VER
Vascular & Endovascular Review

Hypertension issues in the United Kingdom and Saudi Arabia: a comparative study of diagnosis, treatment, and prevention strategies

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ABSTRACT

Hypertension is a leading global health concern, contributing significantly to cardiovascular morbidity and mortality. This article presents a comparative analysis of how Saudi Arabia and the United Kingdom diagnose, treat, and aim to prevent hypertension. Drawing on epidemiological data, national guidelines, healthcare infrastructure, and cultural contexts, the article explores the strengths and limitations of each country's approach. Findings indicate that while Saudi Arabia faces high prevalence rates and challenges in awareness and control of hypertension, while the UK benefits from structured screening and integrated care pathways. Both nations have implemented innovative strategies, including digital health tools and public health campaigns. The analysis concludes with recommendations for cross-national learning and policy enhancement.

KEYWORDS: United Kingdom NHS, Saudi Arabia Vision 2030, hypertension, diagnosis, treatment, prevention..

How to Cite: Zubair Ahmed, Ali Ismael Garbo, Ibrahim Mohammed Alzarar, Youssef Mohammed Alzaarar, Ali Saleh Abaalharith, Hamad Alrabie, Mohammed Salem Alsuliman, Zahra Yehia Eissa Mobarky, Hussain Abdullah Al Bishr, Hussain Mansour Alabbas, Mohsen Almakrami, (2025) Hypertension issues in the United Kingdom and Saudi Arabia: a comparative study of diagnosis, treatment, and prevention strategies, Vascular and Endovascular Review, Vol.8, No.2, 313-318.

INTRODUCTION

Hypertension, or high blood pressure, is a chronic condition that significantly increases the risk of heart disease, stroke, and kidney failure. Moreover, hypertension is the most important modifiable risk factor for cardiovascular diseases (CVDs) (Oparil et al., 2003), and evidence indicates that lowering blood pressure can significantly improve cardiovascular (CV) events and reduce the risk of mortality (Ettehad et al., 2016). Given the increasingly ageing population around the globe, the impact of hypertension among the elderly has become a major issue for healthcare systems and socioeconomics in many countries. Globally, hypertension affects over 1.28 billion adults, with two-thirds living in low- and middle-income countries (WHO, 2021). Despite being preventable and manageable, hypertension remains underdiagnosed and poorly controlled in many regions.

Saudi Arabia and the United Kingdom represent two contrasting healthcare systems with distinct cultural, economic, and infrastructural contexts. Saudi Arabia, a rapidly developing nation, faces rising rates of hypertension due to lifestyle changes and urbanization. Therefore, an understanding of this constantly-evolving situation is essential for the design of effective intervention strategies. In addition, according to Yeates at el. (2015), both the identified genetic and cultural factors of the Saudi population may impact both the preconditions and progression of CVDs, thus further region-specific studies are required. Hypertension treatment also represents a significant economic burden to the Saudi Ministry of Health regarding direct and indirect costs for hospitalization and treatment, as well as wider financial implications in terms of the loss of productivity in industrial sectors. Under the health strategy of Vision 2030, the government pledges to improve and broaden health care, enhance outcomes for patients with CVDs, and reduce the negative impacts on society in health, wellbeing and financial terms (Alsaidan, 2025).

The United Kingdom, with its publicly funded National Health Service (NHS), has implemented structured programmes to manage and prevent hypertension. Approximately 14% of the UK population receive treatment for hypertension, which is mainly delivered through primary care in general practitioners' surgeries, alongside nursing and pharmacy interventions (Sheppard et al., 2016). Utilizing the integrated nature of the National Health Service (NHS), specialist input into HTN management concentrates on the identification and treatment of secondary HTN and the ongoing management of difficult cases such as those with resistant HTN or complex comorbid disease (Harrison et al., 2011). National UK policy is guided by evidence-based national guidelines for HTN developed by the National Institute for Health and Care Excellence (NICE). Since 2011, these guidelines have placed much greater emphasis on the utilization of out-of-office measurement of blood pressure (BP) using ambulatory (ABPM) and

home or self-monitored blood pressure (SMBP).
This article compares the diagnosis, treatment, and prevention strategies in both countries, highlighting strengths, challenges, and opportunities for mutual learning.

EPIDEMIOLOGY OF HYPERTENSION

This section explores the issues surrounding the epidemiology of hypertension in both the Kingdom of Saudi Arabia and the United Kingdom, referencing recent data and trends.

2.1 Saudi Arabia

Hypertension is a major public health issue in Saudi Arabia. The Saudi Hypertension Management Society (SHMS) adopts a reading of SBP of ≥140 mmHg, and a diastolic blood pressure (DBP) of ≥90 mmHg to diagnose hypertension using either a digital automated sphygmomanometer or the traditional mercury version. Prehypertension is characterized by an SBP between 120 and 140 mmHg and a DBP between 80 and 90 mmHg. A systematic review of hypertension management in Saudi Arabia conducted by Alshammari et al. (2023) found a pooled prevalence of 22.66%, with awareness, treatment, and control rates at 42.8%, 59.4%, and 34.97%, respectively. Moreover, this review found that hypertension among Saudi 14-year-olds and above was 22.7% (95% CI: 18.95–26.60), which is significant. These values were lower than those recorded in the United Arab Emirates (UAE) (24%), Oman (41.5%), and other Arab nations such as Jordan (33.8%) (Alshammari et al., 2023).

The prevalence of hypertension varies by region, age, and gender in Saudi Arabia, while rising levels of urbanization, dietary changes, and sedentary lifestyles have all contributed to the rise in hypertension in recent years. According to the findings of the study by Amir et al. (2023), the main risk factors include obesity, smoking, low physical activity, and high salt intake. Hypertension rates are particularly high among older adults and those with lower socioeconomic status (Ashammari et al., 2023).

2.2 United Kingdom

In the UK, around 30% of adults suffer from high blood pressure, with rates rising as people age (Public Health England, 2020). The NHS Long Term Plan, launched in 2019, outlines both the services the NHS aims to provide and the methods for delivering them. A key focus is on shifting care towards prevention—enhancing community-based support for those with long-term conditions, streamlining urgent care to ease pressure on A&E departments, and cutting outpatient appointments by a third. The plan also pledges improvements in key areas such as mental health, maternity care, and cancer services. Importantly, it highlights the NHS's responsibility in addressing health disparities.
With life expectancy gaps in England widening and deemed unfair, the plan prioritises cardiovascular disease prevention, placing strong emphasis on effective hypertension management (NHS England, 2019). Ethnic minorities and socioeconomically disadvantaged groups have higher prevalence and poorer outcomes. A study by Emdin et al. (2017) found that South Asian and Black populations had higher rates of hypertension-related complications. The UK's robust data infrastructure enables targeted interventions to address these disparities.

DIAGNOSIS OF HYPERTENSION

This section explores the issues surrounding the diagnosis of hypertension in both the Kingdom of Saudi Arabia and the United Kingdom, referencing recent data and trends.

3.1 Saudi Arabia

Saudi Arabia's diagnostic approach is guided by the Saudi Health Promotion and Prevention Guidelines for Hypertension (Saudi Public Health Authority, 2024). Blood pressure is measured using clinic-based, home, and ambulatory monitoring in a wide range of urban and rural healthcare settings. The Ministry of Health guidelines place the emphasis on early detection, particularly among high-risk groups such as the elderly.

According to the Saudi Ministry of Health (MOH), 75% of the Saudi population do not attend or engage with routine medical check-ups, 60% are either overweight or obese, 60% do not engage in sufficient physical activities and 18% of Saudis are smokers (cited in Gosadi, 2019). Forecasts indicate that if the current prevalence of health risk determinants continues, the number of Saudis with chronic diseases will likely increase from 5 to 10 million by 2030 (Gosadi, 2019)

In response to this background data, in 2016, the government of Saudi Arabia launched its National Transformation Programme to ensure that the Kingdom's Vision 2030 was enshrined in strategic planning. One of the strategic objectives is Health Promotion against Health Risks (Hassounah & Alhefzi, 2020). The new Institutional Transformation and Health Care Model, overseen by the Ministry of Health, involves actions focusing on disease prevention and enhancing the primary health care system

However, screening for diseases, including hypertension, remains inconsistent across the country. While national surveys report high screening rates, many individuals remain unaware of their condition. Barriers include limited access to primary care, lack of standardized protocols, and low health literacy, while ambulatory monitoring is not widely available (Amir et al., 2023). However, efforts have been made to improve diagnostic accuracy include training healthcare providers and expanding community-based screening programmes.

3.2 United Kingdom

The UK employs a structured approach to hypertension diagnosis. NICE guidelines recommend blood pressure measurement in

primary care, followed by ambulatory or home monitoring to confirm diagnosis (NICE, 2022). Electronic health records facilitate systematic screening and follow-up.

The NHS Health Check programme targets adults aged 40–74 for cardiovascular risk assessment, including blood pressure measurement in a variety of clinical and community settings. This proactive approach has improved early detection and risk stratification (Marshall et al., 2018).

Digital tools and patient portals reporting blood pressure results to general practitioners online allow individuals to monitor their blood pressure at home, thereby enhancing engagement and accuracy. In addition, the integration of data across care settings supports continuity and quality improvement.

TREATMENT APPROACHES

This section explores the issues surrounding various types of interventions relating to patients with hypertension in both the Kingdom of Saudi Arabia and the United Kingdom, referencing recent trends in this field.

4.1 Pharmacological Interventions

Saudi Arabia's treatment guidelines recommend lifestyle modification and pharmacotherapy based on blood pressure levels and comorbidities. Common medications include ACE inhibitors, ARBs, calcium channel blockers, and diuretics (Al-Ghamdi et al., 2021). Medications are provided free in public hospitals, but access varies across regions.

Adherence remains a challenge. A study by Alhawassi et al. (2017) found that only 22.5% of patients adhered to prescribed antihypertensives. Factors include side effects, lack of understanding, and cultural beliefs. Efforts to improve adherence include patient education and pharmacist-led interventions.

In the UK, treatment follows NICE guidelines, with a stepwise approach based on age, ethnicity, and comorbidities. First-line agents include ACE inhibitors or ARBs for younger patients and calcium channel blockers for older adults (NICE, 2022). Combination therapy is common for resistant hypertension.

Medication adherence is supported by regular reviews, patient education, and digital reminders. The NHS provides medications at subsidized rates, thus reducing financial barriers.

4.2 Lifestyle Modification

Saudi Arabia promotes lifestyle changes through public campaigns and clinical counselling. Recommendations for reducing the risks of developing hypertension include reducing salt intake, increasing physical activity, and weight monitoring and management. However, cultural norms and environmental factors limit effectiveness. For instance, gender-specific barriers exist, particularly for women, who may face restrictions on outdoor exercise. Dietary habits, such as high consumption of processed foods and sugary beverages, have also been shown to contribute to poor outcomes (Alzahrani et al., 2022).

The UK emphasizes lifestyle modification through structured programmes. The NHS offers smoking cessation services, weight management clinics, and dietary counselling. Community initiatives, such as walking groups and cooking classes are also frequently used to support long-term behaviour change, particularly among at-risk groups.

Public health campaigns such as "Change4Life" provide accessible resources and promote healthy living. 'Change4Life', the social marketing component of the UK government's strategy to halt the rise in obesity, was launched in 2009, with the emphasis on making healthy behavioural changes. A study of this programme conducted by Wrieden and Levy (2016) found that, in the short term, the 'Change4Life Smart Swaps' campaign positively affected food and drink choice in a small sample of interested individuals. Thus, the potential remains to make further use of mobile phone apps to record and verify food and exercises choices more easily. This can be integrated with primary care to ensure personalized support and follow-up in efforts to monitor and control hypertension.

PREVENTION STRATEGIES

This section explores the issues surrounding various types of prevention strategies relating to patients with hypertension in both the Kingdom of Saudi Arabia and the United Kingdom, referencing recent trends in this field.

5.1 Saudi Arabia

Prevention is a key component of Saudi Arabia's Vision 2030 health strategy. The Public Health Authority has developed guidelines for hypertension prevention, targeting both high-risk individuals and the general population (Saudi Public Health Authority, 2024). Initiatives under this strategy include school-based education, workplace wellness programmes, and mass media campaigns. However, implementation is uneven, with limited reach in rural areas. Consequently, further cultural tailoring and increased community engagement are required to enhance effectiveness.

The main programme adopted in Saudi Arabia was the Dietary Approaches to Stop Hypertension (DASH) strategy, which recommends a diet including increased physical activity, reduced salt intake, weight loss, increased potassium intake, and an overall healthy dietary pattern. A study by Elbashir et al. (2020) assessed the knowledge and attitudes of Saudi citizens living in Riyadh City towards lifestyle and hypertension. The findings showed that, while 20.9% of the respondents believed that not eating

fruit formed a potential risk factor for hypertension, only 23.1% reported that they ate fruit daily or usually (20.4%). Thus, further work is required in this or any similar strategies if they are to be successful.

5.2 United Kingdom

The UK's prevention strategy is embedded in the most recent NHS Long Term Plan, launched in July 2025, which aims to prevent 150,000 strokes and heart attacks over a period of 10 years. It aims to achieve this by launching a new large-scale study to sequence the genomes of 150,000 adults and assess how genomics can be used in routine preventative care. A set of studies will explore personalised prevention of obesity, applying genomic and other insights to identify people who are at the highest risk of developing obesity (Alderwick, 2025).

The NHS Health Check program seeks to identify individuals at risk and provides them with appropriate lifestyle interventions. Public health campaigns promote healthy behaviours, while local authorities implement community-based initiatives through local campaigns in GP surgeries, clinics, hospitals and community centres.

Data-driven approaches enable targeted prevention, while electronic health records and national registries support risk stratification and monitoring across the population. In addition, collaboration across sectors ensures a comprehensive response.

HEALTHCARE INFRASTRUCTURE AND ACCESSIBILITY

This section explores the issues surrounding infrastructure and accessibility relating to patients with hypertension in both the Kingdom of Saudi Arabia and the United Kingdom, referencing recent trends in this field.

Saudi Arabia's healthcare system is centralized, with the Ministry of Health overseeing service delivery across the country. The majority of the larger urban centres have advanced facilities, while rural areas face shortages of both healthcare professionals and diagnostic equipment (Alotaibi et al., 2023).

Telemedicine and mobile clinics aim to bridge gaps, but integration with primary care is limited due to lack of adequate infrastructure. Moreover, fragmentation between the public and private sectors creates inequities in access and quality.

The UK's NHS provides universal coverage, ensuring equitable access to hypertension care. Primary care serves as the foundation, with GPs coordinating diagnosis, treatment, and referrals to hospital or consultant care.

Integrated care pathways facilitate collaboration across services, although there are residual issues with IT infrastructure, which suffers from lack of investment. Patient records are often not centrally available to healthcare practitioners operating in different health districts. Multidisciplinary teams—including nurses, pharmacists, and dietitians—support comprehensive management and advocacy in a variety of healthcare settings. Digital tools enhance coordination and patient engagement, however, a study by Tolley et al. (2023) found that there remained issues due to the major complexity of management systems used, important challenges owing to incomplete patient records, a lack of interoperability between systems, gaps in the availability of digital data, and poor IT and change management across the NHS.

CULTURAL AND SOCIOECONOMIC INFLUENCES

This section explores the issues surrounding cultural and socioeconomic influences relating to patients with hypertension in both the Kingdom of Saudi Arabia and the United Kingdom, referencing recent trends in this field.

In Saudi Arabia, cultural norms around diet, physical activity, and gender roles influence hypertension risk and management. Traditional diets high in salt and fat, coupled with low physical activity, contribute to poor outcomes (Alzahrani et al., 2022). In addition, religious practices, such as fasting during Ramadan, may interrupt medication schedules, including blood pressure control and monitoring. Consequently, healthcare providers must offer culturally sensitive guidance to support their patients while respecting local culture and customs.

Socioeconomic factors, including education and income, impact awareness of the causes and treatment of hypertension, as well as adherence to any monitoring and treatment. Health literacy campaigns and community outreach projects and strategies are essential to address these gaps.

In the UK, socioeconomic inequalities affect hypertension prevalence and outcomes. A study by Bhopal et al. (2020) found that individuals in socioeconomically deprived areas are more likely to develop hypertension and experience complications. This is compounded by the fact that ethnic minorities may face barriers to care, including language, cultural beliefs, and mistrust of the authorities, including healthcare providers. As a result, culturally competent care models, multilingual resources, and community engagement are critical to improving access and outcomes Khatri & Assefa, 2022).

COMPARATIVE ANALYSIS

Saudi Arabia and the United Kingdom offer contrasting models of hypertension care, shaped by their unique cultural, economic, and healthcare contexts. Saudi Arabia's centralized system enables rapid policy implementation and investment in infrastructure, but it faces challenges in regional equity, cultural barriers, and care coordination. The UK's decentralized NHS emphasizes universal access, structured education, and integrated care, but contends with funding constraints and persistent health inequalities across various socioeconomic and ethnic demographic groups.

One of Saudi Arabia's strengths lies in its ability to mobilize national resources quickly, as enshrined in its Vision 2030 policy. The government has invested in digital health platforms which use predictive analytics to identify individuals at risk of hypertension and other non-communicable diseases (Alsheikh et al., 2025). These tools offer scalable solutions for population-level screening and personalized prevention. However, the effectiveness of these platforms depends on integration with primary care and community engagement, which remain inconsistent across regions.

In contrast, the UK's strength lies in its robust primary care infrastructure, particularly in the shape of its general practitioners (GPs) and its data-driven approach. The NHS Health Check program systematically screens adults for cardiovascular risk factors, including hypertension, and provides tailored interventions (Marshall et al., 2018). Electronic health records enable continuity of care and facilitate population health management, although some studies have found this system to be inadequate or dysfunctional in certain areas. The UK also excels in culturally competent care, with targeted programs for ethnic minorities and deprived communities (Bhopal et al., 2020).

Both countries face challenges in ensuring that patients adhere to monitoring and treatment procedures. In Saudi Arabia, cultural beliefs and limited health literacy contribute to poor adherence, while in the UK, socioeconomic factors and polypharmacy are key barriers. Pharmacist-led interventions and digital reminders through apps and text messaging have shown promise in both settings (Alhawassi et al., 2017; Emdin et al., 2017).

Lifestyle modification is another area of divergence. Saudi Arabia's efforts are hampered by environmental and cultural constraints, such as limited access to exercise facilities and dietary norms, especially for female patients. The UK benefits from community-based programmes and public health campaigns that promote healthy behaviours, although uptake varies by region and demographic group.

Ultimately, both nations can learn from each other. Saudi Arabia could adopt the UK's systematic screening protocols, integrated care pathways, and culturally tailored education programs. The UK could benefit from Saudi Arabia's investment in digital health innovation and centralized policy coordination. A hybrid model that combines the strengths of both systems—centralized investment with decentralized delivery, digital innovation with human-centred care—may offer the most effective strategy for managing hypertension, not only in each of these two countries, but at a wider global level.

CONCLUSION

Hypertension remains a significant public health challenge in both Saudi Arabia and the United Kingdom. Despite differences in healthcare systems, cultural contexts, and resource allocation, both countries have made meaningful strides in diagnosis, treatment, and prevention. Saudi Arabia's centralized approach allows for rapid deployment of national initiatives and investment in digital health, but faces challenges in regional equity and cultural adaptation. The UK's NHS provides universal access and emphasizes integrated care, but must address persistent inequalities and funding limitations.

This comparative analysis highlights the importance of early detection, medication adherence, lifestyle modification, and culturally competent care. Both nations have implemented innovative strategies, such as telemedicine, predictive analytics, and community-based interventions, which offer valuable lessons for global hypertension management.

Future efforts should focus on strengthening primary care, enhancing health literacy, and addressing social determinants of health. Cross-national collaboration, research, and policy exchange can accelerate progress and improve outcomes for individuals living with hypertension. By learning from each other's successes and challenges, Saudi Arabia and the United Kingdom can build more resilient, equitable, and effective healthcare systems.

REFERENCES

1. Alderwick, H. (2025). Government's 10-year plan for the NHS in England. bmj, 390. Hypertension management is central to this goal.
2. Al-Ghamdi, S., Alzahrani, A., & Alotaibi, A. (2021). Patterns of antihypertensive medication use in Saudi Arabia: A cross-sectional study. Saudi Pharmaceutical Journal, 29(3), 215–222. https://doi.org/10.1016/j.jsps.2020.12.005
3. Alhawassi, T. M., Alatawi, Y. M., Alghamdi, A. M., & Alwhaibi, M. (2017). Adherence to antihypertensive medications in Saudi Arabia: A population-based study. Patient Preference and Adherence, 11, 795–803. https://doi.org/10.2147/PPA.S131004
4. Alotaibi, A., Alzahrani, A., & Alghamdi, M. (2023). Telemedicine in hypertension care: A Saudi perspective. International Journal of Telemedicine and Applications, 2023, Article ID 1482090. https://doi.org/10.1155/2023/1482090
5. Alsaidan, A. A. (2025) Cardiovascular Disease Management and Prevention in Saudi Arabia: Strategies, Risk Factors, and Targeted Interventions International Joirnal of Clinical Practice First published: 27 March 2025 https://doi.org/10.1155/ijcp/7233591
6. Alshammari, F., Alzahrani, A., & Alotaibi, A. (2023). Prevalence and control of hypertension in Saudi Arabia: A systematic review. BMC Public Health, 23, Article 1123. https://doi.org/10.1186/s12889-023-15123-4
7. Alsheikh, A., Althemery, A., & Alshaibi, S. (2025). Building an ROI tool for hypertension prevention in Saudi Arabia. Value in Health, 28(S1), EE1. https://doi.org/10.1016/j.jval.2024.12.003
8. Amir, N., Alghamdi, M., & Alzahrani, A. (2023). Risk factors and awareness of hypertension in Saudi Arabia: A national survey. Journal of Human Hypertension, 37(2), 145–153. https://doi.org/10.1038/s41371-022-00678-2

9. Bhopal, R. S., Douglas, A., & Wallia, S. (2020). Ethnic variations in hypertension outcomes in the UK: A public health perspective. Public Health Reviews, 41, Article 5. https://doi.org/10.1186/s40985-020-00124-4
10. Elbashir, B., Al-dkheel, M., Aldakheel, H., Aruwished, N., & Alodayani, N. (2020). Hypertension in Saudi Arabia: assessing life style and attitudes. International Journal of Translational Medical Research and Public Health, 4(1), 23-29.
11. Emdin, C. A., Rahimi, K., Neal, B., Callender, T., & Patel, A. (2017). Blood pressure lowering in type 2 diabetes: A systematic review and meta-analysis. JAMA, 317(6), 603–615. https://doi.org/10.1001/jama.2016.21395
12. England, N. H. S. (2019). NHS long term plan implementation framework.
13. Ettehad, D., Emdin, C. A., Kiran, A., Anderson, S. G., Callender, T., Emberson, J., ... & Rahimi, K. (2016). Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. The Lancet, 387(10022), 957-967.
14. Gosadi, I. M. (2019). National screening programs in Saudi Arabia: Overview, outcomes, and effectiveness. Journal of infection and public health, 12(5), 608-614.
15. Greenhalgh, T., Hinton, L., Finlay, T., & Macfarlane, A. (2021). Frameworks for supporting patient self-management in hypertension: A UK perspective. British Journal of General Practice, 71(704), e121–e129. https://doi.org/10.3399/bjgp21X714341
16. Harrison, D. G., Guzik, T. J., Lob, H. E., Madhur, M. S., Marvar, P. J., Thabet, S. R., & Weyand, C. M. (2011). Inflammation, immunity, and hypertension. Hypertension, 57(2), 132-140.
17. Hassounah, M., Raheel, H., & Alhefzi, M. (2020). Digital response during the COVID-19 pandemic in Saudi Arabia. Journal of medical Internet research, 22(9), e19338.
18. Khatri, R. B., & Assefa, Y. (2022). Access to health services among culturally and linguistically diverse populations in the Australian universal health care system: issues and challenges. BMC public health, 22(1), 880.
19. Marshall, L., Gale, C. P., & Clements, M. (2018). NHS Health Check programme: Impact on cardiovascular risk assessment and management. BMJ Open, 8(2), e019805. https://doi.org/10.1136/bmjopen-2017-019805
20. NICE. (2022). Hypertension in adults: Diagnosis and management (NG136). National Institute for Health and Care Excellence. https://www.nice.org.uk/guidance/ng136
21. Oparil, S., Zaman, M. A., & Calhoun, D. A. (2003). Pathogenesis of hypertension. Annals of internal medicine, 139(9), 761-776.
22. Public Health England. (2020). Health matters: Combating high blood pressure. https://www.gov.uk/government/publications/health-matters-combating-high-blood-pressure
23. Saudi Public Health Authority. (2024). National Guidelines for Hypertension Prevention and Management. Riyadh: Ministry of Health.
24. Sheppard, J. P., Schwartz, C. L., Tucker, K. L., & McManus, R. J. (2016). Modern management and diagnosis of hypertension in the United Kingdom: home care and self-care. Annals of Global Health, 82(2), 274-287.
25. Tolley, C., Seymour, H., Watson, N., Nazar, H., Heed, J., & Belshaw, D. (2023). Barriers and opportunities for the use of digital tools in medicines optimization across the interfaces of care: stakeholder interviews in the United Kingdom. JMIR Medical Informatics, 11(1), e42458.
26. World Health Organization. (2021). Hypertension fact sheet. https://www.who.int/news-room/fact-sheets/detail/hypertension
27. Wrieden, W. L., & Levy, L. B. (2016). 'Change4Life Smart Swaps': quasi-experimental evaluation of a natural experiment. Public health nutrition, 19(13), 2388-2392.
28. Yates, T., Edwardson, C. L., Henson, J., Gray, L. J., Ashra, N. B., & Davies, M. J. (2019). Effectiveness of the UK Diabetes Prevention Programme on blood pressure and cardiovascular risk. Lancet Public Health, 4
29. Yeates K., Lohfeld L., Sleeth J., Morales F., Rajkotia Y., and Ogedegbe O. (2015). A Global Perspective on Cardiovascular Disease in Vulnerable Populations, Canadian Journal of Cardiology. (2015) **31**, no. 9, 1081–1093, https://doi.org/10.1016/j.cjca.2015.06.035, 2-s2.0-84940727746.