela, Paula, Daniela, and Gabriel Junior—for their unwavering support during my academic journey, particularly while working on my dissertation. I owe a special thanks to my supervisor, Dr Junaid, for his patience and dedicated assistance, as well as to the academic staff for their valuable guidance and encouragement. I truly appreciate the insights and support from my colleagues and fellow students throughout this process. Most importantly, I am thankful to God for His grace and blessings during my studies.

Abstract

Background: Hypertension prevalence among individuals of Black African or Black Caribbean heritage in the UK is markedly higher than that of the general population. Despite advancements in blood pressure management, racial and ethnic minorities continue to face significant differences in hypertension care.

Aim: This systematic review aimed to evaluate the risk factors associated with hypertension outcomes in Afro-Caribbeans in the UK.

Method: A systematic search across PubMed, Science Direct, and ProQuest was conducted via the University of Wales Trinity Saint David (UWTSD) library, selecting 11 research articles out of the 61,769 articles collected that fulfilled the PRISMA 2020 checklist criteria, and the CASP checklist was used to appraise the articles.

Findings: The 11 studies included in this review highlight that African-Caribbeans and South Asians experience higher rates of hypertension, with blood pressure levels typically beginning to rise earlier in African-Caribbean individuals, often between ages 30 and 40, despite available monitoring options and related conditions compared to White British individuals, although patterns and contributing factors can vary by ethnicity and age. While some research found a higher BMI and central arterial stiffness in certain minority groups, other factors like dietary habits, particularly high salt intake and infrequent breakfast consumption, and diastolic dysfunction were also found to play a significant role in these health inequalities.

Conclusion: Findings indicate that blood pressure of the Afro-Caribbeans rises with age. Additionally, challenges in managing blood pressure persist among Black patients in the UK, influenced by dietary habits such as high salt consumption and elevated obesity rates within Afro-Caribbean communities. Notably, behaviours associated with adolescent dietary habits, including a tendency to skip breakfast, were more pronounced in Black populations. The review also highlights complex ethnic variations in arterial characteristics and cardiac function, emphasising the need for tailored hypertension management strategies.

Abbreviations

(cPP/SV) - central pulse pressure to stroke volume
ANOVA/ANCOVA – Analysis of Variance
BMI Body Mass Index- Basal Metabolic Rate (BMR)
BP- Blood Pressure
CASP- Critical Appraisal Skills Programme
cfPWV-central femoral pulse wave velocity
CHD-coronary heart diseases
CVD-cardiovascular disease
DASH -Determinants of Adolescent Social Well-Being and Health
DASH – Dietary Approach to Stop Hypertension
Ea-arterial elastance
Ea-arterial load
FFQ- Food Frequency Questionnaires
GP-General Practitioner
HRs -Hazard Ratios
KAP-Knowledge, Attitudes, and Practices
LV-left ventricular
NHS – National Health Service
ONS – Office for National Statistics
ORS- Odds Ratios
PHE – Public Health England
PoAD- People of African Descent
PWV-Pulse wave velocity
QOF-Quality outcome framework
SABRE- Southall And Brent REvisited
SBP-Systolic Blood Pressure
SPSS -Statistical Package for the Social Sciences
SVR-systemic vascular resistance
Thematic Analysis-TA
UK- United Kingdom
US- United States
WHO – World Health Organisation

1 Introduction and Background

1.1 introduction

Hypertension, commonly known as high blood pressure or BP, is often referred to as a silent killer (Public Health England, 2017) and is closely linked to cardiovascular issues. According to the National Institute for Health and Care Excellence (NICE, 2023), hypertension is a serious health issue that is characterised by blood vessel pressure that is higher than normal, usually at or above 140/90 mmHg (WHO, 2023). Despite progress in managing and controlling blood pressure (Abrahamowicz et al., 2023), the treatment of hypertension remains inequitable for racial and ethnic minorities (Aggarwal et al., 2021).

This systematic review investigates the risk factors related to hypertension outcomes in Afro-Caribbeans living in the UK by examining existing literature. A thorough search will be conducted using PubMed, Science Direct, and ProQuest via the University of Wales Trinity Saint David (UWTSD) library. Research articles will be selected according to the PRISMA 2020 checklist guidelines. Using set exclusion and inclusion criteria, relevant articles and grey literature will be evaluated and included if they meet the requirements. Articles matching the title ('Risk factors of hypertension AND Afro-Caribbean AND United Kingdom') will be included in this systematic review. Clinical research often overlooks racial and ethnic minority populations (Haughton et al., 2018), and England has considerable opportunities to enhance the diagnosis and management of high blood pressure, particularly when compared to advancements seen in Canada and the US (Public Health England, 2017).

To examine the reasons behind racial inequality in the UK (Race Disparity Unit, 2022), the Prime Minister established the Commission on Race and Ethnic Differences in the summer of 2020. In his report, released on March 31, 2021, the Commission recommended that instead of using general terminology like "BAME" (black, Asian, and minority ethnic), which is no longer useful, it should concentrate on understanding the results for each ethnic group (Race Disparity Unit, 2022).

High blood pressure is the second most significant global risk factor for illnesses, with poor diet as the only greater risk (Forouzanfar et al., 2015). In the UK, it ranks third, following tobacco use and unhealthy diets (PHE, 2017). Without intervention, hypertension can lead to serious health issues like heart disease and stroke (Fuchs and Whelton, 2019). In 2015, around 12.5 million people in England had high blood pressure, affecting nearly one in four adults (PHE, 2017).

Hypertension is particularly prevalent in Black ethnic minorities due to a combination of genetic, environmental, and lifestyle factors (Zilbermint et al., 2019; NHS, 2022). Risk factors can be non-modifiable (age, race, family history) or modifiable (diet, physical activity, socioeconomic status) (Public Health England, 2017; Beckie, 2017; Ogunniyi et al., 2021). Lower socioeconomic backgrounds can increase risk due to various stressors (NICE, 2023; Chelak and Chakole, 2023). Effective management of blood pressure is influenced by health literacy, access to healthcare, and adherence to medication, which can help reduce ethnic disparities (Abrahamowicz et al., 2023; Bosworth et al., 2008).

1.2 Background

Historically, ethnic and racial minority groups have been subjected to physical, social, economic, and political conditions that restrict their capacity to make healthy choices, including eating well (Satia, 2009). There is a complex interaction of factors that makes Afro-Caribbeans more likely to develop hypertension (Spence and Rayner, 2018). These factors include a tendency for increased sodium retention, a "low renin" state within the renin-angiotensin-aldosterone system (RAAS), and potential genetic variations that impact blood pressure regulation (Maraboto and Ferdinand, 2020).

Additional variables that might increase the risk include being overweight, not exercising enough (Koshoedo *et al.*, 2015) and eating a diet high in saturated fat and salt (Maraboto and Ferdinand, 2020). Some studies reported that high consumption of saturated fats and salt and low intake of fruits, vegetables, and whole grains cause diet inequalities, which in turn cause nutritional deficiencies (Satia, 2009).

High sodium intake affects sodium homeostasis, increasing fluid retention and blood vessel wall pressure, which increases hypertension risk (PHE, 2017). Afro-Caribbeans' salt susceptibility raises their blood pressure (Usman et al., 2024). Several other studies have linked salt intake to African ancestry-related blood pressure increases (British Heart Foundation, 2021; Chaturvedi et al., 2023; Maraboto and Ferdinand, 2020; Mathur, 2011; Patel, Alicandro, and La Vecchia, 2020; Spence and Rayner, 2018; Turban, 2013; Usman, 2024). High sodium intake affects sodium homeostasis, increasing fluid retention and blood vessel wall pressure, which increases hypertension risk (Public Health England (PHE), 2017). According to Turban et al. (2013), the DASH diet decreases BP more in Blacks than Whites. The DASH diet is high in fruits, vegetables, low-fat dairy, and low saturated and total fat (Patel, Alicandro, and La Vecchia, 2020).

In addition to a diet rich in salt, other factors may contribute to elevated blood pressure. Specifically, a diet characterised by high caloric and high-fat content (British Heart Foundation,

2021), particularly one that is elevated in saturated fats while offering insufficient intake of fruits and vegetables, significantly heightens the risk of obesity (Public Health England, 2017; World Health Organisation, 2023; Das, 2024). People who were overweight were 6.1% more likely to have hypertension, and those who were obese were 2.35 times more likely than people of normal weight (PHE, 2017). Alcohol is another factor that contributes to about 60 medical problems, including high blood pressure (PHE, 2017). Heavy drinking has been reported to raise blood pressure (WHO, 2023). Another study stated that high blood pressure, dilated cardiomyopathy, and left ventricular dysfunction are also linked to heavy alcohol use (Tasnim et al., 2020).

Risk factors like inactivity and lack of aerobic exercise increase the risk of high blood pressure (PHE, 2017). Compared to the 1960s, UK residents are 20% less active. If current trends continue, activity may reduce by 35% by 2030 (British Medical Association, 2019). One in six deaths in the UK is attributed to physical inactivity, which is projected to cost a total of £7.4 billion annually, with £0.9 billion allocated to the NHS alone. (Office for Health Improvement and Differences, 2022).
Socio-economic status and deprivation impact individuals with low incomes or in poverty who exhibit higher blood pressure levels (PHE, 2017). According to the Public Health England report 'Tackling high blood pressure – from evidence into action', residents in the most disadvantaged areas of England face a 30% increased likelihood of having high blood pressure (Public Health England, 2014). The differences are notably more significant for strokes and coronary heart disease associated with high blood pressure (Chaturvedi et al., 2023).

Lifestyle significantly impacts health outcomes, influencing mortality risk and contributing to socioeconomic disparities in death rates (Beckie, 2017; Cutler, Lleras-Muney, and Vogl, 2008). Social and cultural factors affect blood pressure management, notably among Black populations in the US and UK (Bosworth et al., 2008; Forrester, Cooper, and Weatherall, 1998). Individuals of African and South Asian descent in affluent countries experience higher rates of hypertension and vascular issues (Lackland, 2014). U.S.-born Black individuals often have higher energy and saturated fat intake while consuming less fibre and calcium than their Hispanic and foreign-born Black counterparts (Lancaster, Watts, and Dixon, 2006). Lower socioeconomic backgrounds are linked to a greater incidence of cardiovascular diseases, including hypertension (Pickering, 1999; Dwivedi and Beevers, 2009). Factors such as lifestyle, employment, education, and financial resources greatly influence health outcomes

and overall well-being (Balia and Jones, 2008; Cutler, Lleras-Muney, and Vogl, 2008).

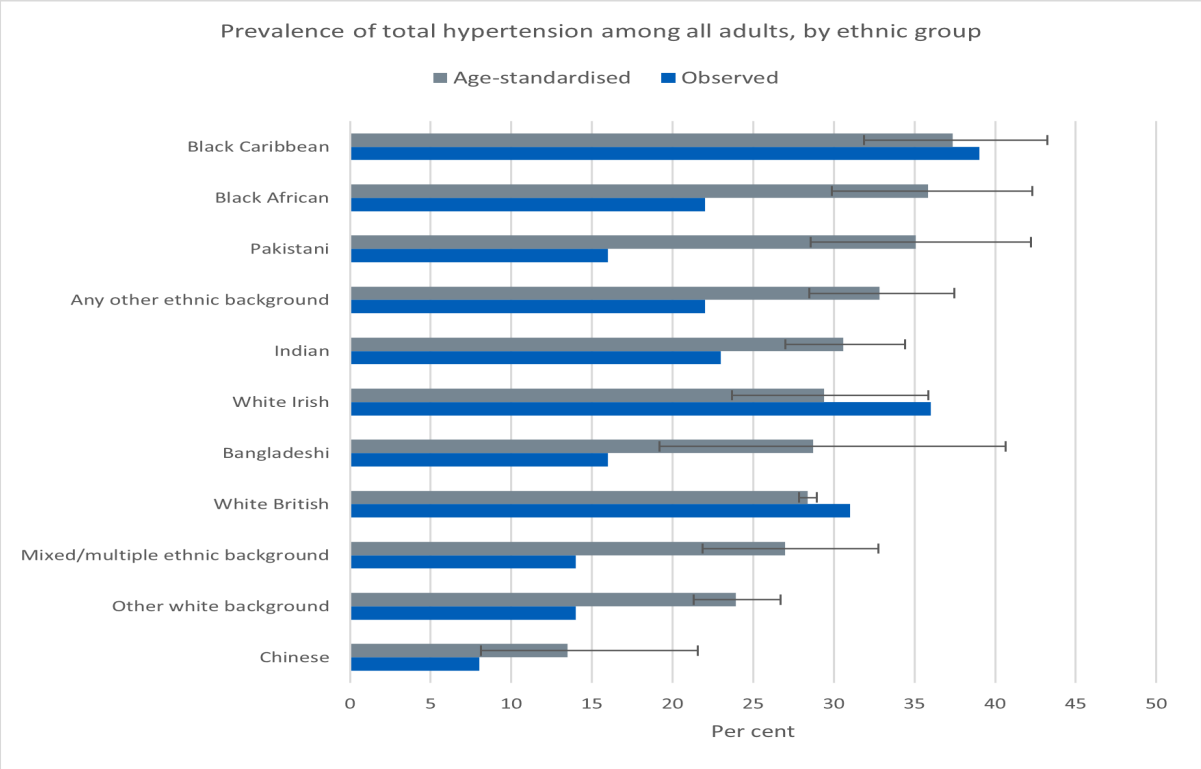

Fig. 1 National Health Services (NHS, 2022)

The figure above shows that hypertension is significantly more prevalent among individuals of Black Caribbean, Black African, and Pakistani descent, particularly when age is **considered** (NHS, 2022). An analysis conducted between 2012 and 2014 revealed that individuals from Black ethnic groups, including Black Other, Black Caribbean, and Black African, had higher mortality rates associated with hypertensive diseases and high blood pressure in comparison to other ethnic groups (Office for National Statistics, 2021). It is crucial to understand and address these issues to improve health outcomes and foster meaningful change within these communities (Balia and Jones, 2008).

1.3 Rationale

The rationale for this review came from the pressing need to address health inequalities faced by minority populations in the UK, particularly among Afro-Caribbean individuals. Hypertension is a significant health concern, and understanding the specific risk factors that contribute to its prevalence within this group is important. Firstly, it enables the development of targeted strategies aimed at reducing health inequalities. Secondly, it helps understand how risk factors like lifestyle choices and socioeconomic factors affect health outcomes, which improves public health strategies. Despite hypertension management advances, racial and ethnic minorities still differ (Aggarwal et al., 2021).

1.4 Research Question

What are the risk factors associated with hypertension among the Afro-Caribbean ethnicity in the United Kingdom?

1.5 Aims

To study the risk factors associated with hypertension in Afro-Caribbean individuals in the United Kingdom.

1.6 Objectives

1. To explore the impact of risk factors associated with hypertension in Black individuals in the UK.

2. To investigate how these factors influence the outcome of hypertension among the Afro-Caribbeans living in the UK.

3. To encourage healthcare professionals to gain the essential knowledge needed to foster a more equitable healthcare system, focusing on preventive strategies and holistic care.

1.7 Research Impact

This systematic literature review will assist healthcare providers and policymakers in formulating targeted strategies to tackle social determinants of health. It focuses on the impact of race, socioeconomic status, and lifestyle factors on individuals genetically predisposed to hypertension. Prioritising early detection and intervention can significantly improve the health and longevity of Afro-Caribbean individuals in the UK (Ahmed and Webb, 2022). Addressing barriers such as affordability, language, and cultural differences is crucial for establishing a fair and just healthcare system for everyone (World Health Organisation, 2023a).

1.8 Summary

This chapter introduces how risk factors such as ethnicity, age, diet, physical inactivity, socioeconomic status, job loss, unemployment, and limited awareness contribute to hypertension. Addressing these issues can improve health outcomes. The next chapter will discuss the literature review of this dissertation on the risk factors associated with the outcome of hypertension among Black people in the UK.

2 Literature Review

2.1 Introduction to Literature Review

According to Pati and Lorusso (2018), a systematic literature review is a method that comprehensively examines and evaluates the academic research that is the most pertinent, up-to-date, and significant on a particular topic. This chapter aims to give readers a full grasp of the current state of research by examining the literature related to the systematic review and providing general views on the subject matter. In addition, the most important themes and patterns found in the research will be reviewed to determine future research paths and examine the potential consequences for practice.

2.2 literature review

Hypertension is the largest avoidable risk factor for cardiovascular disease (CVD) death, affecting about 1.3 billion individuals worldwide (Mills, Stefanescu and He, 2020). Conditions such as hypertension, diabetes, and cardiovascular diseases are impacted by ethnic health, which has a significant impact on healthcare outcomes and experiences, particularly in the United Kingdom. These differences are especially prevalent among African and Caribbean populations in the United Kingdom (Abbotts, 2004; Adegboye, Ojo and Begum, 2020; Agyemang et al., 2010; Ajayi et al., 2010).

Eastwood et al.'s (2023) research of 2006–2019 data found significant variations in hypertension treatment among ethnic groups, including drug types and blood pressure management, even when using the same health care system. This suggests that ethnicity can be a factor that influences the approach taken by healthcare professionals in primary care when managing a patient's hypertension (Agyemang et al., 2010). Cultural beliefs held by different ethnic groups also play a substantial role in shaping health behaviours and impacting how individuals understand and manage conditions like hypertension (Desormais et al., 2019).

Lip et al. (2007) further emphasise the necessity of considering ethnicity when formulating cardiovascular disease prevention strategies in the UK. Their research indicates that varying cardiovascular risk profiles across different ethnic groups, including variations in the risk for and treatment of hypertension, call for specialised management strategies.

This emphasises that ethnicity plays a vital role in healthcare strategies for preventing and managing conditions such as hypertension. Akinlua et al.'s (2017) qualitative research on Nigerian immigrants in the UK reveals that their cultural beliefs and experiences significantly influence health behaviours related to blood pressure management. These beliefs impact crucial aspects of disease management, such as adhering to prescribed medications and

adopting recommended lifestyle changes. Therefore, primary care providers must use culturally sensitive methods when working with patients from diverse ethnic backgrounds to enhance engagement and create management plans that are more likely to be followed (Adegboye, Ojo and Begum, 2020). Ethnic differences in hypertension risk can also emerge early in life, especially among Afro-Caribbeans (Eto et al., 2023).

Harding et al.'s (2007) studies on adolescents in Britain found significant ethnic variations in the prevalence of overweight, obesity, and high blood pressure. These findings suggest that the trajectory of developing hypertension risk may differ across ethnic groups from a young age (Chaturvedi et al., 2023). This has important implications for primary care regarding the early identification of at-risk individuals and the implementation of preventive measures that might need to be specifically tailored to address the distinct risk trajectories observed in different ethnic groups, including African and Caribbean adolescents.

Genetic factors are believed to play a role in the ethnic differences observed in hypertension, as discussed by Davis, Cull, and Holman (2001). Research by Dong et al. (2001) specifically examined genetic polymorphisms in the sodium channel β subunit and their correlation with hypertension in Black populations. These genetic variations may help explain the higher prevalence and severity of hypertension found in certain Black communities, as noted by several researchers (Davis, Cull, and Holman, 2001; Dong et al., 2001; Harding et al., 2007).

Furthermore, Tu et al. (2014) discovered that racial differences exist in the sensitivity of blood pressure to aldosterone, which could influence the management of hypertension across different ethnic groups. Emerging evidence also suggests physiological differences among ethnic groups that may contribute to the differences in hypertension. For instance, the African-PREDICT study by Crouch et al. (2020) identified distinct inflammatory mediator patterns in young Black adults compared to their White counterparts.

In addition to genetic and physiological factors, social determinants of health are crucial for understanding and tackling ethnic health differences, particularly concerning hypertension and cardiovascular diseases (Cole et al., 2016). Research by Chaturvedi et al. (2023) emphasises the extensive influence of social factors on health differences.

Commodore-Mensah et al. (2017) noted that even among populations of African descent, such as African Americans, African immigrants, and Afro-Caribbeans, there are notable differences in the social determinants associated with hypertension and diabetes. This emphasises the diversity within these groups and underscores the significant impact of social factors on cardiovascular health (Crouch et al., 2020). Further supporting this viewpoint, Cole et al. (2016) identified a correlation between neighbourhood socioeconomic disadvantage and racial composition in relation to the stage, awareness, and treatment of hypertension among

Black men, with nativity acting as a modifying factor. These findings highlight the importance of socioeconomic conditions and the social environment in understanding disparities in hypertension, which may also be applicable in the UK context (Foster et al., 2018).

Additionally, the studies conducted by du Toit et al. (2022, 2023) investigated urinary metabolomics profiling and markers of arterial stiffness in relation to cardiovascular risk factors among young Black adults. Lambert et al. (2019) focused on ambulatory blood pressure monitoring and the morning surge in blood pressure among Black and White South Africans. Park et al. (2013) found differences in left-ventricular structure within a multi-ethnic population in the UK, potentially revealing variations connected to ethnicity and hypertension (Eastwood et al., 2023). These physiological variations suggest that underlying biological factors may contribute to the differing risk and progression of hypertension across ethnic groups.

Several factors influence engagement with healthcare services, particularly in diverse populations. A study by Ayoub et al. (2023) conducted in South London examined the determinants of referral to and attendance at lipid clinics among multi-ethnic adults, revealing potential ethnic variations in access to specialised care. Similarly, research by Eto et al. (2023) explored ethnic differences in the onset of multimorbidity, highlighting its correlation with health service utilisation, long-term medication prescriptions, years of life lost, and mortality rates in the UK. Additionally, Catalao et al. (2022) indicate that ethnic background can influence how individuals interact with and benefit from healthcare services, potentially impacting the management of chronic conditions like hypertension.

Barriers to adopting healthy lifestyles, especially in physical activity, differ among ethnic groups (Harding et al., 2007). A qualitative study by Koshoedo et al. (2015) explored the factors hindering physical activity in Black and minority ethnic communities in the UK. Understanding these barriers is crucial for developing effective interventions to promote healthier behaviours and manage conditions like hypertension. Additionally, the national environment influences blood pressure and hypertension across various ethnic groups (Abrahamowicz et al., 2023; Chaturvedi et al., 2023).

Abbotts' (2004) study in the UK backs this up by looking at the heart health risks of UK-born Caribbeans and Irish people living in England and Wales, showing apparent differences in their health risks, including blood pressure, even though they are in the same country. These findings underscore that national-level factors, such as healthcare systems, dietary habits (Heraclides et al., 2011), socioeconomic conditions (Chaturvedi et al., 2023), and cultural norms (Akinlua, Meakin and Freemantle, 2017), interact with ethnicity to influence health outcomes, including blood pressure.

Other factors, including dietary habits (Heraclides et al., 2011) and environmental influences (Avila-Palencia et al., 2019), may also contribute to ethnic health differences. Adegboye et al.'s (2020) study examined the use of dietary supplements among African and Caribbean women in the UK. Research by Avila-Palencia et al. (2019) explored the effects of physical activity and air pollution on blood pressure, highlighting a potential pathway where environmental factors could differentially impact ethnic groups living in varied environments. Studies on dairy intake (Heraclides et al., 2011), alcohol consumption (Heraclides et al., 2011), and the impact of national salt reduction strategies (Millett et al., 2012) further suggest that dietary and environmental factors, which can vary across ethnic groups, may play a role in blood pressure regulation and hypertension risk.

2.3 Conclusions

In summary, the sources provide a comprehensive picture of ethnic health differences, focusing on hypertension and cardiovascular health in Black populations (Chaturvedi et al., 2023). They consistently indicate a higher burden of hypertension and potential Differences in its management within this ethnic group compared to others (Abbotts, 2004). These Differences are shaped by a complex interplay of factors, including differences in healthcare management, cultural beliefs about health (Akinlua, Meakin and Freemantle, 2017), the early development of risk factors (Cruickshank *et al.*, 2016), social determinants of health (Chaturvedi *et al.*, 2023; Cole *et al.*, 2016), potential genetic and physiological variations (Köchli, Schutte and Kruger, 2020; Koshoedo *et al.*, 2015), access to healthcare services, barriers to adopting healthy lifestyles, and the broader national and environmental context (Elpida Vounzoulaki *et al.*, 2024). The following chapter will address the methodology used in this systematic review.

3 Methodology

This methodology chapter will outline and describe the techniques used for data collection and analysis. It details how the systematic review was performed, emphasising the articles and resources that were employed. It also defines the criteria for including or excluding studies. A comprehensive literature search to identify the best evidence is essential in all evidence-based disciplines (McKeever et al., 2015). The PRISMA statement set forth standards for reporting systematic reviews (Moher, Liberati, and Tetzlaff 2009). The articles selected for this systematic review were published between 2010 and 2025.

A systematic literature search was conducted using electronic databases to find pertinent research on the socioeconomic factors influencing hypertension among black individuals in the United Kingdom. The systematic review applies inclusion and exclusion criteria to ensure that only high-quality and relevant research papers are selected for examination. An extensive search was performed utilising terms typically used for searching online databases like PubMed, Science Direct, and ProQuest. The selection of studies, assessment of their quality, data collection, and data analysis were all carried out independently. Studies that did not meet the predetermined inclusion criteria were disregarded. To ensure the accuracy of the search keywords, they were re-executed monthly until March 2025.

Table 1: PICO Framework	
Population/ Problem	African-Caribbeans in the United Kingdom
Intervention/ issue	Hypertension
Context	Risk factors
Outcome	outcome

3.1 PRISMA 2020 flow diagram for new systematic reviews, which included searches of databases

3.1.1 Search strategies

From December 2024 to March 2024, an extensive literature search was conducted, utilising PRISMA guidelines to gather relevant data for a quality assessment in the systematic review (Page et al., 2021). Various academic resources, searching databases such as PubMed, Embase, and ProQuest Central via the University of Wales Trinity Saint David (UWTSD) library were accessed. This process ensured a thorough evaluation of the current literature. A literature search was performed using academic databases (Atkinson and Cipriani, 2018), incorporating keywords and phrases like "(((((((Hypertension) AND (blacks)) OR (African-Caribbeans)) AND (United Kingdom)) OR (UK)) OR (England)) NOT (United States)'' in PubMed,61,769 results were extracted after applying filters such as publication dates from the past 14 years, English language, full-text access, and human studies.

Other keywords used in the search strategies were "(hypertension risk factors Afro-Caribbean UK) OR (hypertension prevalence Afro-Caribbean population) OR (socioeconomic factors hypertension Afro-Caribbean) OR (lifestyle factors hypertension UK Afro-Caribbean) OR (genetic predisposition hypertension Afro-Caribbean community) OR (hypertension risk factors in Afro-Caribbean populations in the UK) OR (causes of high blood pressure among Caribbean communities in the United Kingdom) OR (prevalence of hypertension and associated factors in UK Afro-Caribbean individuals) OR (socioeconomic and lifestyle factors contributing to hypertension in Afro-Caribbean groups in the UK) OR (Inequality and hypertension risk in Afro-Caribbean residents of the UK) OR (risk factors associated with hypertension among Afro-Caribbeans in the UK)" (Afro-Caribbeans AND blacks AND hypertension AND the United Kingdom) were the keywords used to search ProQuest databases through the University of Wales Trinity Saint David library. The search resulted in 146 findings, but after applying the inclusion and exclusion criteria, 95 articles were chosen.

This left 21 articles saved for full-text review. The reference lists of the valid studies were examined to discover additional sources that might have been overlooked in the initial search. This method guarantees comprehensive coverage of the existing literature. The selection process for the articles used in the research was guided by the evaluation frameworks CRAAP (Currency, Relevance, Authority, Accuracy, and Purpose) and RADAR (Relevance, Authority, Date, Appearance, and Reason for Writing) (Central Michigan University, 2022). 61,769 articles were gathered during our search across all the databases (see the table above).

3.1.2 Inclusion and exclusion criteria

Each article was meticulously reviewed during the search process, with particular focus on the titles and abstracts. This review aimed to identify articles that aligned with the predetermined inclusion criteria developed prior to the search. Only those articles deemed to meet these

stringent criteria were ultimately selected for inclusion in the study, adhering to the research standards outlined by Leung (2015). To ensure the inclusion of the latest research findings, the search was extended through April 2025. Boolean operators like "AND", "OR" and "NOT" are used to combine and refine search terms (Bramer et al., 2018). For instance, searching for "risk factors AND hypertension" will yield studies that encompass both terms. While conducting a literature review on the risk factors, including socioeconomic components, that affect the onset of hypertension in Black individuals in the United Kingdom, the search strategy was further honed using the keywords and phrases presented in the table below.

Inclusion keywords

3.1.3 Inclusion table

Risk factors	Africans-Caribbeans	**Countries:**	**Hypertension**
Socioeconomic factors	Afro-Caribbean ethnicity	United Kingdom	High blood pressure
Lifestyle			BP
	Black ethnic groups	UK	
Risk factors	Afro-Caribbean populations	Great Britain	
Behavioural factors	Black Ethnicity	England	
Physical activities	Black Ethnicities	Scotland	
Dietary Habits		Wales	

The study employs predetermined inclusion and exclusion criteria to ensure a focused investigation into hypertension risk factors among Black communities in the UK, including Black Africans and Black Caribbeans, as well as individuals from other minority ethnic backgrounds. Key inclusion criteria specify that the reviewed articles must be peer-reviewed, available in full text online, open access, published in English, and relevant to human subjects. The review emphasises the importance of selecting studies that provide insights into risk factors for hypertension.

To maintain the quality and relevance of the research, exclusion criteria eliminate studies with methodological flaws, insufficient information, or those published in languages other than English. Articles that do not directly address the relationship between hypertension risk factors and ethnic minorities, as well as blogs and newspaper articles, are also excluded from consideration. Overall, these criteria create a structured framework for examining the influence of hypertension risk factors on minority communities, ensuring the selected studies are relevant, reliable, and aligned with the research objectives (Bramer et al., 2018; Hollier, 2020).

3.2 Implications for public health

Tackling risk factors is crucial for enhancing hypertension outcomes in individuals of African descent in the United Kingdom. Public health interventions should concentrate on the social determinants of health to enhance healthcare access, promote health education, and improve socioeconomic conditions. This approach will help reduce the inequality that exists between the two groups.

3.3 Ethical Considerations

When conducting a systematic review of the Afro-Caribbean community in the United Kingdom, it is important to adhere to ethical standards, particularly in assessing the impact of risk factors. The term BAME (Black, Asian, and Minority Ethnic) is increasingly criticised for being an inadequate representation of the diverse experiences within minority ethnic groups, leading organisations such as the Law Society and the University of Bristol to advocate for more precise terms like "ethnically diverse," "ethnic minority," or "people of colour"(The Law Society, 2025).

Furthermore, the characterisation of Black British individuals as "hard to reach" has been viewed negatively (Davies et al., 2020; Sims, 2020), as it reinforces stereotypes and distracts from the real challenges faced by members of the Global Majority. Ethical practices include transparency about methodologies, accurate citation of original studies, and proper

interpretation of the included studies. Additional considerations involve addressing conflicts of interest, ensuring data analysis integrity, and clearly outlining any limitations within the review (Tripathy, 2013). Maintaining transparency and accountability throughout the research process is essential for safeguarding its integrity (Bhandari, 2021).

3.4 Plan of Work and Time Schedule

A study timeline illustrates the dates and times for article gathering, analysis, and final report writing. The table below explains the several phases and associated deadlines for creating and carrying out the systematic review, including composing the report.

Research Phase	**Month/year**	**Deadline**
Identify a gap and select a topic of interest**.**	December 2024	December 21st
Meet with the supervisor for an initial discussion**.**	December 2025	December 30th
Choose a methodology and method.	January 2025	January 2025
The proposal	January 2025	January 30th
Ethical approval	January 2025	January 30th
Research and Analysis of Findings	February 2025	February 13th
Write up the results.	March 2025	March 26th
Literature review Thematic Analysis	March 2025	March 15th
Recommendations and conclusions	April 2025	March 29th
Editing, revising, and meeting with the supervisor	May 2025	April 18th
Final touches and submission	May 2025	May 12th

3.5 Conclusion

Overall, the methodology chapter provides a clear and structured approach to exploring the influence of risk factors of hypertension on Black communities in the UK. The inclusion studies selected are relevant, reliable, and focused on the right questions; these criteria also help define the research study's parameters (Bramer et al., 2018; Hollier, 2020).

4 Data extraction and evaluation

4.1 Introduction to Chapter

This chapter aims to systematically extract and evaluate all articles in the literature review using the CASP checklist. Before applying the Critical Appraisal Skills Programme (CASP) checklists, it is essential to identify each publication's study strategy. A variety of checklists created especially to match the different research approaches and study designs in each article are offered by the CASP applications. The appropriate CASP checklist can be suggested by examining the titles and summaries of the sources supplied, guaranteeing a comprehensive and suitable literature review (CASP, 2024).

4.2 Data Extraction

Data extraction in systematic reviews is still done mainly by hand, even with recent advancements in machine learning models that automate this procedure (Higgins and Thomas, 2024; Jonnalagadda, Goyal, and Huffman, 2015) (see Appendix I). In systematic reviews, collecting and organising a wide range of information from various studies is an important step for ensuring validity (Taylor, Mahtani, and Aronson, 2021). This process includes gathering essential data from every study, including the research methodology, participant demographics, specifics of the interventions or treatments used, outcomes assessed, and findings attained (Higgins and Thomas, 2024).

In this systematic review, which focused on identifying the risk factors linked to hypertension outcomes among Afro-Caribbean populations residing in the United Kingdom, data from 11 relevant studies were compiled and all gathered information is systematically arranged in a standard format to facilitate clarity and coherence, presented in the accompanying table (see Appendix 1a-c). By improving the analysis and integration of results from many studies, this methodical approach hopes to provide a thorough discussion of results and spot patterns and trends (Taylor, Mahtani, and Aronson, 2021). These insights can inform future studies and public health efforts to reduce high blood pressure in the Afro-Caribbean population.

4.3 Introduction to Critical Appraisal and Paper Quality Assessment

Critical appraisal is a detailed evaluation process that prompts readers to analyse literature in a structured manner. Assessing literature involves determining the significance or merit of specific pieces of information (Blair, 2019). Research articles are systematically scrutinised for their validity, reliability, and relevance as part of the critical appraisal process, which evaluates the quality of the paper (Hill and Spittlehouse, 2001). This process helps researchers and practitioners determine whether a study's findings can be trusted and applied

in their practice settings (Blair, 2019). to support informed decision-making and personalised care, using the best available evidence to identify the most suitable options (Hill and Spittlehouse, 2001).

4.4 Critical Appraisal Tools

The CASP checklist is used in this systematic review, which looks at risk factors for hypertension in Afro-Caribbeans in the UK (see Appendix. Critical appraisal tools are essential for evaluating data objectively (Buccheri and Sharifi, 2017). Appraisal checklists, such as those from the Critical Appraisal Skills Programme (CASP) and the Joanna Briggs Institute (JBI), guide users through the evaluation process (Blair, 2019). It offers structured checklists for various study designs, enabling users to assess evidence quality with straightforward responses of "Yes," "No," or "Can't tell" (CASP, 2024). Every question comprises prompts for essential reflections to assess the reliability and relevance of research outcomes (CASP, 2024). Novice and experienced users might struggle with choosing the appropriate tool, but a systematic method helps determine a study's credibility (Blair, 2019). To effectively appraise the papers used in this systematic review, the CASP checklist assesses their quality, validity, and relevance, identifying strengths and weaknesses.

4.5 Evaluation of Qualitative Studies using any appropriate tool

The CASP checklist was applied to assess the only qualitative study used in this systematic review. Usman et al. (2024) involve 21 participants and apply the concept of "information power" to determine their sample size. This method aligns well with reflexive thematic analysis, where meaning emerges from the interaction between the researcher and the data rather than focusing solely on achieving statistical power (Usman et al., 2024). The thematic analysis results expressed key topics from the interviews (Usman et al., 2024). This study focuses on dietary habits among diverse ethnic groups, including a survey on salt knowledge among People of African Descent (Usman et al., 2024).

The lead author documented reflections, which were further enriched by co-authors reviewing findings to challenge assumptions. To address social desirability bias, participants were assured confidentiality. The results revealed complex behavioural, cultural, and health literacy factors influencing dietary salt intake in People of African Descent (Poad), with unexpected similarities between African and Afro-Caribbean participants (Usman et al., 2024). The study recognised its limitations, notably insufficient angulation in the analysis, and reflexivity was used to reduce researcher bias and enhance interpretations (Usman et al., 2024).

4.6 Evaluation of a quantitative study using the CASP tool

The articles focused on health issues, especially blood pressure, in various ethnic groups in the UK. Agyemang, Humphry, and Bhopal (2012) studied the age crossover effect concerning blood pressure and hypertension in white and African-Caribbean populations, pointing out the drawbacks of their cross-sectional design based on data from the Health Survey for England (1998-2004). Similarly, Earland, Campbell, and Srivastava (2010) surveyed the diets of Black British adults of Caribbean and West African descent. They employed a structured questionnaire about their daily food intake, dietary habits, and health conditions. Rison et al. (2023) investigated ethnic differences in blood pressure monitoring in southeast London, using electronic health records and comparing their findings with a UK Biobank study. Schofield, Saka, and Ashworth (2011) echoed this by contrasting their cross-sectional survey with earlier studies with smaller ethnic minority samples.

Shantsila et al. (2018) focused on diastolic dysfunction in South Asian and African-Caribbean individuals aged 45 and older in their community-based E-ECHOES survey. Cruickshank et al. (2016) revisited an earlier meta-analysis on arterial stiffness tied to a longitudinal study. Su et al. (2024) drew from cross-sectional and longitudinal data to reveal health trends. Harding et al. (2010) compared their longitudinal findings with various cross-sectional studies.

Focus Issue: The articles explore health concerns and ethnic differences in the UK, particularly focusing on blood pressure (BP) and related risk factors and the influence of diet on health status (Agyemang, Humphry and Bhopal, 2012; Cruickshank *et al.*, 2016; Earland, Campbell and Srivastava, 2010; Goff *et al.*, 2019; Harding *et al.*, 2010; Park *et al.*, 2016; Rison *et al.*, 2023; Schofield, Saka and Ashworth, 2011; Shantsila *et al.*, 2018; Su *et al.*, 2024; Usman *et al.*, 2024).

Studies investigate BP monitoring and management in different populations, including a specific survey of age-related effects in white and African-Caribbean groups (Agyemang, Humphry and Bhopal, 2012; Earland, Campbell and Srivastava, 2010; Harding *et al.*, 2010) ; Cruickshank et al., 2016; Goff et al., 2019; Harding et al., 2010). Another study uses UK Biobank data to set ethnicity-specific blood pressure thresholds for cardiorenal complications (Su et al., 2024). Schofield et al. (2011) highlight BP management differences in hypertensive patients in Northeast London, while Harding et al. (2010) note ethnic differences in BP emergence during adolescence. Additionally, research examines ethnic variances in central haemodynamic and their relation to coronary heart disease risk (Park et al., 2016) and diastolic function in hypertension (Shantsila et al., 2018).

Method Used: The methodologies across the sources vary to address different research questions (Agyemang, Humphry and Bhopal, 2012; Cruickshank *et al.*, 2016; Earland, Campbell and Srivastava, 2010; Goff *et al.*, 2019; Harding *et al.*, 2010; Park *et al.*, 2016; Rison

et al., 2023; Schofield, Saka and Ashworth, 2011; Shantsila *et al.*, 2018; Su *et al.*, 2024; Usman *et al.*, 2024). Many of the researchers use cross-sectional designs to gather data at a single point in time, such as the studies using GP electronic health records in Northeast and Southeast London (Rison et al., 2023; Schofield, Saka and Ashworth, 2011) and the dietary study of African-Caribbean adults (Earland, Campbell and Srivastava, 2010).

Others employ longitudinal (Goff et al., 2019) or prospective cohort designs (Su et al., 2024), enabling follow-up over time. For example, the DASH study tracks participants from adolescence into young adulthood (Goff et al., 2019), while the SABRE study focuses on older adults over 20 years (Park et al., 2016). The UK Biobank study also uses baseline data from a large cohort to analyse outcomes over time (Su et al., 2024). Additionally, the survey of dietary salt knowledge, attitudes, and practices (KAP) among (PoAD) uses a qualitative reflexive thematic analysis (TA) approach (Usman et al., 2024), contrasting with the quantitative methods of the other studies.

Recruiting Method: Recruitment strategies depended heavily on the study design and target population. Longitudinal studies like DASH recruited participants from schools in London boroughs at an early age (Goff et al., 2019). The SABRE study recruited participants from clinic attendees for a follow-up visit of a previously established population-based cohort (Park et al., 2016).

The UK Biobank study is conducted on a large cohort of participants recruited from 22 assessment centres across England, Scotland, and Wales (Su et al., 2024). Research utilising electronic health records from general practice has sourced its cohorts from currently registered patients in participating practices in regions such as the Northeast (Rison *et al.*, 2023) and Southeast London (Su et al., 2024).

Measures Taken to Reduce Bias & Data Collection: Various measures were implemented by the authors to reduce bias and enhance study data quality. Trained nurses and research assistants conducted blood pressure (BP) measurements multiple times to improve accuracy, with averaged results (Cruickshank et al., 2016; Su et al., 2024). The UK Biobank study took BP readings twice using a validated digital monitor. For analyses of existing data, such as general practitioner (GP) records, adjustments were made for confounders like age, sex, socioeconomic factors, comorbidities, and treatment intensity (Rison et al., 2023; Schofield, Saka, and Ashworth, 2011). The UK Biobank also adjusted for various sociodemographic, lifestyle, clinical, and biomarker factors (Su et al., 2024). However, national survey data faced challenges representing Black and ethnic minority groups (Schofield, Saka, and Ashworth, 2011).

The SABRE study used multivariable regression models that accounted for age, sex, BMI, BP treatment, and diabetes status (Park et al., 2016). The DASH follow-up study on arterial

stiffness included adjustments for current and adolescent exposures, utilising GP data from Southeast London and addressing factors like comorbidities and social deprivation (Goff et al., 2019; Schofield, Saka, and Ashworth, 2011). Additionally, analysing data from all patients mitigated potential bias.

For dietary data, both the Food Frequency Questionnaire (FFQ) and a 24-hour recall method were employed, with efforts to enhance validity using portion size aids and quality scoring systems (Earland, Campbell, and Srivastava, 2010; Goff et al., 2019). Limitations, such as under-reporting, were also acknowledged (Goff et al., 2019).

Enough Participants to Reduce the Play of Chance: The adequacy of sample sizes and their potential impact on findings varied. Studies utilising extensive administrative datasets, such as GP records from Northeast London (approximately 1.23 million adults, 156,296 with hypertension (Rison et al., 2023)), Southeast London with 192,432 patients, 106,575 having chronic diseases (Schofield, Saka, and Ashworth, 2011), and the UK Biobank (444,418 participants), benefited from significantly large sample sizes that offered considerable statistical power (Su et al., 2024). According to Su et al. (2024), their large cohort facilitated the dependable derivation of ethnicity-specific cutoffs. Cohort studies started with large initial samples, such as the DASH baseline of approximately 6,643 participants (Goff et al., 2019) and 1,438 attendees at follow-up in the SABRE study (Park et al., 2016). However, the follow-up subsamples were smaller. The DASH follow-up study for young adults included a pilot with 665 participants, about 100 from each major ethnic group. The authors highlighted that the small sample sizes limited the precision of results and hindered longitudinal analysis due to ethnicity (Goff et al., 2019). Similarly, the Southeast London GP study lacked sufficient power for detailed ethnic subgroup analysis (Schofield, Saka, and Ashworth, 2011).

Results and Main Presentation— The results were communicated using statistical measures and visualisations. Descriptive statistics, including mean values, standard deviations, and percentages for various ethnic groups, were presented in tables (Goff et al., 2019; Park et al., 2016; Schofield, Saka, and Ashworth, 2011; Su et al., 2024; Usman et al., 2024). To illustrate associations and differences, inferential statistics such as Odds Ratios (ORs) and Hazard Ratios (HRs) with confidence intervals were utilised, taking confounding factors into account (Rison et al., 2023; Schofield, Saka, and Ashworth, 2011; Shantsila et al., 2018).

Adjusted mean blood pressure (BP) differences were reported (Schofield, Saka, and Ashworth, 2011). Forest plots were employed in the Northeast London GP study to visualise regression results (Rison et al., 2023). Comparisons of arterial hemodynamics were displayed in tables, accompanied by p-values from ANOVA and post-hoc tests (Park et al., 2016).

Key findings: Key findings indicate an age crossover effect in blood pressure (BP) between white and African-Caribbean populations in the UK, with African-Caribbean individuals experiencing a quicker rise in BP with age, leading to higher levels in older adults compared to their white peers (Agyemang et al., 2012; Cruickshank et al., 2016). The UK Biobank study revealed ethnicity-specific systolic blood pressure (SBP) thresholds: Black Caribbean individuals had higher thresholds (156 mmHg) than whites (140 mmHg), while Black African individuals had even higher thresholds (165 mmHg); South Asians had lower thresholds (123 mmHg) (Su et al., 2024).

GP data indicated that BP management was less effective among Black individuals compared to Whites, while Asian groups often had better control (Park et al., 2016; Rison et al., 2023). Monitoring rates were similar or higher among Black and Asian groups (Rison et al., 2023). The SABRE study found that African-Caribbean individuals showed more favourable arterial stiffness than Europeans and South Asians, despite having higher BP and systemic vascular resistance (SVR). Conversely, South Asians exhibited greater SVR, a higher central pulse pressure to stroke volume coefficient (cpp/SV) and increased total arterial elastance (Ea) in comparison to Europeans (Park et al., 2016). Further, South Asian ethnicity was linked to poorer diastolic function, while African-Caribbeans displayed significant left ventricular hypertrophy (Shantsila et al., 2018). In dietary studies, Black African and Caribbean groups had higher body weight and BMI but lower total cholesterol and HDL levels, likely due to reduced saturated fat intake (Goff et al., 2019).

Rigorous and Sufficient Data Analysis: The studies employed appropriate analytical methods for their designs. Quantitative studies used statistical software such as R (Agyemang, Humphry and Bhopal, 2012; Rison *et al.*, 2023), STATA (Cruickshank *et al.*, 2016; Goff *et al.*, 2019; Park *et al.*, 2016), and SPSS (Earland, Campbell and Srivastava, 2010) for analyses, including linear regression (Agyemang, Humphry and Bhopal, 2012), logistic regression (Rison *et al.*, 2023), Cox regression (Shantsila *et al.*, 2018), ANOVA/ANCOVA (Park *et al.*, 2016), and comparing models (Cruickshank *et al.*, 2016).

Authors consistently adjusted for potential confounders in regression models to isolate the effects of ethnicity and other variables (Agyemang, Humphry and Bhopal, 2012; Park et al., 2016; Schofield, Saka and Ashworth, 2011; Su et al., 2024). The UK Biobank study derived risk-equivalent SBP thresholds using a three-step process based on predicted incidence rates (Su et al., 2024).

Clear Statement of Findings: The findings presented across the various sources are generally found in the results sections and effectively summarised in the conclusions. The authors clearly express their key observations regarding ethnic variations in blood pressure (BP) patterns (Agyemang, Humphry, and Bhopal, 2012), risk thresholds (Su et al., 2024), and

arterial stiffness (Park et al., 2016), as well as BP monitoring and management (Rison et al., 2023; Schofield, Saka, and Ashworth, 2011).

Authors also stated their findings on dietary habits (Earland, Campbell, and Srivastava, 2010; Goff et al., 2019) and related factors (Shantsila et al., 2018; Usman et al., 2024). Limitations of the studies are discussed in detail separately (Agyemang, Humphry, and Bhopal, 2012; Goff et al., 2019; Park et al., 2016; Rison et al., 2023; Schofield, Saka, and Ashworth, 2011; Shantsila et al., 2018; Su et al., 2024; Usman et al., 2024*)* (see appendix) for detail.

Result Applicable to the Local Population. The studies primarily focus on the population in the UK, with many specifically examining areas in London. For example, Southeast London GP data (Schofield, Saka, and Ashworth, 2011) and Northeast London GP data (Rison et al., 2023) have been utilised, along with the DASH study, which recruited participants from London schools (Cruickshank et al., 2016; Goff et al., 2019; Harding et al., 2010). Focusing on regions with high ethnic diversity, particularly London, makes these findings relevant to urban populations with significant ethnic minorities (Schofield, Saka, and Ashworth, 2011). However, some studies note difficulties in generalising findings to other regions or the broader UK ethnic minority population, especially for under-represented groups or those in areas with different ethnic compositions (Schofield, Saka, and Ashworth, 2011; Su et al., 2024).

The SABRE study highlighted that its South Asian sample was mainly Punjabi Sikh, limiting the applicability of results to other South Asian groups (Park et al., 2016). Similarly, qualitative research acknowledged that its internet user sample was likely more educated, which affects generalisability to less educated populations (Usman et al., 2024). Moreover, comparisons of findings suggest results may not be universally applicable within the same broad ethnic categories due to differing contexts and migration histories (Agyemang, Humphry, and Bhopal, 2012; Harding et al., 2010).

Value of Research: This research offers valuable insights into ethnic health inequalities in the UK, particularly regarding blood pressure (BP). Understanding age crossover effects can inform screening strategies (Agyemang, Humphry, and Bhopal, 2012). Establishing ethnicity-specific SBP thresholds is essential for improving risk estimation and hypertension management to reduce ethnic differences (Su et al., 2024). Findings show ongoing healthcare inequities despite similar monitoring rates (Rison et al., 2023; Schofield, Saka, and Ashworth, 2011).

Arterial stiffness and diastolic function studies reveal biological mechanisms behind varying cardiovascular risks (Park et al., 2016; Shantsila et al., 2018). Dietary research identifies habits for targeted health promotion within specific ethnic groups (Earland, Campbell, and Srivastava, 2010; Goff et al., 2019), while qualitative studies explore cultural influences on dietary salt consumption (Usman et al., 2024). Longitudinal studies like DASH track risk factor

development from adolescence to adulthood (Goff et al., 2019). Overall, this research is essential for understanding health inequalities and enhancing public health interventions in the UK.

4.7 Conclusion

This chapter examined how the data were extracted and evaluated from 11 papers utilised for the systematic review, most of which were quantitative, with one qualitative study. These works' strengths and shortcomings were evaluated using the CASP checklist, which evaluated their quality, validity, and relevance. Readers can assess the research's reliability and applicability with this assessment. Both the limitations of cross-sectional study designs and the difficulties of comprehending health differences among ethnic groups are covered in the papers. Data synthesis and analysis will be covered in the upcoming chapter.

Table 2: characteristics table

Source information	Research country	Numbers of Participants	Study design	Aim/objectives	Findings and Results	Limitations or weaknesses	Enrolment period
1. (Agyemang, Humphry and Bhopal, 2012)	England	n - 22,723 A/C – 1,379 White – 21,344	Cross-sectional study	The study, using data from the Health Survey for England, aims to assess whether BMI changes BP with age.	Afro-Caribbean women exhibit a higher BMI and prevalence compared to white women yet have lower SBP. In African-Caribbean individuals, systolic BP levels in men and diastolic BP levels in both genders begin to rise at around 30 and 40 years of age, surpassing those of their white counterparts.	The BP readings may have been inflated because they were based on the average of two measures taken during a single visit. Due to the cross-sectional character of our study design, causal implications may only be drawn with caution.	Datasets from 1998, 1999, 2003, and 2004
2. (Cruickshank et al., 2016)	London boroughs UK	6643 in 2002-2003	cohort study	The DASH (Determinant of Adolescent Social Well-	The limitations include a small sample size of ≈approximately 100	Current abdominal girth (height-adjusted) correlated with	2002 - 2013

		4785 in 2005-2006 666 in 2013		being and Health) assesses how BMI, blood pressure, and physical activities affect aortic stiffness, measured as aortic pulse wave velocity (PWV), from childhood to young adulthood.	individuals per ethnic group, evenly distributed by sex; nevertheless, these young participants are expected to represent the entire cohort of 6000.	increased PWV, but this was not observed in those aged 11–13. Objectively measured physical activity seems to reduce arterial stiffness, but stress-induced stiffening due to racism, particularly among women, may play a role. PWV continued to be independently linked to age, blood pressure, waist-to-height ratios, and the effects of racism.	
3. Earland et al. (2010)	Staffordshire (England)	39	Cross-sectional study (Questionnaires)	The study sought to evaluate African-Caribbean adults'	This study's comprehensive dietary data reveals that	The final sample size, while informative, was limited, likely	June and October 2005.

				nutrition, health status, and dietary habits in Staffordshire, gathering socio-economic, medical, dietary, and anthropometric data. This information will guide future health promotion efforts targeting this community.	participants consumed various nutrient-rich foods and beverages. Many of the participants were classified as overweight. Additionally, salt consumption exceeded recommended levels in ways that may not be recognised by dietitians gathering dietary histories, notably due to a lack of awareness regarding salt sources. Furthermore, overcooked vegetables were frequently observed.	introducing a bias toward those who are especially invested in their diet or eager to improve their health. As a result, the findings may not be applicable to the wider population. Furthermore, the food frequency questionnaire (FFQ) may not have captured a comprehensive range of food items. It's also crucial to recognise that participants may overreport their intake, especially when it comes to fruits and vegetables, potentially	

						skewing the data further.	
4. (Goff et al., 2019)	UK	Original study 6643 Follow-up 627	Cohort study	It aimed to investigate /Dietary Intake on cardiometabolic risk factors in adolescents and young adults.	This study revealed that the Black African and Caribbean populations had the highest body weight and BMI. However, their waist circumference and waist-to-height ratio were like those of other groups. Among participants, Black African and Black Caribbean individuals exhibited the highest rates of skipping breakfast, a crucial factor influencing BMI and total cholesterol levels in young adulthood.		2002-2014

5. (Harding et al., 2010)	London	6643 in 2003-2004 4779 in 2005 - 2006	Longitudinal study	Ethnic difference/early age hypertension	At 12 years, boys' systolic blood pressure showed no racial differences; however, by 16, Black Africans experienced a larger increase than Whites (+2.9 mm Hg). While the mean systolic blood pressure for White females remained stable with age, variations were seen in Black Caribbeans and Black Africans. Diastolic blood pressure exhibited greater variation by ethnicity compared to systolic blood pressure. Body mass index, height, and leg length influenced blood pressure	BP was measured once, three times every survey. For ages 11–13, measuring Socioeconomic (SEC) was difficult since they could not provide their parents' occupation. Changing SEC distribution within waves	2003-2006

					independently of ethnicity. Socioeconomic challenges disproportionately impacted blood pressure among minority females. This data suggests that ethnic Differences in blood pressure emerge during adolescence and are particularly pronounced in boys.		

6. (Park et al., 2016)	UK (Southall and Brent, London)	1312 participants	Cohort study	The Southall and Brent study explored variations in arterial central hemodynamic, stiffness, and load within a tri-ethnic population-based context cohort.	Brachial and central systolic blood pressures were comparable across all ethnic groups. Compared to Europeans, Asians and African Caribbeans exhibit higher prevalence rates of hypertension and diabetes. African Caribbeans show a greater BMI along with lower rates of coronary heart disease than Europeans and South Asians. Additionally, African Caribbeans reported elevated DBP, MAP, and SVR, while not showing differences in arterial central	In this study, the majority of South Asians (53%) originate from a Punjabi Sikh background. The follow-up research focused on survivors who were both willing and able to visit the clinic.	2008 and 2011

					hemodynamic, stiffness (cfPWV), or load (Ea).		
7. (Rison et al., 2023)	England: Northeast London clinical commissioning groups (CCGs): City and Hackney; Newham; Redbridge; Tower Hamlets; and Waltham Forest	156,296 adults	cross-sectional cohort study	To examine health Inequalities in BP monitoring, therapy, and monitoring in a large cohort of hypertensive adults by ethnicity, sex, age, and socioeconomic position.	Black people had a lower rate of regulated BP than Whites (OR 0.87, 95% CI = 0.84 to 0.91). Asians had higher regulated BP (OR 1.28, 95% CI = 1.23 to 1.32). Hypertension management was more prevalent in older persons (≥50 years) than in younger patients.	Cross-sectional studies do not investigate patient group trends over time. Treatment changes for 6 months may be mismeasured, and treatment intensity may be overestimated in a few individuals. Northeast London has 72.6% of the population in the two poorest quintiles and 10.6% in the two richest.	1 April 2019

8. Schofield et al., (2011)	South-east, London	16,613	Cross-sectional study	To explore ethnic inequalities in blood pressure monitoring and control.	Ethnic differences in blood pressure management significantly impact health outcomes, leading to Black patients being less likely to meet QOF targets compared to White patients (OR 0.73; 95% CI = 0.64 to 0.82). Additionally, clear discrepancies in blood pressure regulation emerge among various sickness categories and ethnic groups. African and Caribbean patients with diabetes and coronary heart disease face greater challenges in achieving optimal blood pressure control compared to	It is a cross-sectional study. The study used exception reporting to exclude patients. Smoking was excluded from the result because it made little difference.	

					White patients, evidenced by odds ratios of 0.63 (95% CI = 0.50 to 0.79) and 0.53, respectively.		
9. (Shantsila et al., 2018)	Birmingham, England (UK)	n = 1546, 830 South Asians and 716 African-Caribbeans)	Cross-sectional study	The study sought to determine the association between diastolic dysfunction and ethnicity in people of South Asian and African-Caribbean descent, as well as the effect of these factors on cardiovascular and all-cause mortality.	African-Caribbean ethnicity was associated with increased left ventricular filling pressure (odds ratio 0.48, 95% CI 0.34-0.69, $p < 0.001$), a lower left atrial index ($p < 0.001$), and a reduced prevalence of diastolic dysfunction (odds ratio 0.67, 95% CI 0.51-0.87, $p = 0.003$). Furthermore, a greater left ventricular mass index was	It's unclear what causes African-Caribbean patients to have larger Left Ventricular masses, although there may be a hereditary component. The analysis does not cover the white population. The study is only generalisable to the UK. Finally, it does not	September 2006 to August 2009

					independently linked to African-Caribbean ethnicity ($p < 0.001$). In comparison to participants of South Asian descent, those of African-Caribbean origin were older ($p < 0.001$) and had a higher body mass index ($p < 0.001$) and higher systolic blood pressure ($p = 0.002$). However, they also had a smaller waist circumference ($p < 0.001$) and a lower heart rate ($p < 0.001$). South Asian individuals, on the other hand, exhibited a higher prevalence of	automatically give insight into the processes that link the observed variations, which should be explored in separate investigations.	

					diabetes (47% vs. 35%, $p < 0.001$).		
10. Su et al. (2024)	UK (England, Scotland and Wales)	444,418	Prospective study	to define ethnicity-specific systolic blood pressure (SBP) cutoffs for ethnic minority groups and evaluate their ability to predict unfavourable outcomes.	The risks of cardiovascular and renal complications vary among ethnic groups for any specific level of SBP.	The relationship between SBP and cardiovascular and renal problems continues throughout SBP levels	2006-2009
11.Usman et al. (2024)	UK	21	Qualitative study	This study examined the UK People of African Descent (PoAD) population's dietary salt-related knowledge, attitudes, and practices (KAP) to inform culturally specific	The study revealed a lack of awareness of the recommended daily consumption of salt and a low level of interaction with product labels, indicating the pressing need for better health	The bias towards social desirability. Lack of in-person interviews Insufficient triangulation with essential informants	October to December 2022.

				treatments to reduce salt intake.	literacy. It identified special obstacles to public health initiatives to reduce dietary salt. This Study indicates that female participants prefer research engagement.		

5 Data analysis and synthesis

5.1 Introduction To Chapter

This chapter will provide a comprehensive analysis and synthesis of the data drawn from the 11 studies included in this systematic review. To achieve this, Braun and Clarke's framework for thematic analysis will be utilised, which will facilitate the identification and exploration of recurring themes and characteristics present across the selected studies. This method will enable the systematic categorisation of the data, uncover patterns (see Appendix 1), and gain deeper insights into commonality and variance among the studies. A detailed examination highlights key findings and implications from the collective research, enriching the understanding of the risk factors associated with hypertension among Afro-Caribbeans in the United Kingdom.

5.2 Thematic Analysis

Thematic synthesis represents a vital inductive approach to generate overarching themes and key messages from various articles (Nicholson et al., 2016). Thematic analysis (TA) identifies, explores, and interprets significant patterns or "themes" within qualitative data (Clarke and Braun, 2017). Unlike a methodology, which provides a well-defined theoretical framework for conducting research, TA acts as a method or tool that remains open to various theoretical frameworks (Clarke and Braun, 2016). This quality differentiates it from other qualitative analytic techniques (Clarke and Braun, 2017). Reflexive thematic analysis streamlines identifying and analysing patterns or themes within a specific data set (see Appendix 1). It's a flexible and approachable interpretive method for analysing qualitative data, accommodating a range of theoretical perspectives (Clarke and Braun, 2016).

5.3 Data analysis tool

The thematic analysis tool employed in this systematic review is ideal for data analysis, following the six steps established by Braun and Clarke (2006). The first step is familiarising with the collected information before beginning the study. The second step, coding, emphasises uncovering key patterns within the data. This process leads to themes, which emerge through the combination of recurring patterns identified in the articles (See Appendix 1). Next, the themes are assessed to ensure they accurately represent the data. Each theme is labelled and clearly defined, leading to a final report (Caulfield, 2022). Several themes that exhibit similar characteristics were merged to create a more cohesive understanding, resulting

in a new theme. Specifically, psychosocial factors and socioeconomic factors were combined under the umbrella of psychosocial factors to form a single, unified theme.

5.4 Characteristics of the identified studies

The review comprises eleven studies in various locations across the United Kingdom. A number of these studies utilised the Health Survey for England (HSE) (Agyemang, Humphry, and Bhopal, 2012) as well as data gathered from certain London boroughs (Cruickshank et al., 2016), Staffordshire in England (Earland, Campbell, and Srivastava, 2010), and the UK Biobank (Su et al., 2024). The geographical areas referenced for the studies and datasets in the reviewed sources include ten specific London boroughs involved in DASH recruitment (Goff et al., 2019).

Similarly, data was sourced from schools in London (Harding et al., 2010) as well as from Southall and Brent for the SABRE study (Park et al., 2016), Northeast London CCGs (Rison et al., 2023), and Southeast London (Schofield, Saka, and Ashworth, 2011). Other locations featured in the studies include Birmingham (Shantsila et al., 2018), Manchester, Cardiff (Wales), Belfast (Northern Ireland), Leeds, Sheffield, and Glasgow (Scotland) (Usman et al., 2024). Moreover, the data sources span more broadly across England, Scotland, and Wales through linkages to the HSE and the UK Biobank.

5.5 Emerging Themes from included studies

Once the data has been extracted, it will undergo theme synthesis (Thomas and Harden,2008). The process of thematic synthesis is like that of analysing main qualitative datasets in that it involves systematically coding data and coming up with descriptive and analytical themes (Taylor, Mahtani, and Aronson, 2021). The table below shows all the extracted subthemes grouped into the themes analysed below. The themes obtained from the analysis of the articles are ethnicity, age/sex, lifestyle/health status, cardiovascular/cardiometabolic risk factors, hypertension management and control, and psychosocial factors. See Appendix 1 for how the subthemes and themes were analysed.

5.6 Analysis/Synthesis of included studies

5.6.1 Ethnicity

Most of the eleven sources indicate that cardiovascular diseases, especially hypertension, represent a significant threat to British populations of African descent, including African-Caribbeans, and can lead to serious health complications (Agyemang, Humphry and Bhopal, 2012; Cruickshank et al., 2016; Goff et al., 2019; Harding et al., 2010; Park et al., 2016; Rison et al., 2023; Schofield, Saka and Ashworth, 2011; Shantsila et al., 2018; Su et al., 2024; Usman et al., 2024). Communities of African descent in the UK exhibit a notably higher incidence of hypertension compared to white populations (Agyemang, Humphry, and Bhopal, 2012; Schofield, Saka, and Ashworth, 2011; Usman et al., 2024).

Age, sex, and ethnicity significantly and complexly influence hypertension outcomes among African Caribbeans in the United Kingdom. People of African Descent (PoAD) (Usman et al., 2024), including those from African and Afro-Caribbean backgrounds, face an increased risk of developing cardiovascular diseases (CVDs), mainly due to a greater occurrence of primary CVD risk factors such as hypertension (Agyemang, Humphry and Bhopal, 2012).

Reports indicate that the prevalence of hypertension among populations of African descent in the UK is three to four times greater than that among individuals of European descent (Agyemang, Humphry and Bhopal, 2012; Usman et al., 2024). This high prevalence substantially contributes to the significant excess of target organ damage, end-stage renal disease, and stroke reported in African Caribbeans within the UK (Agyemang, Humphry and Bhopal, 2012).

Despite experiencing a higher rate of hypertension (Agyemang, Humphry and Bhopal, 2012), leading to elevated complications such as stroke (Su et al., 2024), At any specified SBP level, the predicted incidence rate of combined cardiorenal outcomes appears lower for Black Caribbean individuals than for White individuals (Su et al., 2024). For equivalent outcome risks observed in the White population at a 140 mm Hg SBP, the corresponding risk threshold for Black Caribbean individuals is higher, at 156 mm Hg (Su et al., 2024). This implies that BP thresholds recommended by guidelines might overstate risk for Black populations (Su et al., 2024). Moreover, research suggests that African Caribbeans might exhibit better overall arterial function than Europeans and South Asians, demonstrated by lower central arterial stiffness in one study (Park et al., 2016) and a reduced prevalence of diastolic dysfunction in hypertensive patients, despite more pronounced LV hypertrophy (Shantsila et al., 2018). Despite having elevated BP and higher systemic vascular resistance (SVR), Park et al. (2016) found that African-Caribbeans had more favourable arterial central hemodynamic, and stiffness (cPP/SV) compared to Europeans and South Asians

Nevertheless, a significant challenge remains in effectively managing hypertension. Black patients with chronic diseases, including hypertension, are consistently less likely to meet controlled blood pressure targets compared to their White counterparts (Rison et al., 2023; Schofield, Saka and Ashworth, 2011). This gap in blood pressure control persists even though Black patients are equally or more likely to have their blood pressure monitored (Rison et al., 2023; Schofield, Saka and Ashworth, 2011) and are not less aggressively treated (Rison et al., 2023). Despite proper monitoring and adequate treatment, the causes for this poorer control are not completely understood and may involve factors such as adherence, medication choices, or physiological differences (Rison et al., 2023; Shantsila et al., 2018).

5.6.2 Age and Sex

Several authors examine the complex relationship between age, sex, ethnicity, and hypertension, particularly regarding African-Caribbean identity in the UK (Agyemang et al., 2012; Cruickshank et al., 2016; Harding et al., 2010; Rison et al., 2023). Agyemang et al. (2012) highlight a higher prevalence of hypertension among individuals of African descent compared to those of European descent, with age being a significant factor. Cruickshank et al. (2016) identify age as an independent predictor of arterial stiffness, noting that while young men of different ethnicities show similar unadjusted Pulse Wave Velocity (PWV), Black Caribbean young women demonstrate lower arterial stiffness compared to their white British counterparts after adjustments.

An age crossover effect is evident in blood pressure and hypertension prevalence, occurring between ages 28 and 39, influenced by sex and blood pressure type (Agyemang et al., 2012). A longitudinal study by Harding et al. (2010) reveals that ethnic differences in blood pressure begin in males during adolescence. Agyemang et al. (2012) find that men of African-Caribbean descent have lower blood pressure than their white counterparts at ages 20-29, but this changes with older age groups. While African-Caribbean women have lower systolic blood pressure, they show a higher prevalence of hypertension compared to white women, especially after their twenties.

Rison et al. (2023) observe that younger adults (under 50) with hypertension are less likely to control blood pressure than older individuals, with females generally achieving better control than males. Additionally, Harding et al. (2010) note that while boys had similar systolic blood pressure at age 12, Black Africans experienced a steeper increase by age 16. Girls showed varied changes; systolic blood pressure remained stable in White girls but increased in both Black Caribbean and Black African girls, indicating that the crossover identified in adulthood starts earlier (Harding et al., 2010).

Cruickshank et al. (2016) suggest that the physiological impacts of ageing and blood pressure trends differ across ethnic and gender groups. Rison et al. (2023) further find that individuals of Black ethnicity are less likely to have controlled blood pressure than their White counterparts, even after accounting for age, sex, deprivation, and treatment intensity. Typically, African-Caribbean blood pressure levels exceed those of white individuals by 30 to 40, emphasising the need for targeted prevention strategies (Agyemang et al., 2012).

5.6.3 Lifestyle and health status

Recent research underscores significant health differences among different demographic groups, particularly regarding hypertension and related conditions. Rison et al. (2023) found that younger adults (under 50) with hypertension struggle more with blood pressure control than older individuals, with females generally faring better than males in managing their hypertension.

Research emphasises significant health differences among various ethnic groups in the UK, particularly regarding hypertension and related conditions. Lifestyle factors also play a crucial role, as populations of African descent in the UK, particularly African-Caribbeans, experience higher rates of obesity and type II diabetes (Agyemang, Humphry, & Bhopal, 2012; Usman *et al*., 2024). Studies show Black Caribbeans exhibit a prevalence of obesity (37.4%) and diabetes (9.3%) greater than that of White individuals (Su *et al*., 2024). Dietary acculturation, especially in Black Caribbean communities marked by increased fat intake, exacerbates these health issues (Goff *et al*., 2019).

The ethnic differences in hypertension management are further explored by Cruickshank et al. (2016), who suggest variations in physiological responses across different ethnic and gender groups. Rison et al. (2023) indicate that Black individuals are less likely to achieve controlled blood pressure compared to their White counterparts, even after controlling for age and treatment intensity. African-Caribbean populations report blood pressure levels exceeding those of White individuals by 30 to 40 mmHg, illustrating the need for targeted prevention strategies (Agyemang et al., 2012).

High salt intake is identified as a significant contributor to hypertension risk in these populations (Usman et al., 2024). Although many individuals recognise the health risks of excessive salt, awareness of recommended daily limits remains low, alongside limited engagement with nutritional information (Usman et al., 2024). Younger generations tend to skip breakfast more frequently than their White peers, correlating with worse cardiometabolic outcomes (Goff et al., 2019).

In contrast, older African-Caribbeans often adhere to healthier traditional diets rich in fruits and vegetables, potentially providing cardiovascular protection (Agyemang, Humphry, & Bhopal, 2012). However, health interventions must be culturally tailored to address these

differences effectively (Usman et al., 2024). This body of evidence highlights the critical need for targeted strategies to improve health outcomes in African descent populations in the UK.

5.6.4 Cardiovascular/Cardiometabolic Outcomes

In the UK, communities of African descent have a greater stroke mortality rate than populations of European descent. Agyemang, Humphry, and Bhopal (2012) found a significant correlation between the high incidence of hypertension among older African-Caribbeans and an increased risk of stroke, end-stage renal disease, and damage to target organs. Compared to other ethnic groups, African and Caribbean people in the UK are 1.5–2.5 times more likely to have a stroke (Su et al., 2024). However, compared to the White population, these groups have a far lower risk of coronary heart disease (CHD), with rates that are 20–50% lower. (Park et al., 2016; Su et al., 2024).

For Black Caribbean individuals, the systolic blood pressure (SBP) threshold that poses a similar risk to that of the White population is higher, set at 156mmHg, compared to 140 mmHg (Su et al., 2024). For those receiving treatment for hypertension, this threshold can rise to as much as 176 mmHg. This raise concerns that the currently recommended blood pressure targets might overestimate the risks for the Black population in the UK (Su et al., 2024). Among adults diagnosed with hypertension, younger individuals (under 50 years) are generally less likely to meet BP control targets compared to older adults (50 years and older), and females typically show better BP control than males (Agyemang, Humphry and Bhopal, 2012).

A study indicated that people of African-Caribbean descent exhibit higher mean arterial pressure and increased systemic vascular resistance (SVR) than Europeans (Park et al., 2016). In hypertensive patients, African-Caribbeans tend to display more pronounced left ventricular (LV) hypertrophy compared to South Asians. However, they also have a lower prevalence of diastolic dysfunction in comparison to that group (Shantsila et al., 2018).

Black Caribbean people were less likely than White people to have composite cardiorenal outcomes, such as atherosclerotic cardiovascular disease (CVD), heart failure, and chronic kidney disease, for any given level of SBP, according to a prospective study (Su et al., 2024). There is also consideration of a genetic predisposition to LV hypertrophy in people of African descent (Shantsila et al., 2018).

Moreover, despite having higher blood pressure and SVR, African-Caribbean individuals demonstrate more favourable arterial central hemodynamic and stiffness (cpp/SV) than Europeans and South Asians (Park et al., 2016). This combination is a potentially protective effect that might help explain the different patterns of hypertension-related complications compared to other ethnic groups (Shantsila et al., 2018).

5.6.5 Management and Control Challenges

In patients with hypertension, African-Caribbeans tend to exhibit more pronounced left ventricular (LV) hypertrophy compared to South Asians (Shantsila et al., 2018). This noticeable LV hypertrophy is thought to offer protection against diastolic dysfunction, potentially, and may be linked to genetic factors (Shantsila et al., 2018). One study found that individuals of African-Caribbean descent had higher mean arterial pressure and increased systemic vascular resistance (SVR) than Europeans (Park et al., 2016). Current hypertension guidelines and treatment thresholds, which are applied universally, may not be entirely suitable or effective for different ethnic groups in the UK (Su et al., 2024).

The observation that Black ethnic groups and younger individuals often struggle with blood pressure control suggests that targeted interventions could be beneficial (Rison et al., 2023). Among adults diagnosed with hypertension, those under 50 years old are less likely to meet blood pressure control targets compared to older adults (50 years and above). Interestingly, women typically demonstrate better blood pressure control than men (Rison et al., 2023).

Moreover, the high prevalence of hypertension among older African-Caribbeans is linked to a significant increase in target organ damage, end-stage renal disease, and stroke (Agyemang, Humphry, and Bhopal, 2012). In the UK, stroke mortality rates are higher in populations of African origin (Agyemang, Humphry and Bhopal, 2012; Su et al., 2024). African and Caribbean groups in the UK are 1.5 to 2.5 times more at risk of stroke compared to other ethnicities (Su et al., 2024). While these findings may indicate that current fixed thresholds could overestimate risk, they also emphasise the continuous relationship between systolic blood pressure (SBP) and related complications (Su et al., 2024). The lower rates of blood pressure control observed in Black patients highlight a considerable additional risk for cardiovascular disease (Schofield, Saka and Ashworth, 2011). Risk-equivalent, ethnicity-specific thresholds are suggested to characterise risk better (Su et al., 2024).

Despite having similar or even more frequent blood pressure monitoring in primary care than white patients (Rison et al., 2023; Schofield, Saka and Ashworth, 2011), the poorer control rates persist. Black ethnic groups were similarly or even less likely to be untreated or on single antihypertensive medications compared to their White counterparts (Rison et al., 2023). Although the monitoring and treatment intensity levels are satisfactory, the reasons behind the lack of control remain unclear (Rison et al., 2023). Possible contributing factors include medication adherence, initial treatment choices and dosages, treatment adjustments, physiological resistance to treatment, and the notion that higher population blood pressure norms mean greater reductions are needed to meet fixed targets (Rison et al., 2023; Schofield, Saka and Ashworth, 2011). Medication costs and adherence issues may also play a role,

particularly for younger individuals (Rison et al., 2023). Additionally, physical inactivity and the rise in overweight/obesity among those aged 30 to 40 are suspected contributors to the increase in blood pressure, especially in women (Agyemang, Humphry, and Bhopal, 2012).

In summary, African-Caribbeans in the UK bear a significant burden of hypertension and related health outcomes, especially strokes. Although their blood pressure levels may be comparable or lower in younger years, they rise markedly faster than in white populations starting around age 30-40. Despite frequent monitoring and similar treatment intensity, achieving blood pressure control remains a notable challenge, particularly for younger individuals and those from Black ethnic backgrounds. Additionally, recent studies suggest that universal blood pressure thresholds may overestimate risk for Black populations at specific SBP levels. Still, the clinical implications of these findings, especially given the poor control rates, require further exploration. Factors such as higher SVR and pronounced LV hypertrophy, with complex potential consequences, along with modifiable lifestyle factors like high salt intake, contribute to the cardiovascular health landscape in this population.

5.6.6 Socioeconomic factors

The authors shed light on the several ways psychosocial factors affect hypertension and related health outcomes among African-Caribbeans in the UK. Some studies draw attention to the link between socioeconomic circumstances and high blood pressure, especially when comparing populations of African descent in both the UK and the USA (Agyemang, Humphry, and Bhopal, 2012). Within the UK Biobank cohort, non-white communities, particularly Black Caribbean individuals, often face lower household incomes and greater levels of deprivation compared to their White counterparts (Su et al., 2024). The Determinants of Adolescent Social Well-Being and Health (DASH) study highlighted that socioeconomic disadvantages disproportionately influence blood pressure in adolescent girls from minority backgrounds (Harding et al., 2010). In Northeast London, research uncovered significant inequities in hypertension monitoring and control linked to deprivation (Rison et al., 2023). Likewise, a study in Lambeth, southeast London, found that although the gap in blood pressure control related to social deprivation had narrowed (Schofield, Saka, and Ashworth, 2011), socioeconomic differences based on ethnicity continued to exist.

Psychosocial factors, including perceived racism, were found to independently heighten arterial stiffness (Cruickshank et al., 2016). Perceived racism is another crucial element that impacts hypertension outcomes among Afro-Caribbeans in the UK. The DASH study followed a cohort of young Black Caribbean adults and found that those who reported experiences of racism were associated with increased arterial stiffness (pulse wave velocity), a key indicator of cardiovascular risk (Cruickshank et al., 2016). Factors such as medication adherence,

which may be affected by socioeconomic status (like prescription costs) (Rison et al., 2023) or understanding treatments, could also explain the poorer blood pressure control found in Black patients (Schofield, Saka, and Ashworth, 2011). For many working-age adults, worries about prescription costs complicate medication adherence (Rison et al., 2023).

Overall, the authors suggest that a blend of socioeconomic factors, deprivation, specific lifestyles and dietary habits (including culturally influenced salt consumption, skipping breakfast, physical inactivity, and obesity), along with perceived racism, contribute to the risk of hypertension and its related complications (such as arterial stiffness). These psychosocial elements also play a role in the inequities seen in hypertension management and control among African-Caribbeans in the UK (Agyemang, Humphry, and Bhopal, 2012; Cruickshank et al., 2016; Goff et al., 2019; Harding et al., 2010; Rison et al., 2023; Schofield, Saka, and Ashworth, 2011; Usman et al., 2024).

5.7 CHAPTER SUMMARY

These sources collectively analyse health factors and outcomes in ethnic minority groups in the UK, focusing particularly on individuals of African and South Asian descent. They explore dietary habits, such as high salt consumption and skipping breakfast, as factors contributing to cardiovascular risks, while acknowledging cultural influences on food choices and limited access to nutritional information. Research on arterial health reveals ethnic differences in arterial stiffness and haemodynamic, pointing to issues like increased waist circumference, physical inactivity, high blood pressure, and perceived racism affecting arterial function. The studies also assess the prevalence and management of hypertension, emphasising differences in monitoring and control among different ethnic groups, despite the critical role of blood pressure regulation in cardiovascular health. Additionally, they investigate the predictors and occurrences of diastolic dysfunction, noting connections to ethnicity, age, gender, and other factors such as waist circumference and history of diabetes.

6 Discussion

6.1 Introduction to Chapter

This discussion chapter focuses on the results and their potential impacts on other research fields. This systematic review was conducted on the risk factors associated with the outcome of hypertension in the United Kingdom. 11 articles that met the predetermined criteria were selected and analysed for the final inclusion in the systematic review. The 11 sources collectively highlight significant ethnic differences in BP levels, cardiovascular risk factors, disease outcomes, and hypertension control in the UK. Populations of South Asian and African descent face increased risks, albeit for different outcomes (higher CHD/diastolic dysfunction risk in South Asians, higher stroke risk/LV hypertrophy in African Caribbeans). These differences are influenced by age (notably the age crossover effect in BP), sex, and lifestyle/health factors like BMI, diabetes, and dietary salt intake. However, the impact of these factors varies by ethnic group.

6.2 Discussion of Key Findings

6.2.1 Ethnicity

Ethnicity emerges as a crucial theme across various studies, revealing significant differences in blood pressure levels, the prevalence of hypertension, cardiovascular disease (CVD) risk, and overall health outcomes among diverse populations in the UK (Agyemang, Humphry, and Bhopal, 2012; Park et al., 2016; Rison et al., 2023; Schofield, Saka, and Ashworth, 2011; Su et al., 2024; Usman et al., 2024; Akinlua et al., 2017). Agyemang et al.'s (2010) comparative research across nations investigated blood pressure and hypertension in South-Asian and African-origin communities in England and the Netherlands, revealing that the national context affects these health outcomes. For instance, the study found that African-origin men in England tended to have higher diastolic blood pressure compared to their counterparts in the Netherlands, even after adjusting for various risk factors (Agyemang et al., 2010). This suggests that factors specific to the UK national environment contribute to this higher blood pressure in this ethnic group (Ajayi et al., 2010).

Researchers commonly categorise participants into broad ethnic groups, such as White, South Asian, Black Caribbean, and Black African, but often explore more specific sub-groups, including Black or Black British, Asian or Asian British, and People of African Descent (PoAD). This broader classification encompasses individuals with mixed heritages and diverse cultural backgrounds, focusing particularly on those of African or Afro-Caribbean descent (Agyemang, Humphry, and Bhopal, 2012; Goff et al., 2019).

Some studies have compared Black Caribbean and Black African groups, uncovering notable similarities in their knowledge, attitudes, and practices (KAP) concerning dietary salt intake (Usman et al., 2024). This suggests that shared cultural practices and lifestyle choices might influence dietary behaviours more profoundly than distinct ethnic customs. For instance, both groups may prioritise specific traditional diets or cooking methods that impact their overall health (Akinlua, Meakin, and Freemantle, 2017; Millett et al., 2012; Usman et al., 2024).

However, contrasting findings emerge from another comprehensive study, which indicates that African individuals may experience greater difficulties in managing blood pressure compared to their Caribbean counterparts (Cruickshank et al., 2016). Research from Schofield, Saka, and Ashworth, (2011) did not reveal significant differences in hypertension control across these groups. Furthermore, variations in cerebrovascular risk between Black African and Black Caribbean populations have also been documented, highlighting the complex interplay of genetic, environmental, and lifestyle factors influencing health outcomes in these communities (Schofield, Saka, and Ashworth, 2011).

6.2.2 Age and Sex

The age and gender of individuals play a critical role in influencing blood pressure (BP) levels and health outcomes, often interacting complexly with ethnicity. A comprehensive study examining BP differences between white and African-Caribbean populations in the UK revealed that white individuals typically exhibit higher systolic and diastolic BP levels compared to their African-Caribbean counterparts. This trend notably shifts around the ages of 30 to 40, suggesting that as individuals enter middle adulthood, the patterns of BP regulation may differ significantly (Agyemang, Humphry, & Bhopal, 2012).

Interestingly, research has found that older adults, specifically those aged 50 years and older, demonstrate better BP control compared to their younger counterparts. This trend appears consistent across different ethnic groups, suggesting that ageing may confer certain physiological benefits in managing blood pressure levels (Rison et al., 2023). On the contrary, in the United States, higher levels of BP are consistently observed among African Americans across various age groups, indicating a persistent disparity that requires further exploration (Agyemang, Humphry, & Bhopal, 2010). Ethnic differences in the risk of developing hypertension can emerge quite early in life, particularly for individuals of Afro-Caribbean descent, highlighting the importance of early surveillance and intervention strategies (Eto et al., 2023).

Moreover, gender dynamics also play a significant role in hypertension management. Women tend to demonstrate superior control of high blood pressure compared to men. This is further

illustrated in dietary salt research, where a notable gender ratio indicates differing dietary impacts on BP regulation (Usman et al., 2024). Additionally, clinical guidelines recommend varying blood pressure thresholds between genders, reflecting the distinct physiological responses to hypertensive conditions (Su et al., 2024). Understanding these intricacies can facilitate more tailored and effective hypertension prevention and management approaches across diverse populations.

6.2.3 Lifestyle and Health Status

Lifestyle factors like diet, physical activities, smoking, drinking, cultural influence and health status of the afro- Caribbeans play a critical role in health outcomes. African-Caribbeans are more prone to diet-related issues like obesity and type 2 diabetes, with excessive salt intake being a major contributor to hypertension and cardiovascular diseases (Earland, Campbell, & Srivastava, 2010; Usman et al., 2024).Other scholars found that dietary habits, levels of physical activity, and socioeconomic status can influence high blood pressure (Ogunniyi, Commodore-Mensah, and Ferdinand, 2021).

studies highlight significant lifestyle and health differences across ethnic groups in the UK, particularly regarding body mass index (BMI), dietary habits, and smoking rates (Park et al., 2016. Compared to white women, African-Caribbean women had higher BMI readings. with ageing correlating to increased BMI and blood pressure (BP), impacting hypertension risk (Agyemang, Humphry, & Bhopal, 2012; Goff et al., 2019). In contrast, young Black African and Caribbean adults show the highest BMI levels despite similar waist measurements compared to other groups. Indian participants tend to have lower BMI compared to both White British and Black ethnic groups (Goff et al., 2019).

Among African-Caribbean women, rising BMI after age 30 aligns with increased BP, indicating a direct link between obesity and hypertension. However, for men, other factors contribute to elevated BP beyond weight gain (Agyemang, Humphry, & Bhopal, 2012). Ethnic minorities also face lower BMI thresholds for obesity, particularly concerning type 2 diabetes risk, compounding health issues (Harding et al., 2007; Su et al., 2024). Factors like being overweight, not exercising enough (Koshoedo *et al.*, 2015) and eating a diet high in saturated fat and salt (Maraboto and Ferdinand, 2020) might be a contributary factor.

Cultural influences and a general lack of nutritional knowledge exacerbate these health risks (Usman et al., 2024). Turban et al. (2013) found that the DASH diet lowers BP more in Black people than in Whites. DASH is a diet high in fruits, vegetables, and low-fat dairy with low saturated and total fat (Patel, Alicandro and La Vecchia, 2020)

Smoking rates vary significantly by ethnicity, with White British young adults showing the highest prevalence at 47%, while Black African participants have a substantially lower smoking rate of 11% (Goff et al., 2019). The UK Biobank data studied reflect similar trends, highlighting the lower rates of smoking and drinking among South Asians and Black Africans compared to whites (Su et al., 2024). Schofield et al. (2011) omitted smoking from the results because it made little effect.

6.2.4 Cardiovascular/Cardiometabolic Risk Factors

Afro-Caribbeans Ethnic groups exhibit distinct differences in cardiovascular and cardiometabolic risk factors. The UK Biobank study revealed that Black Africans had the most significant average systolic and diastolic blood pressure (BP), while South Asians and Black Caribbeans had lower average systolic BP than Whites, with varying diastolic levels (Su et al., 2024). A tri-ethnic study indicated that South Asians had higher central pulse pressure and arterial stiffness compared to Europeans and African Caribbeans, who, despite higher BP, displayed more favourable arterial stiffness profiles (Park et al., 2016). These ethnic differences in arterial hemodynamic may explain varying coronary heart disease (CHD) risks (Park et al., 2016).

Further, differences in left ventricular (LV) structure and diastolic function among hypertensive patients were noted, with South Asians showing poorer diastolic function linked to higher mortality, while African Caribbeans had more LV hypertrophy and lower rates of diastolic dysfunction (Agyemang et al., 2012; Shantsila et al., 2018). Cardiometabolic profiles also varied; Black Africans exhibited low total cholesterol and high HDL levels due to dietary factors, unlike Indian participants, who had lower HDL (Goff et al., 2019).

Public health challenges are highlighted by significant differences in cardiometabolic diseases in the UK, where African and Caribbean populations have a 20-50% lower risk of CHD but a 1.5-2.5 times higher risk of stroke (Su et al., 2024). Furthermore, stroke mortality rates are nearly double in South Asians and African Caribbeans versus Europeans (Park et al., 2016), with Black individuals in the USA showing higher prevalence of hypertension-related organ damage (Su et al., 2024). Physiological variations, including distinct inflammatory patterns and LV structural differences, suggest underlying biological factors influencing hypertension risks across ethnic groups (Crouch et al., 2020; du Toit et al., 2022; Eastwood et al., 2023).

6.2.5 Hypertension Management and Control

There are clear ethnic differences in the treatment and control of hypertension. Black people were less likely than White or Asian people to keep their blood pressure (BP) under control, according to a study by Rison et al. (2023) carried out in Northeast London. On the other hand,

compared to their White counterparts, Asian ethnic group members had a greater chance of sustaining regulated blood pressure (Rison et al., 2023). The Asian group performed better than the White group, whereas the Black group had more frequent blood pressure checks than the White group, although their blood pressure control was worse. These results are in line with another study that found Asians typically perform better at controlling blood pressure than Black people do (Eto et al., 2023). The result of another study assessing GP data from a different London borough found that blood pressure monitoring among Black, Asian, and minority ethnic (BAME) patients was at least as effective and, in some cases, better than in the White population. Caribbean and Asian patients were notably more likely to have their BP checked (Schofield, Saka, and Ashworth, 2011). This highlights that ethnic health differences in BP management persist, despite advancements in addressing social deprivation inequalities (Schofield, Saka, and Ashworth, 2011).

Moreover, concerns have been raised about the appropriateness of current guideline-recommended hypertension thresholds for non-White populations in the UK (Su et al., 2024). These standards might overestimate risks for Black individuals while underestimating them for South Asians (Su et al., 2024). Possible reasons behind the differences in BP control and outcomes include the idea that Black patients may require greater BP reductions to meet targets, along with variations in adherence to ethnic-specific treatment guidelines and the types of medications prescribed (Schofield, Saka, and Ashworth, 2011).

6.2.6 Psychosocial factors

Additionally, ethnic minorities in the UK are impacted by psychosocial factor like racism and socioeconomic issues. According to some authors, all non-white populations were more likely than the white population to be more deprived and have the lowest household income (Su et al., 2024). The impact of socioeconomic class and ethnicity can be distinguished by controlling for area-level measures of deprivation (Su et al., 2024). This is further supported by research conducted in New York City by Cole et al. (2016), which found a correlation between Black men's hypertension stage, awareness, and treatment and neighbourhood socioeconomic disadvantage and racial composition, with nativity serving as a moderating factor. These results imply that the social environment and socioeconomic factors are important in determining the differences in hypertension and may be pertinent in the UK context (Foster et al., 2018). Psychosocial factors, including perceived racism, were found to independently heighten arterial stiffness (Cruickshank et al., 2016). Social determinants also vary within populations of African descent, underscoring the complexity of health differences (Crouch et al., 2020; Chaturvedi et al., 2023).

Socioeconomic status (SES) is another risk factor that has been reported to be strongly linked to hypertension (Grotto et al., 2007; Spruill, 2010), especially for Black people and other ethnic minorities (Lackland, 2014). Chronic non-communicable diseases, such as hypertension, have surged among specific demographics due to socioeconomic changes (Cooke et al., 2021). Socioeconomic factors as a modifiable factor have been reported to significantly affect the prevalence of hypertension in Black populations (Foster et al., 2021); this highlights why. Changes in lifestyle can enhance health results (Brook et al., 2013).

Poverty represents a significant obstacle to these transformations (Pampel, Krueger, and Denney, 2010), especially when systemic solutions do not address the socioeconomic elements that contribute to detrimental behaviours (Cuevas, Williams, and Albert, 2018). Socioeconomic factors correlate with mortality and non-communicable diseases (NCDs) at rates like those of unhealthy lifestyle choices; however, lifestyle interventions frequently overlook these socioeconomic aspects (Stringhini et al., 2017).

6.3 Strengths and limitations

One advantage of conducting this systematic review is the thorough analysis obtained from the results of the various studies. Another strength is its ability to uncover consistent patterns and trends concerning the risk factors of hypertension within the African-Caribbean population. Ultimately, these findings will aid in guiding healthcare policymakers and highlight the necessity for more longitudinal studies on the risk factors linked to hypertension among Afro-Caribbeans in the UK.

A limitation of this review is the difference in study design and methodologies; some studies are cross-sectional, while others are longitudinal. Most of the research is quantitative, with only one study being qualitative. Additionally, this systematic review excluded all non-English studies, grey literature, and studies conducted outside the United Kingdom, reducing the limited available evidence to UK studies conducted on the African-Caribbean ethnic groups.

6.4 Conclusion

This chapter has outlined and evaluated the findings, illustrating their connection to the research questions and literature review. It also advocates for conclusions and possible recommendations to reduce the risk factors associated with hypertension outcomes among Afro-Caribbeans in the UK. Additionally, it highlights that the current universal blood pressure thresholds may not accurately represent risk across different ethnic groups, as Black individuals often face poorer hypertension management in primary care, despite similar rates of monitoring.

African-Caribbeans in the UK face a high burden of hypertension and related health issues, particularly strokes. Factors like higher SVR, LV hypertrophy, and modifiable lifestyle choices, such as high salt intake, influence cardiovascular health in this community. Further exploration of these issues is needed. The next chapter will focus on recommendations and the conclusion.

7 Recommendations and Conclusion

7.1 Introduction

This systematic review aims to identify the risk factors linked to hypertension among Afro-Caribbeans in the United Kingdom. After analysing all 11 studies included, this chapter offers recommendations for addressing hypertension risk factors in the UK. It will stress the significance of targeted actions and continuous research to mitigate health risks. The findings are intended to inform future health policies and preventive programmes, highlighting the necessity for proactive approaches in reducing the risk factors of hypertension for ethnic minorities in the United Kingdom.

7.2 Implications of findings

Several significant implications arise from the findings regarding blood pressure, hypertension, and cardiovascular risk across different ethnic groups in the UK, particularly for people of African-Caribbean descent. Recent data highlight the ongoing challenge of effectively managing controlled hypertension in Black patients, underscored by the urgent need for targeted and culturally sensitive strategies to improve blood pressure regulation within this population.

These implications highlight the importance of adopting a more significant and culturally aware approach to managing blood pressure and preventing cardiovascular disease in the UK. This means implementing targeted screening, making necessary adjustments in risk assessment, creating focused interventions to enhance blood pressure control, conducting deeper research into mechanisms, and promoting health in ways that resonate with diverse communities.

7.3 Recommendations for Practice

7.3.1 Target age blood pressure screening

The lack of tailored screening for Afro-Caribbean individuals acts as a barrier to early detection, as the existing one-size-fits-all approach in the health service may hinder timely diagnosis for this at-risk population in the UK. It is strongly advised that African-Caribbean patients receive comprehensive clinical evaluations and targeted blood pressure screenings beginning at age 30. This proactive approach is particularly vital for those in the 30 to 40 age group, as they may face an increased risk of hypertension and related cardiovascular issues. Regular monitoring and assessment during this critical age range will facilitate early detection and intervention, enhancing long-term health outcomes within this demographic.

7.3.2 Culturally sensitive intervention

Barriers to developing culturally sensitive interventions could be a lack of knowledge among healthcare professionals. Developing and implementing culturally sensitive health interventions to reduce dietary salt intake among People of African Descent (PoAD) is essential. These interventions should consider traditional culinary practices, such as specific spices and flavouring techniques, to ensure that the recommended changes do not compromise cultural preferences. Additionally, it is crucial to address the existing knowledge gaps regarding the recommended daily limits for sodium intake, which can significantly influence health outcomes. Effective strategies could include educational workshops emphasising the importance of reading nutritional labels and using the food traffic light system to guide food choices, understanding the sources of hidden salts in processed foods, and incorporating alternative seasoning methods that align with cultural tastes while promoting healthier choices. Collaborating with community leaders and local chefs will help tailor these efforts to ensure acceptance and sustainability within the community.

7.3.3 Health education

Barriers to health education could be cultural and socioeconomic challenges. Health education strategies aimed at African-Caribbean adults should adopt a balanced approach that emphasises the positive aspects of their traditional diet, while also addressing critical health concerns associated with high salt and calorie intake (Earland, Campbell and Srivastava, 2010). This includes specific recommendations for reducing processed foods, often high in sodium and unhealthy fats, and encouraging the consumption of fresh fruits, vegetables, and whole grain staples in traditional diets. Additionally, attention should be given to beverage consumption, particularly the intake of sugary drinks and alcoholic beverages, which can contribute to adverse health outcomes.

Furthermore, it is essential to implement targeted interventions to enhance adolescent dietary behaviours, specifically focusing on reducing the prevalence of breakfast skipping (Goff et al., 2019). This is especially important for Black African and Caribbean youth, who may face unique cultural and socioeconomic challenges affecting their dietary choices. Strategies could include community workshops, school-based nutrition education programmes, and parental involvement initiatives highlighting the importance of a nutritious breakfast and providing practical solutions for its incorporation into daily routines. Addressing these areas, health education can promote improved dietary habits and overall community well-being.

7.4 Recommendations for future research

There is an urgent need for comprehensive and detailed longitudinal studies that explore the underlying mechanisms contributing to the observed age-related differences in blood pressure levels between African-Caribbean and white populations. These studies should investigate factors such as genetic predispositions, lifestyle choices, dietary patterns, level of physical activities, socioeconomic influences, and access to healthcare that may impact blood pressure regulation over time. Psychosocial factors are identified as potential influences that warrant further exploration. Moreover, focused research is essential to explore the trajectory of uncontrolled hypertension within the African-Caribbean population, identifying specific risk factors and barriers to effective treatment. This knowledge will be necessary in developing targeted intervention strategies to enhance this population's blood pressure management and overall cardiovascular health (Agyemang, Humphry, and Bhopal, 2012; Rison et al., 2023).

7.5 Conclusion

This systematic review examines the risk factors associated with hypertension among Afro-Caribbeans in the United Kingdom, analysing 11 studies to uncover these risk factors. It reveals that the age at which blood pressure (BP) and hypertension begin to diverge between African-Caribbean and white populations in England is notable. The findings suggest that ethnic differences in cardiovascular disease (CVD) outcomes continue to exist, highlighting that the relationship between BP and risk can vary significantly across different ethnic groups. Hypertension may develop earlier in the Afro-Caribbean population than in the general population, raising the need for further investigation into the underlying causes of these differences.

Blood pressure tends to rise earlier in African-Caribbean individuals, despite potentially effective monitoring. Managing BP remains a persistent challenge for Black patients in the UK. Concerns surrounding dietary habits, especially high salt intake and a higher prevalence of obesity, have been identified in Afro-Caribbean communities. Additionally, dietary behaviours during adolescence, such as frequently skipping breakfast, are more common in Black groups. There are also complex ethnic variations in arterial characteristics and heart function. These findings highlight the importance of implementing age-targeted BP screenings and culturally sensitive dietary interventions that address knowledge gaps and cooking practices. Moreover, more detailed research, particularly longitudinal studies, is critical to better understanding the mechanisms behind these observed differences.

8 References

Abbotts, J. (2004) ‘Cardiovascular Risk Profiles in UK-born Caribbeans and Irish Living in England and Wales’, *Atherosclerosis*, 175(2), pp. 295–303. Available at: https://doi.org/10.1016/j.atherosclerosis.2004.03.019.(Accessed: 13 November 2024).

Abrahamowicz, A.A., Ebinger, J., Whelton, S.P., Mensah, Y.C. and Yang, E. (2023) ‘Racial and Ethnic Differences in hypertension: Barriers and Opportunities to Improve Blood Pressure Control’, *Current Cardiology Reports*, 25(1), pp. 17–27. Available https://doi.org/10.1007/s11886-022-01826-x (Accessed: 12 February 2025).

Adegboye, A.R.A., Ojo, O. and Begum, G. (2020) ‘The Use of Dietary Supplements among African and Caribbean Women Living in the UK: a Cross-Sectional Study’, *Nutrients*, 12(3), p. 847. Available at: https://doi.org/10.3390/nu12030847 (Accessed: 18 January 2025).

Aggarwal, R., Chiu, N., Wadhera, R.K., Moran, A.E., Raber, I., Shen, C., Yeh, R.W. and Kazi, D.S. (2021) ‘Racial/Ethnic Differences in Hypertension Prevalence, Awareness, Treatment, and Control in the United States, 2013 to 2018’, *Hypertension*, 78(6). Available at: https://doi.org/10.1161/hypertensionaha.121.17570 (Accessed: 14 December 2024).

Agyemang, C., Humphry, R.W. and Bhopal, R. (2012) ‘Divergence with Age in Blood Pressure in African-Caribbean and White Populations in England: Implications for Screening for Hypertension’, *American Journal of Hypertension*, 25(1), pp. 89–96. Available at: https://doi.org/10.1038/ajh.2011.160 (Accessed: 23 January 2025).

Agyemang, C., Kunst, A., Bhopal, R., Zaninotto, P., Unwin, N., Nazroo, J., Nicolaou, M., Redekop, W.K. and Stronks, K. (2010) ‘A Cross-National Comparative Study of Blood Pressure and Hypertension Between English and Dutch South-Asian- and African-Origin Populations: The Role of National Context’, *American Journal of Hypertension*, 23(6), pp. 639–648. Available at: https://doi.org/10.1038/ajh.2010.39 (Accessed: 18 January 2025).

Ahmad, S. and Webb, D. (2022) *NHS England» How People Can ‘know Their Numbers’ to Prevent Cardiovascular Disease*, *www.england.nhs.uk*. Available at: https://www.england.nhs.uk/blog/how-people-can-know-their-numbers-to-prevent-cardiovascular-disease/ (Accessed: 25 November 2024).

Ajayi, E.A., Balogun, M.O., Akintomide, O.A., Adebayo, R.A., Ajayi, O.E., Ikem, R.T., Ogunyemi, S.A. and Oyedeji, A.T. (2010) 'Blood Pressure Response to an Exercise Treadmill test, and Echocardiographic Left Ventricular Geometry in Nigerian Normotensive Diabetics', *Cardiovascular Journal of Africa*, 21(2), pp. 93–6. Available at: https://pubmed.ncbi.nlm.nih.gov/20532433/ (Accessed: 19 December 2024).

Akinlua, J.T., Meakin, R. and Freemantle, N. (2017) 'Beliefs about Hypertension among Nigerian Immigrants to the United Kingdom: A Qualitative Study', *PLOS ONE*. Edited by A.M.N. Renzaho, 12(7), p. e0181909. Available at: https://doi.org/10.1371/journal.pone.0181909 (Accessed: 19 December 2024).

Atkinson, L.Z. and Cipriani, A. (2018) 'How to Carry out a Literature Search for a Systematic review: a Practical Guide', *BJPsych Advances*, 24(2), pp. 74–82. Available at: https://doi.org/10.1192/bja.2017.3 (Accessed: 23 January 2025).

Avila-Palencia, I., Laeremans, M., Hoffmann, B., Anaya-Boig, E., Carrasco-Turigas, G., Cole-Hunter, T., de Nazelle, A., Dons, E., Götschi, T., Int Panis, L., Orjuela, J.P., Standaert, A. and Nieuwenhuijsen, M.J. (2019) 'Effects of Physical Activity and Air Pollution on Blood Pressure', *Environmental Research*, 173, pp. 387–396. Available at: https://doi.org/10.1016/j.envres.2019.03.032 (Accessed: 19 December 2024).

Ayoub, A., Akyea, R.K., Veline L'Esperance, Salma Ayis, Parmar, D., Stevo Durbaba, Fisher, M., Patel, R., Harding, S., Wierzbicki, A.S., Qureshi, N. and Molokhia, M. (2023) 'Determinants of Lipid Clinic Referral and Attendance in a multi-ethnic Adult Population in South London: a cross-sectional Study', *The Lancet*, 402, pp. S26–S26. Available at: https://doi.org/10.1016/s0140-6736(23)02150-5 (Accessed: 6 January 2025).

Balia, S. and Jones, A.M. (2008) 'Mortality, Lifestyle and Socio-economic Status', *Journal of Health Economics*, 27(1), pp. 1–26. Available at: https://doi.org/10.1016/j.jhealeco.2007.03.001 (Accessed: 6 January 2025).

Beckie, T.M. (2017) 'Ethnic and Racial Differences in Hypertension Management among Women', *Seminars in Perinatology*, 41(5), pp. 278–286. Available at: https://doi.org/10.1053/j.semperi.2017.04.004 (Accessed: 6 January 2025).

Blair, E. (2019) *LibGuides: Systematic Review: Quality Assessment*, *guides.lib.strath.ac.uk*. Available at: https://guides.lib.strath.ac.uk/systematic/quality (Accessed: 3 April 2025).

Bosworth, H.B., Olsen, M.K., Neary, A., Orr, M., Grubber, J., Svetkey, L., Adams, M. and Oddone, E.Z. (2008) 'Take Control of Your Blood Pressure (TCYB) study: a Multifactorial Tailored Behavioral and Educational Intervention for Achieving Blood Pressure Control', *Patient Education and Counseling*, 70(3), pp. 338–347. Available at: https://doi.org/10.1016/j.pec.2007.11.014 (Accessed: 19 December 2024).

Bramer, W.M., De Jonge, G.B., Rethlefsen, M.L., Mast, F. and Kleijnen, J. (2018) 'A Systematic Approach to Searching: An Efficient and Complete Method to Develop Literature Searches', *Journal of the Medical Library Association*, 106(4), pp. 531–541. Available at: https://doi.org/10.5195/jmla.2018.283 (Accessed: 6 January 2025).

Braun, V. and Clarke, V. (2006) 'Using Thematic Analysis in Psychology', *Qualitative Research in Psychology*, 3(2), pp. 77–101. Available at: https://doi.org/10.1191/1478088706qp063oa (Accessed: 23 January 2025).

British Heart Foundation (2021) *How Your Ethnic Background Affects Your Risk of Heart and Circulatory Diseases*, *British Heart Foundation*. Available at: https://www.bhf.org.uk/what-we-do/our-research/research-successes/ethnicity-and-heart-disease (Accessed: 4 February 2025).

British Medical Association (2019) *Get a Move on Steps to Increase Physical Activity Levels in the UK*. Available at: https://www.bma.org.uk/media/2104/bma-physical-activity-briefing-get-move-on-oct-19-v2.pdf (Accessed: 11 February 2025).

Brook, R.D., Appel, L.J., Rubenfire, M., Ogedegbe, G., Bisognano, J.D., Elliott, W.J., Fuchs, F.D., Hughes, J.W., Lackland, D.T., Staffileno, B.A., Townsend, R.R., Rajagopalan, S. and American Heart Association Professional Education Committee of the Council for High Blood Pressure Research, Council on Cardiovascular and Stroke Nursing, Council on Epidemiology and Prevention, and Council on Nutrition, Physical Activity (2013) 'Beyond Medications and diet: Alternative Approaches to Lowering Blood pressure: a Scientific Statement from the American Heart Association', *Hypertension (Dallas, Tex. : 1979)*, 61(6), pp. 1360–83. Available at: https://doi.org/10.1161/HYP.0b013e318293645f (Accessed: 19 February 2025).

Buccheri, R.K. and Sharifi, C. (2017) 'Critical Appraisal Tools and Reporting Guidelines for Evidence-Based Practice', *Worldviews on Evidence-Based Nursing*, 14(6), pp. 463–472 (Accessed: 23 January 2025).

CASP (2024) *CASP - Critical Appraisal Skills Programme*, *Critical Appraisal Skills Programme*. Available at: https://casp-uk.net/ (Accessed: 18 January 2025).

Catalao, R., Dorrington, S., Pritchard, M., Jewell, A., Broadbent, M., Ashworth, M., Hatch, S. and Howard, L. (2022) 'Ethnic Inequalities in Mental and Physical Multimorbidity in Women of Reproductive age: a Data Linkage Cohort Study', *BMJ Open*, 12(7), p. e059257. Available at: https://doi.org/10.1136/bmjopen-2021-059257 .(Accessed: 11 February 2025).

Caulfield, J. (2022) *How to Do Thematic Analysis | Guide & Examples*, *Scribbr*. Available at: https://www.scribbr.co.uk/research-methods/thematic-analysis-explained/ (Accessed: 3 April 2025).

Central Michigan University (2022) *Research Guides: Website Research: CRAAP Test*, *Cmich.edu*. Available at: https://libguides.cmich.edu/web_research/craap (Accessed: 8 February 2025).

Chaturvedi, A., Zhu, A., Gadela, N.V., Prabhakaran, D. and Jafar, T.H. (2023) 'Social Determinants of Health and Differences in Hypertension and Cardiovascular Diseases', *Hypertension*, 81(3). Available at: https://doi.org/10.1161/hypertensionaha.123.21354 (Accessed: 23 January 2025).

Chelak, K. and Chakole, S. (2023) The Role of Social Determinants of Health in Promoting Health Equality: A Narrative Review', *Cureus*, 15(1). Available at: https://doi.org/10.7759/cureus.33425 (Accessed: 20 January 2025).

Clarke, V. and Braun, V. (2016) *Thematic Analysis*, *ResearchGate*. Available at: https://www.researchgate.net/publication/311801765_Thematic_analysis (Accessed: 2 February 2025).

Clarke, V. and Braun, V. (2017) 'Thematic Analysis', *The Journal of Positive Psychology*, 12(3), pp. 297–298 (Accessed: 23 April 2025).

Cole, H., Duncan, D.T., Ogedegbe, G., Bennett, S. and Ravenell, J. (2016) 'Neighborhood Socioeconomic Disadvantage; Neighborhood Racial Composition; and Hypertension Stage, Awareness, and Treatment among Hypertensive Black Men in New York City: Does Nativity Matter?', *Journal of Racial and Ethnic Health Differences*, 4(5), pp. 866–875. Available at: https://doi.org/10.1007/s40615-016-0289-x. (Accessed: 23 January 2025).

Commodore-Mensah, Y., Matthie, N., Wells, J., B. Dunbar, S., Himmelfarb, C.D., Cooper, L.A. and Chandler, R.D. (2017) 'African Americans, African Immigrants, and Afro-Caribbeans Differ in Social Determinants of Hypertension and Diabetes: Evidence from the National Health Interview Survey', *Journal of Racial and Ethnic Health Differences*, 5(5), pp. 995–1002. Available at: https://doi.org/10.1007/s40615-017-0446-x (Accessed: 29 January 2025).

Cook, T., Kursumovic, E. and Lennane, S. (2020) *Exclusive: deaths of NHS staff from covid-19 analysed*, *Health Service Journal*. Available at: https://www.hsj.co.uk/exclusive-deaths-of-nhs-staff-from-covid-19-analysed/7027471.article (Accessed: 20 December 2024).

Crouch, S.H., Roux, S.B.-L., Delles, C., Graham, L.A. and Schutte, A.E. (2020) 'Distinct Inflammatory Mediator Patterns in Young Black and White adults: the African-predict Study', *Cytokine*, 126, p. 154894. Available at: https://doi.org/10.1016/j.cyto.2019.154894..(Accessed: 19 February 2025).

Cruickshank, J.K., Silva, M.J., Molaodi, O.R., Enayat, Z.E., Cassidy, A., Karamanos, A., Read, U.M., Faconti, L., Dall, P., Stansfield, B. and Harding, S. (2016) 'Ethnic Differences in and Childhood Influences on Early Adult Pulse Wave Velocity', *Hypertension*, 67(6), pp. 1133–1141. Available at: https://doi.org/10.1161/hypertensionaha.115.07079 (Accessed: 2 March 2025).

Cuevas, A.G., Williams, D.R. and Albert, M.A. (2018) 'Psychosocial Factors and hypertension: a Review of the Literature', *Cardiology Clinics*, 35(2), pp. 223–230. Available at: https://doi.org/10.1016/j.ccl.2016.12.004.(Accessed: 23 January 2025).

Cutler, D.M., Lleras-Muney, A. and Vogl, T. (2008) *Socioeconomic Status and Health: Dimensions and Mechanisms*, *www.nber.org*. Available at: https://www.nber.org/papers/w14333..(Accessed: 19 February 2025).

Das, S. (2024) 'Association of Hypertension with Overweight and Obesity among Adults in Rangpur Region of Bangladesh: a cross-sectional Study', *Human Nutrition & Metabolism*, 37, pp. 200273–200273. Available at: https://doi.org/10.1016/j.hnm.2024.200273..(Accessed: 19 February 2025).

Davis, T.M.E., Cull, C.A. and Holman, R.R. (2001) 'Relationship between Ethnicity and Glycemic Control, Lipid Profiles, and Blood Pressure during the First 9 Years of Type 2 Diabetes: U.K. Prospective Diabetes Study (UKPDS 55)', *Diabetes Care*, 24(7), pp. 1167–1174. Available at: https://doi.org/10.2337/diacare.24.7.1167 (Accessed: 13 March 2025).

Desormais, I., Salimanou Ariyoh Amidou, Dismand Houinato, Stephan Dismand Houinato, Gwladys Nadia Gbagouidi, Pierre-Marie Preux, Aboyans, V. and Lacroix, P. (2019) 'The prevalence, awareness, Management and Control of Hypertension in Men and Women in Benin, West Africa: the TAHES Study', 19(1). Available at: https://doi.org/10.1186/s12872-019-01273-7..(Accessed: 19 February 2025).

Dong, Y., Zhu, H., Baker, E., Sagnella, G., MacGregor, G., Carter, N., Wicks, P., Cook, D. and Cappuccio, F. (2001) 'T594M and G442V polymorphisms of the sodium channel β subunit and hypertension in a black population', *Journal of Human Hypertension*, 15(6), pp. 425–430. Available at: https://doi.org/10.1038/sj.jhh.1001182 (Accessed: 11 March 2025).

du Toit, W.L., Kruger, R., Gafane-Matemane, L.F., Schutte, A.E., Louw, R. and Mels, C.M.C. (2022) 'Urinary Metabolomics Profiling by Cardiovascular Risk Factors in Young adults: the African Prospective Study on Early Detection and Identification of Cardiovascular Disease and Hypertension Study', *Journal of Hypertension*, 40(8), pp. 1545–1555. Available at: https://doi.org/10.1097/hjh.0000000000003182 (Accessed: 13 March 2025).

du Toit, W.L., Kruger, R., Gafane-Matemane, L.F., Schutte, A.E., Louw, R. and Mels, C.M.C. (2023) 'Markers of Arterial Stiffness and Urinary Metabolomics in Young Adults with Early Cardiovascular risk: the African-PREDICT Study', *Metabolomics*, 19(4). Available at: https://doi.org/10.1007/s11306-023-01987-y..(Accessed: 10 February 2025).

Dwivedi, G. and Beevers, D.G. (2009) 'Hypertension in Ethnic groups: Epidemiological and Clinical Perspectives', *Expert Review of Cardiovascular Therapy*, 7(8), pp. 955–963. Available at: https://doi.org/10.1586/erc.09.88 (Accessed: 13 December 2024).

Earland, J., Campbell, J. and Srivastava, A. (2010) 'Dietary Habits and Health Status of African-Caribbean Adults', *Journal of Human Nutrition and Dietetics*, 23(3), pp. 264–271. Available at: https://doi.org/10.1111/j.1365-277x.2009.01030.x (Accessed: 19 February 2025).

Eastwood, S.V., Hughes, A.D., Tomlinson, L., Mathur, R., Smeeth, L., Bhaskaran, K. and Chaturvedi, N. (2023) 'Ethnic Differences in Hypertension management, Medication Use and Blood Pressure Control in UK Primary care, 2006–2019: a Retrospective Cohort Study', *The Lancet Regional Health - Europe*, 25, p. 100557. Available at: https://doi.org/10.1016/j.lanepe.2022.100557 (Accessed: 19 February 2025).

Elpida Vounzoulaki, Miksza, J.K., Zaccardi, F., Tan, B.K., Davies, M.J., Kamlesh Khunti and Gillies, C.L. (2024) 'Association of Ethnicity and Socioeconomic Status with Health

Outcomes in Women with Gestational diabetes: Clinical Practice Research Datalink Cohort Study', *Diabetes & Metabolic Syndrome*, 18(4), pp. 103010–103010. Available at: https://doi.org/10.1016/j.dsx.2024.103010 (Accessed:12 February 2025).

Eto, F., Samuel, M., Henkin, R., Mahesh, M., Ahmad, T., Angdembe, A., R. Hamish McAllister-Williams, Paolo Missier, Reynolds, N.J., Barnes, M.R., Hull, S., Finer, S. and Mathur, R. (2023) 'Ethnic Differences in Early Onset Multimorbidity and Associations with Health Service use, long-term Prescribing, Years of Life lost, and mortality: a cross-sectional Study Using Clustering in the UK Clinical Practice Research Datalink', *PLOS Medicine*, 20(10), pp. e1004300–e1004300. Available at: https://doi.org/10.1371/journal.pmed.1004300 (Accessed: 1 February 2025).

Forouzanfar, M.H., Alexander, L., Anderson, H.R., Bachman, V.F., Biryukov, S., Brauer, M., Burnett, R., Casey, D., Coates, M.M., Cohen, A., Delwiche, K., Estep, K., Frostad, J.J., KC, A., Kyu, H.H., Moradi-Lakeh, M., Ng, M., Slepak, E.L., Thomas, B.A. and Wagner, J. (2015) 'Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013', *The Lancet*, 386(10010), pp. 2287–2323. Available at: https://doi.org/10.1016/s0140-6736(15)00128-2 (Accessed: 19 January 2025).

Forrester, T., Cooper, R.S. and Weatherall, D. (1998) 'Emergence of Western Diseases in the Tropical World: The Experience with Chronic Cardiovascular Diseases', *British Medical Bulletin*, 54(2), pp. 463–473. Available at: https://doi.org/10.1093/oxfordjournals.bmb.a011701 (Accessed: 13 February 2025).

Foster, H.M.E., Celis-Morales, C.A., Nicholl, B.I., Petermann-Rocha, F., Pell, J.P., Gill, J.M.R., O'Donnell, C.A. and Mair, F.S. (2018) 'The Effect of Socioeconomic Deprivation on the Association between an Extended Measurement of Unhealthy Lifestyle Factors and Health Outcomes: A Prospective Analysis of the UK Biobank Cohort', *The Lancet Public Health*, 3(12), pp. e576–e585. Available at: https://doi.org/10.1016/s2468-2667(18)30200- (Accessed: 6 February 2025).

Fuchs, F.D. and Whelton, P.K. (2019) 'High Blood Pressure and Cardiovascular Disease', *Hypertension*, 75(2), pp. 285–292. Available at: https://doi.org/10.1161/HYPERTENSIONAHA.119.14240 (Accessed: 19 February 2025).

Goff, L.M., Huang, P., Silva, M.J., Bordoli, C., Enayat, E.Z., Molaodi, O.R., Cassidy, A.,

Maynard, M. and Harding, S. (2019) ‘Associations of Dietary Intake with Cardiometabolic Risk in a multi-ethnic cohort: a Longitudinal Analysis of the Determinants of Adolescence, Now Young Adults, Social well-being and Health (DASH) Study’, *British Journal of Nutrition*, 121(09), pp. 1069–1079. Available at: https://doi.org/10.1017/s0007114519000291 (Accessed: 16 February 2025).

Grotto, I., Huerta, M., Grossman, E. and Sharabi, Y. (2007) ‘Relative Impact of Socioeconomic Status on Blood Lessons from a Large-Scale Survey of Young Adults’, *American Journal of Hypertension* [Preprint]. Available at: https://doi.org/10.1016/j.amjhyper.2007.06.004 (Accessed: 19 November 2024).

Hamzah, I.F. and Subandi, S. (2020) ‘THE ILLNESS EXPERIENCE IN HYPERTENSION PATIENTS WITH LOW SOCIOECONOMIC STATUS’, *Jurnal Psikologi*, 19(4), pp. 357–372. Available at: https://doi.org/10.14710/jp.19.4.357-372(Accessed: 15 December 2024).

Harding, S., Maynard, M.J., Cruickshank, K. and Teyhan, A. (2007) ‘Overweight, Obesity and High Blood Pressure in an Ethnically Diverse Sample of Adolescents in Britain: The Medical Research Council DASH Study’, *International Journal of Obesity*, 32(1), pp. 82–90. Available at: https://doi.org/10.1038/sj.ijo.0803662 (Accessed: 19 February 2025).

Harding, S., Whitrow, M., Lenguerrand, E., Maynard, M., Teyhan, A., Cruickshank, J.K. and Der, G. (2010) ‘Emergence of Ethnic Differences in Blood Pressure in Adolescence’, *Hypertension*, 55(4), pp. 1063–1069. Available at: https://doi.org/10.1161/hypertensionaha.109.142935 (Accessed: 7 February 2025).

Haughton, C.F., Silfee, V.J., Wang, M.L., Lopez-Cepero, A.C., Estabrook, D.P., Frisard, C., Rosal, M.C., Pagoto, S.L. and Lemon, S.C. (2018) ‘Racial/ethnic Representation in Lifestyle Weight Loss Intervention Studies in the United States: A Systematic Review’, *Preventive Medicine Reports*, 9, pp. 131–137. Available at: https://doi.org/10.1016/j.pmedr.2018.01.012 (Accessed: 15 February 2025).

Heraclides, A., Mishra, G.D., Hardy, R.J., Geleijnse, J.M., Black, S., Prynne, C.J., Kuh, D. and Soedamah-Muthu, S.S. (2011) ‘Dairy intake, Blood Pressure and Incident Hypertension in a General British population: The 1946 Birth Cohort’, *European Journal of Nutrition*, 51(5), pp. 583–591. Available at: https://doi.org/10.1007/s00394-011-0242-z (Accessed: 11 February 2025).

Higgins, J. and Thomas, J. (2024) *Cochrane Handbook for Systematic Reviews of Interventions*, *Cochrane Training*. Cochrane Training. Available at: https://training.cochrane.org/handbook/current (Accessed: 13 February 2025).

Hill, A. and Spittlehouse, C. (2001) 'What Is Critical appraisal? Sponsored by an Educational Grant from AVENTIS Pharma', *What Is Critical Appraisal?* 3(2). Available at: https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=db3debfb87f382df016a711a0546f769953b2401 (Accessed: 10 March 2025).

Hollier, C. (2020) *Research Basics: Using Boolean Operators to Build a Search*, *www.ifis.org*. Available at: https://www.ifis.org/en/research-skills-blog/research-basics-boolean-operators (Accessed: 29 January 2025).

Inoue, K., Horwich, T., Bhatnagar, R., Bhatt, K., Goldwater, D., Seeman, T. and Watson, K.E. (2021) 'Urinary Stress Hormones, Hypertension, and Cardiovascular Events: The Multi-Ethnic Study of Atherosclerosis', *Hypertension*, 78(5). Available at: https://doi.org/10.1161/hypertensionaha.121.17618 (Accessed: 30 January 2025).

Institute of Race Relations (2020) *Inequality, housing and employment statistics*, *Institute of Race Relations*. Available at: https://irr.org.uk/research/statistics/poverty/ (Accessed: 21 November 2024).

Joanna Briggs Institute (2019) *Critical Appraisal Tools | Joanna Briggs Institute*, *Joannabriggs.org*. Available at: https://joannabriggs.org/research/critical-appraisal-tools.html (Accessed: 1 March 2025).

Köchli, S., Schutte, A.E. and Kruger, R. (2020) 'Adiposity and Physical Activity Are Related to Heart Rate variability: the African-PREDICT Study', *European Journal of Clinical Investigation*, 50(12), p. e13330. Available at: https://doi.org/10.1111/eci.13330 (Accessed: 3 March 2025).

Koshoedo, S.A., Paul-Ebhohimhen, V.A., Jepson, R.G. and Watson, M.C. (2015) 'Understanding the Complex Interplay of Barriers to Physical Activity Amongst Black and Minority Ethnic Groups in the United Kingdom: A Qualitative Synthesis Using meta-ethnography', *BMC Public Health*, 15(1). Available at: https://doi.org/10.1186/s12889-015-1893-0 (Accessed: 3 March 2025).

Lackland, D.T. (2014) ‘Racial Differences in Hypertension: Implications for High Blood Pressure Management’, *The American Journal of the Medical Sciences*, 348(2), pp. 135–138. Available at: https://doi.org/10.1097/maj.0000000000000308 (Accessed: 18 March 2025).

Lambert, G.W., Head, G.A., Chen, W.S., Hamer, M., Malan, N.T., Quinn, S., Schlaich, M.P. and Malan, L. (2019) ‘Ambulatory Blood Pressure Monitoring and Morning Surge in Blood Pressure in Adult Black and White South Africans’, *The Journal of Clinical Hypertension*, 22(1)https://doi.org/10.1111/jch.13740 (Accessed: 10 February 2025).

Lancaster, K.J., Watts, S.O. and Dixon, L.B. (2006) ‘Dietary Intake and Risk of Coronary Heart Disease Differ among Ethnic Subgroups of Black Americans’, *The Journal of Nutrition*, 136(2), pp. 446–451. Available at: https://doi.org/10.1093/jn/136.2.446 (Accessed: 3 March 2025).

Leung, L. (2015) ‘Validity, reliability, and Generalizability in Qualitative Research’, *Journal of Family Medicine and Primary Care*, 4(3), pp. 324–327. Available at: https://doi.org/10.4103/2249-4863.161306 (Accessed: 11 February 2025).

Lip, G.Y.H., Barnett, A.H., Bradbury, A., Cappuccio, F.P., Gill, P.S., Hughes, E., Imray, C., Jolly, K. and Patel, K. (2007) ‘Ethnicity and Cardiovascular Disease Prevention in the United Kingdom: A Practical Approach to Management’, *Journal of Human Hypertension*, 21(3), pp. 183–211. Available at: https://doi.org/10.1038/sj.jhh.1002126.(Accessed: 15 March 2025).

Maraboto, C. and Ferdinand, K.C. (2020) ‘Update on Hypertension in African-Americans’, *Progress in Cardiovascular Diseases*, 63(1), pp. 33–39. Available at: https://doi.org/10.1016/j.pcad.2019.12.002 (Accessed: 23 February 2025).

Mathur, R., Hull, S.A., Badrick, E. and Robson, J. (2011) ‘Cardiovascular multimorbidity: the Effect of Ethnicity on Prevalence and Risk Factor Management’, *British Journal of General Practice*, 61(586), pp. e262–e270. Available at: https://bjgp.org/content/61/586/e262 (Accessed: 3 February 2025).

McKeever, L., Nguyen, V., Peterson, S.J., Gomez-Perez, S. and Braunschweig, C. (2015) ‘Demystifying the Search Button’, *Journal of Parenteral and Enteral Nutrition*, 39(6), pp. 622–635. Available at: https://doi.org/10.1177/0148607115593791 (Accessed: 3 February 2025).

Millett, C., Laverty, A.A., Stylianou, N., Bibbins-Domingo, K. and Pape, U.J. (2012) 'Impacts of a National Strategy to Reduce Population Salt Intake in England: Serial Cross-Sectional Study', *PLoS ONE*. Edited by M. Bochud, 7(1), p. e29836. Available at: https://doi.org/10.1371/journal.pone.0029836 (Accessed: 13 February 2025).

Mills, K.T., Stefanescu, A. and He, J. (2020) 'The Global Epidemiology of Hypertension', *Nature Reviews Nephrology*, 16(4), pp. 223–237. Available at: https://doi.org/10.1038/s41581-019-0244-2 (Accessed: 7 February 2025).

Moher, D., Liberati, A., Tetzlaff, J. and Altman, D.G. (2009) 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA Statement', *PLoS Medicine*, 6(7). Available at: https://doi.org/10.1371/journal.pmed.1000097 (Accessed: 8 February 2025)

NHS (2022) *Blood Pressure*, *NDRS*. Available at: https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-england-additional-analyses/ethnicity-and-health-2011-2019-experimental-statistics/blood-pressure (Accessed: 24 November 2024).

NICE (2023) *Hypertension*, *NICE*. Available at: https://cks.nice.org.uk/topics/hypertension/ (Accessed: 17 December 2024).

Nicholson, E., Murphy, T., Larkin, P., Normand, C. and Guerin, S. (2016) 'Protocol for a Thematic Synthesis to Identify Key Themes and Messages from a Palliative Care Research Network', *BMC Research Notes*, 9(1). Available at: https://doi.org/10.1186/s13104-016-2282-1..(Accessed: 15 March 2025).

Office for Health Improvement and Differences (2022) *Physical activity: Applying All Our Health*, *GOV.UK*. Available at: https://www.gov.uk/government/publications/physical-activity-applying-all-our-health/physical-activity-applying-all-our-health (Accessed: 21 February 2025).

Office for National Statistics (ONS) (2021) *Mortality from Leading Causes of Death by Ethnic group, England and Wales - Office for National Statistics*, *www.ons.gov.uk*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/mortalityfromleadingcausesofdeathbyethnicgroupenglandandwales/2012to2019#ethnic-group-breakdown-used-in-this-article (Accessed: 22 January 2025).

Ogunniyi, M.O., Commodore-Mensah, Y. and Ferdinand, K.C. (2021) 'Race, Ethnicity, Hypertension, and Heart Disease: JACC Focus Seminar 1/9', *Journal of the American College of Cardiology*, 78(24), pp. 2460–2470. Available at: https://doi.org/10.1016/j.jacc.2021.06.017. (Accessed: 15 March 2025).

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S. and McGuinness, L.A. (2021) 'The PRISMA 2020 statement: an Updated Guideline for Reporting Systematic Reviews', *British Medical Journal*, 372(71). Available at: https://doi.org/10.1136/bmj.n71 (Accessed: 3 February 2025).

Pampel, F.C., Krueger, P.M. and Denney, J.T. (2010) 'Socioeconomic Differences in Health Behaviors', *Annual Review of Sociology*, 36(1), pp. 349–370. Available at: https://doi.org/10.1146/annurev.soc.012809.102529 (Accessed: 9 February 2025).

Park, C.M., March, K., Ghosh, A.K., Jones, S., Coady, E., Tuson, C., Francis, D., Mayet, J., Tillin, T., Chaturvedi, N. and Hughes, A.D. (2013) 'Left-Ventricular Structure in the Southall and Brent REvisited (SABRE) Study', *Hypertension*, 61(5), pp. 1014–1020. Available at: https://doi.org/10.1161/hypertensionaha.111.00610. (Accessed: 15 February 2025)

Park, C.M., Tillin, T., March, K., Jones, S., Whincup, P.H., Mayet, J., Chaturvedi, N. and Hughes, A.D. (2016) 'Adverse Effect of Diabetes and Hyperglycaemia on Arterial Stiffness in Europeans, South Asians, and African Caribbeans in the SABRE Study', *Journal of Hypertension*, 34(2), pp. 282–289. Available at: https://doi.org/10.1097/hjh.0000000000000789 (Accessed: 9 February 2025).

Patel, L., Alicandro, G. and La Vecchia, C. (2020) 'Dietary Approach to Stop Hypertension (DASH) Diet and Associated Socioeconomic Inequalities in the United Kingdom', *British Journal of Nutrition*, 124(10), pp. 1–24. Available at: https://doi.org/10.1017/s0007114520001087 (Accessed: 5 January 2025).

Pati, D. and Lorusso, L.N. (2018) *Scopus Preview - Scopus - Welcome to Scopus*, *Scopus.com*. Available at: https://www.scopus.com/record/display.uri?eid=2-s2.0-85043575301&origin=inward&txGid=6b4626bccade5812a5ec41ec44abaaed (Accessed: 5 March 2025).

Pickering, T. (1999) ‘Cardiovascular Pathways: Socioeconomic Status and Stress Effects on Hypertension and Cardiovascular Function’, *Annals of the New York Academy of Sciences*, 896(1), pp. 262–277. Available at: https://doi.org/10.1111/j.1749-6632.1999.tb08121.x.(Accessed: 15 January 2025).

Public Health England (2014) *Tackling High Blood Pressure from Evidence into Action Developed Together by the 12 Member Organisations of the Blood Pressure System Leadership Board*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/527916/Tackling_high_blood_pressure.pdf (Accessed: 12 February 2025).

Public Health England (PHE) (2017) *Health matters: Combating High Blood Pressure*, *GOV.UK*. Available at: https://www.gov.uk/government/publications/health-matters-combating-high-blood-pressure/health-matters-combating-high-blood-pressure (Accessed: 8 December 2024).

Race Disparity Unit (2022) *Why We No Longer Use the Term ‘BAME’ in Government*, *equalities.blog.gov.uk*. Available at: https://equalities.blog.gov.uk/2022/04/07/why-we-no-longer-use-the-term-bame-in-government/ (Accessed: 8 February 2025).

Rison, S., Redfern, O., Dostal, I., Carvalho, C., Mathur, R., Raisi-Estabragh, Z. and Robson, J. (2023) ‘Inequities in Hypertension management: Observational cross-sectional Study in Northeast London Using Electronic Health Records’, *British Journal of General Practice*, 73(736), pp. e798–e806. Available at: https://doi.org/10.3399/BJGP.2023.0077 (Accessed: 15 January 2025).

Satia, J.A. (2009) ‘Diet-Related Differences: Understanding the Problem and Accelerating Solutions’, *Journal of the American Dietetic Association*, 109(4), pp. 610–615. Available at: https://doi.org/10.1016/j.jada.2008.12.019 (Accessed: 8 February 2025).

Schofield, P., Saka, O. and Ashworth, M. (2011) ‘Ethnic Differences in Blood Pressure Monitoring and Control in Southeast London’, *British Journal of General Practice*, 61(585), pp. e190–e196. Available at: https://doi.org/10.3399/bjgp11x567126 (Accessed: 16 February 2025).

Schutte, A.E., Gona, P.N., Delles, C., Uys, A.S., Burger, A., Mels, C.M., Kruger, R., Smith, W., Fourie, C.M., Botha, S., Lammertyn, L., van Rooyen, J.M., Gafane-Matemane, L.F., Mokwatsi, G.G., Breet, Y., Kruger, H.S., Zyl, T. van, Pieters, M., Zandberg, L. and Louw, R. (2019) 'The African Prospective Study on the Early Detection and Identification of Cardiovascular Disease and Hypertension (African-PREDICT): Design, Recruitment and Initial Examination', *European Journal of Preventive Cardiology*, 26(5), pp. 458–470. Available at: https://doi.org/10.1177/2047487318822354 (Accessed: 7 February 2025).

Shantsila, A., Eduard Shantsila, Gill, P.S. and Gregory (2018) 'Predictors of Diastolic Dysfunction in Ethnic groups: Observations from the Hypertensive Cohort of the Ethnic-Echocardiographic Heart of England Screening Study (E-ECHOES)', *Journal of Human Hypertension*, 32(7), pp. 477–486. Available at: https (Accessed: 15 March 2025).

Spence, J.D. and Rayner, B.L. (2018) 'Hypertension in Blacks', *Hypertension*, 72(2), pp. 263–269. Available at: https://doi.org/10.1161/hypertensionaha.118.11064 (Accessed: 15 January 2025).

Stringhini, S., Carmeli, C., Jokela, M., Avendaño, M., Muennig, P., Guida, F., Ricceri, F., d'Errico, A., Barros, H., Bochud, M., Chadeau-Hyam, M., Clavel-Chapelon, F., Costa, G., Delpierre, C., Fraga, S., Goldberg, M., Giles, G.G., Krogh, V., Kelly-Irving, M. and Layte, R. (2017) 'Socioeconomic Status and the 25 × 25 Risk Factors as Determinants of Premature mortality: a Multicohort Study and meta-analysis of 1·7 Million Men and Women', *The Lancet*, 389(10075), pp. 1229–1237. Available at: https://doi.org/10.1016/s0140-6736(16)32380-7 (Accessed: 15 January 2025).

Su, D., Yang, H., Chen, Z., Kong, Y., Xiaona Na, Lin, Q., Zhao, A., Zheng, Y., Ma, Y., Li, X. and Li, Z. (2024) 'Ethnicity-specific Blood Pressure Thresholds Based on Cardiovascular and Renal complications: a Prospective Study in the UK Biobank', *BMC Medicine*, 22(1). Available at: https://doi.org/10.1186/s12916-024-03259-5 (Accessed: 8 January 2025).

Tasnim, S., Tang, C., Musini, V.M. and Wright, J.M. (2020) 'Effect of Alcohol on Blood Pressure', *Cochrane Database of Systematic Reviews*, 7(7). Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8130994/ (Accessed: 13 February 2025).

Taylor, K.S., Mahtani, K.R. and Aronson, J.K. (2021) 'Summarising Good Practice Guidelines for Data Extraction for Systematic Reviews and meta-analysis', *BMJ Evidence-Based Medicine*, 26(3), pp. 88–90. Available at: https://doi.org/10.1136/bmjebm-2020-111651 (Accessed: 4 February 2025).

Thomas, J. and Harden, A. (2008) ‘Methods for the Thematic Synthesis of Qualitative Research in Systematic Reviews’, *BMC Medical Research Methodology*, 8(1), pp. 1–10. Available at: https://doi.org/10.1186/1471-2288-8-45. (Accessed: 15 January 2025).

Tripathy, J.P. (2013) ‘Secondary Data analysis: Ethical Issues and Challenges’, *Iranian Journal of Public Health*, 42(12), pp. 1478–1479. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4441947/ (Accessed: 8 February 2025).

Tu, W., Eckert, G.J., Hannon, T.S., Liu, H., Pratt, L.M., Wagner, M.A., DiMeglio, L.A., Jung, J. and Pratt, J.H. (2014) ‘Racial Differences in Sensitivity of Blood Pressure to Aldosterone’, *Hypertension*, 63(6), pp. 1212–1218. Available at: https://doi.org/10.1161/hypertensionaha.113.02989 (Accessed: 11 January 2025).

Turban, S., Thompson, C.B., Parekh, R.S. and Appel, L.J. (2013) ‘Effects of Sodium Intake and Diet on Racial Differences in Urinary Potassium Excretion: Results from the Dietary Approaches to Stop Hypertension (DASH)-Sodium Trial’, *American Journal of Kidney Diseases*, 61(1), pp. 88–95. Available at: https://doi.org/10.1053/j.ajkd.2012.08.036 (Accessed: 22 January 2025).

Usman, J.E., Morley, A., Childs, C., Rogerson, D. and Markos Klonizakis (2024) ‘Exploring Dietary Salt Knowledge, Attitude, and Practices among People of African Descent in the United Kingdom: A Qualitative Study’, *Healthcare*, 12(19), pp. 1969–1969. Available at: https://doi.org/10.3390/healthcare12191969 (Accessed:12 February 2025).

World Health Organisation (2023). *Hypertension*, *World Health Organisation.* Available at: https://www.who.int/news-room/fact-sheets/detail/hypertension (Accessed: 12 December 2024).

Zilbermint, M., Hannah-Shmouni, F. and Stratakis, C. (2019) ‘Genetics of Hypertension in African Americans and Others of African Descent’, *International Journal of Molecular Sciences*, 20(5), p. 1081. Available at: https://doi.org/10.3390/ijms20051081 (Accessed: 6 February 2025).

Appendix

Appendix 1: Data extraction and themes Table

Key words	Sub-themes/Authors	Themes
• Age at which blood pressure (BP) and hypertension patterns diverge between African-Caribbean and white populations in the UK. Higher BMI in Afro-Caribbean women contributes to high blood pressure after 30 years. Screening Implications.	Afro-Caribbeans and whites, Higher blood pressure, Age and BMI Screening Implications Sex. (Agyemang, Humphry, and Bhopal, 2012).	Ethnicity Cardiovascular risk Body size Age Sex
• Analysing the relationships among body size, blood pressure, ethnicity, physical activity, and social experiences, including perceptions of racism, about PWV. Increased arterial stiffness measured using pulse wave velocity (PWV). Childhood Influence and Ethnicity Differences Psychological factors Larger waist size	Ethnicity Age Weight Increased arterial stiffness. Physical effect Psychosocial factor Cardiovascular risk Waist size (Cruickshank *et al.*, 2016)	Ethnicity Age BMI Psychosocial factor Cardiovascular risk Health status Anthropometric
• Dietary habits and health status of Afro-Caribbeans Obesity prevalence Health Status Nutritional Assessment High salt consumption Traditional food	Ethnicity Dietary habits Health status Obesity prevalence (Earland, Campbell and Srivastava, 2010)	Ethnicity lifestyle Health status

• Ethnicity differences in blood pressure • Boys of Black African descent have lower systolic blood pressure than their white counterparts during adolescence; however, this level rises by late adolescence. • Diastolic blood pressure is affected by body size, BMI, height, and leg length. Influence of socioeconomic conditions, particularly on girls from ethnic minorities. Cardiovascular risk Social disadvantage Anthropometric	Ethnicity differences in blood pressure Differences in age of onset Body size Psychosocial factors Cardiovascular disease risk Sex (Harding *et al.*, 2010)	Ethnicity Body size Age Psychosocial factors Cardiovascular risk sex
• Impact of high blood sugar and diabetes on arterial stiffness • Ethnic differences in arterial stiffness • Afro-Caribbeans show more favourable arterial stiffness than Europeans and South Asians. • Varying rates of cardiovascular diseases among these populations • Effects of diabetes and hyperglycaemia • Afro-Caribbeans have higher blood pressure and systemic vascular resistance.	Ethnic cardiovascular risk Arterial stiffness difference Diabetes Impact Blood pressure variations Haemodynamic (Park et al., 2016)	Ethnicity Cardiometabolic factors Cardiovascular risk Health status
• Differences in hypertension management • Based on ethnicity, age, sex, and socioeconomic status • Younger people and individuals of Black ethnicity are less likely to have controlled blood pressure compared to whites and older people. • Need for targeted interventions	Ethnicity differences in hypertension management Health inequalities Age Sex Blood pressure control Socioeconomic status (Rison *et al.*, 2023)	Ethnicity Age Socioeconomic factors Health status Sex Blood pressure control

• Ethnic differences in blood pressure management • Patient with chronic diseases • Prevalence among ethnic minorities • Black patients are less likely to have their blood pressure controlled compared to white patients. • Health inequalities related to social deprivation and blood pressure control. • Needs for the target investigation for the underlying reasons	Ethnic differences in blood pressure management and control Health inequalities Social deprivation Cardiovascular disease risk Quality outcome framework (QOF) (Schofield, Saka and Ashworth, 2011)	Ethnicity Blood pressure management and control Health status Cardiovascular risk Socioeconomic factors
• Impact of ethnicity on diastolic dysfunction in hypertensive individuals of South Asian and Afro-Caribbean descent • South Asians show worse diastolic function and a higher risk of mortality. • Afro-Caribbeans show significant heart muscle thickening. • Differences in heart stiffness between the groups • Diastolic dysfunction is a significant predictor of mortality rather than ethnicity itself after accounting for heart changes.	Ethnic differences Diastolic dysfunction in hypertensive individuals Heart muscle stiffness and thickening, Cardiovascular mortality (Shantsila *et al.*, 2018)	Ethnicity Health status Cardiovascular outcomes
• Comparison of complication risks at different systolic blood pressure (SBP) levels among white, South Asian, Black Caribbean, and Black African populations. • Ethnicity significantly influences risk. • Ethnicity-specific blood pressure may be effective in predicting and managing the health condition.	Ethnicity-specific threshold Hypertension management Cardiovascular renal complications Hypertension management Risk estimations (Su *et al.*, 2024)	Ethnicity Cardiovascular outcome Hypertension management and control

• the knowledge, attitudes, and practices (KAP) regarding dietary salt among People of African Descent (PoAD). • Why does this group have a higher risk of hypertension and cardiovascular diseases? • White participants understand food labels for salt content. • PoAD rarely check food labels for salt content. • Strong cultural influence of salt in traditional culinary • Culturally sensitive health intervention	African descent Dietary salt knowledge Food labels awareness Cultural influences of salt Cardiovascular and hypertension risk (Usman *et al.*, 2024)	Ethnicity Dietary habits Health status Cardiovascular risk Hypertension management and control

Appendix 2a: CASP checklist

CASP Checklists	Agyemang et al. (2012)	Cruickshank et al. (2016)	Earland et al. (2010)	Goff et al. (2019)	Harding et al. (2010).
1) Focused issue	yes	yes	yes	yes	yes
2) appropriate method	yes	yes	yes	yes	yes
3) Acceptable recruiting method	yes	yes	yes	yes	yes
4) Accurate measures were used to reduce bias.	yes	yes	yes	yes	Unknown
5) Appropriate data collection to address the issue researched	yes	yes	yes	Yes	yes
6) Enough participants to reduce the play of chance	yes	yes	No	yes	yes
7) Results and main presentation	yes	yes	yes	yes	yes
8) Rigorous and sufficient data analysis	yes	yes	yes	yes	yes
9) Clear statement of findings	yes	yes	No	yes	yes
10) Result Applicable to the local population	yes	yes	yes	yes	yes
11) Value of research	yes	yes	yes	yes	Yes

CASP Checklist	Park et al. (2016)	Rison et al. (2023)	Schofield et al. (2011).	Shantsila et al. (2018)	Su et al. (2024)	Usman et al. (2024)
1) Focused issue	yes	yes	Yes	yes	yes	yes
2) appropriate method	yes	yes	Yes	yes	yes	yes
3) Acceptable recruiting method	yes	yes	Yes	yes	yes	yes
4) An accurate measure to reduce bias.	yes		Yes	yes	yes	Yes
5) Appropriate data collection to address the issue researched	yes	yes	Yes	yes	yes	yes
6) Enough participants to reduce the play of chance	yes	yes	Yes	yes	yes	NO
7) Results and main presentation	yes	yes	Yes	yes	yes	yes
8) Rigorous and sufficient data analysis	yes	yes	Yes	yes	yes	yes
9) Clear statement of findings	yes	yes	Yes	yes	yes	yes
10) Result Applicable to the Local Population	yes	yes	yes	yes	yes	yes
11) Value of research	yes	yes		yes	yes	yes

Appraisal Summary		
Positive/Methodologically sound	Negative/relatively poor methodology	Unknown
Yes		