

Beyond Biology: The Role of Healthcare Infrastructure and Cultural Practices in Hypertension Outcomes

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ABSTRACT

Hypertension remains a major global health concern, affecting over one billion people worldwide and contributing greatly to cardiovascular disease and early deaths. This study examines and portrays how differences in healthcare infrastructure and cultural practices influence the diagnosis and management of hypertension across four prominent countries in their respective regions: Ghana, India, Peru, and Spain. Using comparative studies, the analysis examines how structural factors, including healthcare access, economic barriers, geographic inequalities, and social hierarchies, influence early detection, while cultural beliefs, dietary patterns, and lifestyle behaviors impact long-term disease management. Findings indicate that countries with limited or uneven healthcare access, such as Ghana, India, and Peru, face challenges in early diagnosis due to reduced screening, financial constraints, and geographic isolation. In contrast, Spain's universal healthcare system supports higher rates of diagnosis and treatment, yet hypertension prevalence remains high due to lifestyle-related factors such as declining compliance to the Mediterranean diet and alcohol consumption patterns. Across all regions, cultural practices such as traditional medicine use, dietary habits, and social norms play a critical role in influencing treatment consistency and long-term outcomes. These findings demonstrate that effective hypertension control requires an approach that combines improved healthcare access with cultural interventions aimed at promoting long-term behavior change.

INTRODUCTION

Hypertension, or high blood pressure, is a serious health issue that happens when the blood pushes too hard against the walls of the arteries. This can lead to very negative side-effects like strokes or heart attacks. Additionally, it affects over one billion people in the world, and it is one of the main reasons for heart disease and early death that could be prevented (Mills et al., 2020; Unger et al., 2020). To determine if someone has hypertension, doctors look at the blood pressure numbers. If the top number, called systolic, is 140 or higher, and the bottom number, called diastolic, is 90 or higher, then it's considered high blood pressure. This has to happen multiple times, at different doctor's visits, for verification (Unger et al., 2020). Even though there are numerous ways to treat hypertension, barely anyone is getting the help they need. Only about half of the adults with high blood pressure even know they have it, and less than half are getting treatment. Worst of all, only about one in five people with hypertension have their blood pressure under control (Kario et al., 2024). One of the challenges associated with hypertension diagnosis

and intervention is that the disease frequently develops without noticeable symptoms during its early stages. Many individuals are unaware of their condition until severe complications occur, which is why hypertension is often described as a “silent disease” (Iqbal & Jamal, 2023). When symptoms do appear, they may include headaches, dizziness, blurred vision, fatigue, chest pain, or shortness of breath. These symptoms are often inconsistent and may not occur until blood pressure reaches dangerous levels. Because early symptoms are limited, routine blood pressure screening is critical in prevention and early diagnosis. Moreover, healthcare providers commonly diagnose hypertension through repeated blood pressure measurements using sphygmomanometers or automated blood pressure monitors during clinical visits or community screening programs (Unger et al., 2020). Hypertension is a grave health issue that can be managed with medication and lifestyle changes, but if left untreated or not managed properly, it can lead to a range of other health problems.

To control hypertension, doctors often prescribe medication and recommend lifestyle changes like reducing salt intake, exercising more, drinking less alcohol, maintaining a healthy weight, and eating a balanced diet. The DASH and Mediterranean diets are two examples of healthy eating plans that can help (Iqbal & Jamal, 2023). However, there are many challenges that make it hard for people to keep their hypertension under control. These include not having access to good healthcare, not being able to afford treatment, not taking medication as prescribed, and cultural beliefs that can affect how people behave when it comes to their health (Kario et al., 2024). Researchers have been studying these issues and have found that they are significant barriers to controlling hypertension, not just in one or two places, but all around the world. For example, some people may not be able to get to a doctor regularly, or they may not be able to afford the medication they need. Others may not take their medication as directed, or they may not make healthy lifestyle choices because of their cultural background. Overall, controlling hypertension requires a comprehensive approach that includes medication, lifestyle changes, and addressing the social and cultural factors that can affect health. By understanding these challenges and working to overcome them, we can help people manage their hypertension and reduce their risk of developing other serious health problems.

Healthcare systems in countries like Peru, Ghana, Spain, and India are split into public and private sectors, which can affect how easily people can get medical care based on how much money they make (Tannor et al., 2022; Mohammad et al., 2024). For example, in India, the COVID-19 pandemic showed that the country's healthcare system has some substantial problems, like not enough hospitals, which makes it hard for people to get the care they need (Kapoor et al., 2023). Peru's healthcare system is also disorganized, with medical services not evenly spread out across the country (Vera-Ponce et al., 2024). Ghana's healthcare system has a shortage of workers, especially in hospitals (Sambah et al., 2025). These problems in each country have led to a lot of people having high blood pressure, which can increase the risk of other serious health issues like heart attacks or strokes. It's interesting that Spain, a country with a universal healthcare system, still has high rates of high blood pressure (OECD, 2025; Banegas et al., 2024), similar to the other three countries. This makes us wonder if there are other factors at play that are contributing to these high rates. Moreover, access to healthcare might not be the only contributing factor, but also about other things like lifestyle, diet, or environmental factors. In addition, it is possible that

factors like poverty, lack of education, or limited access to healthy food and exercise opportunities are contributing to these high rates of high blood pressure.

By looking at the experiences of these four countries, we can learn more about what works and what doesn't in healthcare, and how to create systems that really support people's health and wellbeing. Overall, the relationship between healthcare systems and high blood pressure is complex, and there's no easy solution. But by studying the experiences of countries like Peru, Ghana, Spain, and India, we can gain a better understanding of the challenges and opportunities, and work towards creating healthcare systems that really support people's health and wellbeing. Having access to healthcare isn't enough to explain why hypertension is still such a massive issue. The way healthcare systems are set up and paid for can make it challenging for people to get checked, diagnosed, and treated, especially in areas where people don't have a lot of resources. People need to look at the bigger picture and consider all the factors that contribute to this condition in order to really make a difference. It's also worth noting that even with good healthcare systems, there are still many challenges to overcome, such as getting people to prioritize their health, making healthy choices, and managing chronic conditions like hypertension. By understanding these complexities, communities can work towards creating more effective solutions to address the global problem of hypertension.

Overall, hypertension is a multiplex issue that requires a multifaceted approach to solve. It's not just about having access to healthcare, but also about addressing the underlying social, cultural, and economic factors that contribute to the condition. Also, healthcare systems are vitally important when it comes to dealing with hypertension, but they're not the only determinant factor. Moreover, having good healthcare means you can get checked early, screened regularly, and treated properly. But it's also about what you do in your daily life: what you eat, how much you exercise, and how you handle stress. This study looks at how different countries handle hypertension, focusing on both their healthcare systems and cultural practices. By comparing these countries, we can see that while healthcare is key to detecting and treating high blood pressure, cultural and social factors play a huge role in how people manage their condition over time. It's these factors that often determine whether someone will have serious health problems because of their high blood pressure. So, when people think about how to improve healthcare for people with hypertension, they need to consider all these aspects - not just the medical side, but also the social and cultural sides. This way, countries can make sure people get the best possible care and support to manage their condition effectively.

METHODOLOGY

This study methodology used a comprehensive literature review that examines hypertension in Ghana, India, Peru, and Spain. First, the study identified sources using scholarly databases, and the inclusion criteria were topics like hypertension or blood pressure for a particular country. The search criteria used words like "hypertension" or "high blood pressure" in addition to the name of each country.

Next, the study selected a variety of peer-reviewed articles and multiple reports from recognized health

organizations. However, this research did not include sources that were not about hypertension or any other country other than Ghana, India, Peru, and Spain, and the selected sources included topics such as diagnosis, treatment, control, risks, social, cultural, or lifestyle factors.

After selecting the sources, the study identified the specific factors associated with hypertension in each country. For example, in Ghana, low awareness, limited screening, and spiritual beliefs prevailed as the main factors. In India, social inequality, the caste system, and high-sodium diet were among the important factors associated with high blood pressure. In Peru, the review considered factors such as geographic barriers and high-altitude populations. In Spain, with a strong medical system, the review examined factors such as alcohol consumption and the practice of the Mediterranean diet.

Finally, this research compared the factors among the four countries and selected sources that could be examined across the countries. The comparison considered similarities and differences in hypertension control, healthcare access, diagnosis and management, economic factors, cultural beliefs, diet, and lifestyle. Because the sources that this study selected include different populations and each use different methods, this study compared the data based on common topics. This strategy allowed the study to examine the similarities and differences in hypertension across Ghana, India, Peru, and Spain.

GHANA

In Ghana, weak healthcare infrastructure and cultural beliefs shape how hypertension is diagnosed. Studies using population-based blood pressure measurements indicated that hypertension prevalence is substantial, but Ghanaian patients are unaware of their condition due to limited screening and healthcare access (Tannor et al., 2022). In urban areas such as Kumasi, researchers identified multiple Ghanaian citizens with elevated blood pressure during study assessments who had not received a diagnosis, indicating gaps in routine screening and early detection. Inconsistent access to regular medical checkups further limits screening opportunities and reduces early intervention (Sambah et al., 2025). Additionally, cultural beliefs influence how people understand and respond to hypertension. Among participants in Ghana, they interpret the condition as being caused by stress, “too much blood,” or spiritual factors (Nyaaba et al., 2018). These interpretations of hypertension lead Ghanaian citizens to delay seeking medical care and rely on traditional treatments rather than medical alternatives. These factors demonstrate that in Ghana, limited health service access and cultural views restrict early diagnosis and weaken the effective management of hypertension.

Furthermore, financial struggles are a major obstacle when it comes to treating high blood pressure. A lot of people can't afford the medication, doctor's visits, or transportation to get to the hospital, which means they can't stick to their treatment plans (Sambah et al., 2025). This can lead to major future complications. For example, some patients have to stop taking their medication because they can't afford it, or they have to buy it from private pharmacies at a much higher price. Even getting to follow-up appointments can be a challenge, which means people aren't getting the regular check-ups they need to manage their blood

pressure. As a result, a lot of people struggle to keep their condition under control, which increases their risk of developing other serious health problems like heart disease and stroke (Tannor et al., 2022). It's a large issue, and it's not just about the cost of medication - it's about the whole system. People need to be able to get to the hospital, see a doctor, and get the care they need without spending substantial amounts of money. Research has shown that economic challenges can make it really tough for people to stick to their treatment plans. In fact, one study found that a large number of Ghanaian patients have to deal with shortages of medication at hospital pharmacies, which forces them to pay more for the same drugs at private pharmacies. This problem needs to be addressed so all Ghanaian citizens being affected can manage their hypertension and stay healthy. By making healthcare more accessible and affordable, we can help people get the care they need and reduce their risk of developing serious health problems.

In addition, people's beliefs about high blood pressure are shaped by their culture, which affects how they deal with the condition. Some Ghanaian citizens believe high blood pressure is a spiritual problem, not a medical one, and believe it's caused by punishment from gods, curses, or witchcraft (Nyaaba et al., 2018; Atibila et al., 2024). They might think that someone gets high blood pressure if they offend others or get cursed, and that only a spiritual leader can remedy it through rituals or prayers. Others believe high blood pressure is caused by witches because it can't be completely cured in hospitals and requires lifelong medication. These beliefs lead Ghanaian recipients to seek help from spiritual or traditional healers instead of getting regular medical care. As a result, patients might delay treatment or stop taking their medication, which can make their blood pressure harder to control and increase the risk of complications. Cultural beliefs play a big role in how people manage high blood pressure over time. For example, some patients might use traditional medicine or herbal remedies even after they've been diagnosed by a doctor. They might use traditional items like kolanuts, certain seeds that have caffeine, or dawadawa, a fermented seasoning made from African locust beans, to make their own remedies. These treatments are often easy to get, familiar, and cheaper than going to the hospital, which makes people more likely to use them. Sometimes, people will substitute these remedies for their prescribed medication or stop taking their medicine once they start feeling better. This can lead to inconsistent treatment and make it harder to control blood pressure in the long run (Burnier & Egan, 2019). It is clear that cultural beliefs and traditional practices can affect how people deal with high blood pressure. To better manage the condition, it's essential to understand and address these cultural influences. By doing so, healthcare providers can work with patients to develop more effective treatment plans that take into account their cultural beliefs and values. This can lead to better health outcomes and improved blood pressure control. Additionally, healthcare systems can benefit from incorporating traditional practices and remedies into their treatment approaches, as long as they are safe and effective. By working together and considering the cultural context of high blood pressure, communities can improve patient care and reduce the risk of complications.

Overall, the relationship between cultural beliefs and high blood pressure management is complex and multifaceted. While cultural beliefs can sometimes hinder effective treatment, they can also provide opportunities for innovative and patient-centered care. By embracing the diversity of cultural practices and beliefs, healthcare providers can deliver more effective care, ultimately leading to better health

outcomes for patients with high blood pressure. In Ghana, the way doctors diagnose and treat high blood pressure shows how influential issues in the healthcare system and cultural beliefs can affect how people take care of their health. Because Ghanaian patients can't get checked or treated easily, it's difficult to find high blood pressure early and take care of it over time. Also, pre-existing beliefs about hypertension can influence whether they listen to their doctors. All these things together make it tough not just to find out who has high blood pressure, but also to help them manage it effectively. This issue can lead to more serious health problems if not taken care of properly. By understanding how these factors impact disease management, more beneficial solutions can be discovered.

INDIA

In India, obtaining great medical care and having the right social setup play a massive role in how people determine whether they have high blood pressure. Multiple Indian citizens are affected by high blood pressure, but very few of them are diagnosed. Some Indians in cities are more likely to find out they have high blood pressure because they have better access to hospitals and check-ups. On the other hand, people in rural areas often don't get diagnosed because they don't have as many hospitals or doctors around (Anchala et al., 2014). It's also harder for people in rural areas to get checked for high blood pressure because there are not as many healthcare workers. What people eat can also make their blood pressure go up. Eating too much salt and fat can increase blood pressure for anyone (Anchala et al., 2014), but some groups of people, like those from lower castes or tribal communities, have a harder time getting medical care and learning about health issues. This means that getting diagnosed with high blood pressure in India isn't just about having hospitals around, but also about dealing with social and economic issues that make it tough for some people to get the care they need. We need to think about how to make healthcare more accessible to everyone, no matter where they live or who they are. For example, we could try to get more doctors and hospitals to rural areas, or make it easier for people to get check-ups and learn about health issues. We could also try to help people make healthier food choices, like eating less salt and fat. By doing these things, we might be able to help more people get diagnosed and treated for high blood pressure, and that could make a big difference in their lives. People need to think about how to make our healthcare system more fair and accessible to all.

Hypertension is a dilemma in India, and it's not spread evenly across the country. In cities, more people have high blood pressure than in rural areas. About 25% of the city population have hypertension, compared to 21.4% of the rural population. This is true for both men and women (Mohammad et al., 2024). It seems that city life, with its unhealthy food, lack of exercise, and high stress levels, contributes to the higher risk. Additionally, different regions in India also have different rates of hypertension. The Southern region has the highest rate, at 27.9%, while the Eastern region has the lowest, at 19.5% (Mohammad et al., 2024). People living in the Central, Northeastern, and Southern regions are more likely to have high blood pressure than those in the Northern, Eastern, and Western regions. This is true for both men and women. It is clear that where you live, how you live, and the development of your region all play a role in your risk of getting hypertension. The numbers show that hypertension is a complex issue, influenced by many factors. It's not just about individual choices, but also about the

environment and community you live in. To tackle this problem, the regional and lifestyle differences that contribute to hypertension need to be addressed. By doing so, these regions can work towards reducing the risk of high blood pressure and creating a healthier India. It's worth noting that these trends are consistent across different groups of people, which suggests that the factors contributing to hypertension are widespread and deeply ingrained. To make a real difference, a comprehensive approach that involves governments, communities, and individuals working together to promote healthy lifestyles and reduce the risk of hypertension should be taken. Only then can people hope to create a healthier and more equitable society for all.

Furthermore, dietary habits are a big part of why people in India are at risk for hypertension. Studies of Indian populations have reported a sodium intake that is well over the recommended amount, which can raise blood pressure (Ravi et al., 2016). This is especially true for men, who are more likely to have high blood pressure. Most of the sodium people eat comes from food they make at home, where salt is often added while cooking. In some parts of South India, people often eat foods that are high in salt, like pickles and preserved dishes. This means that people in these areas tend to eat more sodium overall (Ravi et al., 2016). As a result, some regions in the South have higher rates of hypertension. This shows how the foods people eat every day, which are often influenced by culture and local customs, can play a big role in the development of high blood pressure. For example, the way people cook and the foods they choose to eat can be very different from one region to another. In some areas, salt is a primary cooking ingredient, while in others, people use more herbs and spices to add flavor. These differences in dietary habits can help explain why some areas have higher rates of hypertension.

It's not just about the food itself, but also about the cultural and social factors that influence what people eat. By understanding these factors, we can better address the problem of hypertension in India and work towards reducing the risk of this disease. Overall, the relationship between diet and hypertension is complex, and there are many factors at play. However, by looking at the dietary habits of people in different regions of India, we can gain a better understanding of how to prevent and treat this disease. This can involve making changes to the way people cook and eat, as well as working to reduce the amount of sodium in the food supply. By taking a comprehensive approach, we can help to reduce the risk of hypertension and improve the health of people in India.

Next, social hierarchy has a big impact on how hypertension affects people in India, especially when it comes to the caste system. For example, women from certain groups like Scheduled Tribes and non-caste groups are more likely to get hypertension than women from upper caste groups (Uddin et al., 2019). But women from other backward classes actually have slightly lower rates of hypertension, which shows that there's a lot of variation within these marginalized groups. What's really important to note is that these differences still exist even when you take into account things like wealth and education. This suggests that the caste system itself is still influencing health outcomes. Generally, getting a higher education can help reduce the risk of hypertension, but it doesn't have the same effect for all caste groups. Studies have found that as people get more education, their risk of hypertension goes down more quickly for upper caste and non-caste individuals, but the effect is much weaker for other backward classes. Similarly, having more

wealth can improve health outcomes, but it works better for some groups than others. The differences between castes are especially big when it comes to lower income levels. This shows that even when people improve their socioeconomic status, the inequalities related to the caste system still limit the health benefits they can get. Studies involving caste-related health disparities have found differences in hypertension prevalence and healthcare across social groups in India. This means that certain Indian populations struggle with getting the care they need to manage their hypertension, which worsen the issue. Overall, the caste system plays a big role in shaping health outcomes in India, and it's something that needs to be addressed in order to reduce the disparities in healthcare. It's also worth noting that these disparities can have long-term effects on the health and wellbeing of individuals and communities. By studying the caste system, some parts of it influences health outcomes, and we can start to develop more effective solutions to address these disparities and improve healthcare for all. This could involve increasing access to education and healthcare, as well as working to reduce the inequalities that exist within this system.

Ultimately, the goal should be to create a more equitable healthcare system that provides high-quality care to everyone, regardless of their caste or socioeconomic status. Overall, the case of India demonstrates that hypertension outcomes are shaped by a complex interplay among health service access, regional differences, cultural practices, and social hierarchy. While insufficient healthcare infrastructure in rural areas restricts early diagnosis, daily habits such as high salt consumption and city living conditions increase overall risk. At the same time, deep-rooted social inequalities, particularly those linked to the caste system, persist in influencing both access to care and the effectiveness of long-term management. Even when individuals experience improvements in education or income, these benefits do not apply equally across all social groups. High rates of hypertension in India cannot be attributed to a single factor, but rather to the combined effects of structural and cultural variables that shape both the development and management of the condition.

PERU

Healthcare in Peru is not equal everywhere. Some people have a harder time getting assistance for hypertension because of where they live. Studies have found that people in cities are more likely to know they have high blood pressure than those in rural areas, especially in the mountains (Vera-Ponce et al., 2024; Vega et al., 2019). This is an issue because people in rural areas often have to travel long distances to seek medical attention, and they might not get checked as often. As a result, many people don't find out they have high blood pressure until they get very sick. The country's geography also plays a role. The coast, the Amazon, and the highlands all have different healthcare systems, which means some people have better access to care than others (Vera-Ponce et al., 2024). And it's not just about getting to a doctor - the environment itself can affect what's considered "normal" blood pressure. For example, Peruvian citizens living in high-altitude areas might have different blood pressure levels than those living at sea level. This means that using the same guidelines to diagnose high blood pressure everywhere might not work, and could even lead to mistakes (Vega et al., 2019). All of this exemplifies that diagnosing high blood pressure in Peru is complex. It is not solely about getting people to the doctor, but also about

understanding how the environment and geography of the country affect healthcare. By taking these factors into account, communities can work towards making sure everyone in Peru has access to the care they need, no matter where they live. In fact, research has highlighted the need for more tailored approaches to healthcare in Peru, taking into account the unique challenges and conditions of each region. This could involve training more healthcare workers to work in rural areas, or developing new guidelines that account for the environmental factors that affect blood pressure. Overall, an important factor to improving healthcare in Peru is to understand the complex interplay of factors that affect access to care, and to develop solutions that take these factors into account. By doing so, it can be ensured that everyone in Peru has access to the healthcare they need, regardless of where they live or what their environment is like.

Moreover, hypertension is also a massive problem in Peru, especially in rural areas and areas in the mountains. Additionally, many Peruvian citizens who live in the mountains are unaware that they have high blood pressure. In fact, more than 70% of people with hypertension in the Andes aren't aware of their condition (Sanchez-Samaniego et al., 2023). This is because they don't have easy access to regular check-ups, there are fewer healthcare facilities, and they don't get enough education about health. Moreover, there is a big gap between how many people have hypertension and how many people know they have it, are getting treatment, and have their condition under control (Vera-Ponce et al., 2024). It is even worse in high-altitude areas, where it is harder to get to healthcare services because of the remote location. All of this resembles that hypertension is a large issue in Peru, and that Peru needs to improve access to healthcare and education so that people can get diagnosed and treated early on. The problem of hypertension in Peru is complex and affects many people. To address this issue, it's essential to increase awareness and access to healthcare, especially in rural and high-altitude areas. This can be achieved by providing more healthcare facilities, educating people about the importance of regular check-ups, and making sure that people have access to the care they need. By doing so, we can help people get diagnosed and treated early on, which can improve their health outcomes and reduce the risk of complications. Moreover, the lack of awareness about hypertension in Peru is closely linked to the limited access to healthcare services, particularly in rural areas. To bridge this gap, it's crucial to invest in healthcare infrastructure, train more healthcare professionals, and implement effective health education programs. By taking these steps, access to healthcare service for Peruvian citizens can be assured. In conclusion, hypertension is a significant health issue in Peru, and addressing it requires a comprehensive approach that includes increasing awareness, improving access to healthcare, and educating people about the importance of regular check-ups.

Diagnosing hypertension in Peru is even more challenging due to the varying altitudes. It's been found that the standard global guidelines for blood pressure don't work equally well in all regions, especially in the Andean highlands where the environment affects normal blood pressure levels (Segura Vega, 2019). For instance, while the standard threshold for diagnosing hypertension is 140/90 mmHg in coastal and Amazon regions, research suggests that a lower threshold of around 134/89 mmHg might be more suitable for people living at high altitudes (Segura Vega, 2019). This is due to people living in high-altitude areas having biological adaptations that change their cardiovascular function and baseline

blood pressure. Using a single universal standard can lead to hypertension being underdiagnosed or misclassified in these communities. Moreover, differences in geography, ethnicity, and lifestyle also play a role in these variations, meaning that people in highland regions might need their own set of diagnostic criteria. These findings highlight that diagnosing hypertension in Peru depends not just on having access to healthcare, but also on whether medical guidelines take into account the unique environmental and population differences. In fact, it's crucial to consider these factors to ensure accurate diagnoses and effective treatment. By acknowledging and addressing these challenges, healthcare providers can better serve the diverse populations in Peru and improve overall health outcomes.

In Peru, people eat differently in various regions, which affects their chances of getting hypertension. Studies have found different eating patterns that show how people's diets are changing, with big differences between traditional and modern diets (Alae-Carew et al., 2019). Peruvians who eat traditional foods like potatoes, grains, and vegetables tend to have lower blood pressure. On the other hand, those who eat more modern or city-style diets with lots of processed foods, meat, and fewer vegetables are more likely to have high blood pressure - in some groups, it's over 30% (Alae-Carew et al., 2019). This is especially true in areas that are partly urban and partly rural, where Peruvians' lifestyles and access to processed foods are changing the way they eat. The way Peruvian citizens eat also varies across different parts of the country, which shows how the environment and city living can influence food choices and health. Overall, these findings suggest that people in Peru don't all eat the same way, and that switching from traditional to modern eating habits can increase the risk of high blood pressure. As people move to cities and have more access to processed foods, their diets are becoming less healthy. This is a big concern because high blood pressure can lead to serious health problems. By understanding how diet and lifestyle are connected to hypertension, we can start to think about ways to help people in Peru make healthier choices and reduce their risk of getting sick. The study by Alae-Carew et al. in 2019 highlights the importance of looking at dietary patterns and how they relate to health outcomes. By studying how people eat in different regions of Peru, the hypertension risks can be notably identified. This information can be used to develop targeted interventions that help people make healthier choices and reduce their risk of getting high blood pressure. In the end, it's not just about what people eat, but also about the environment and lifestyle factors that influence their food choices. By taking a closer look at these factors, we can start to address the root causes of hypertension and work towards creating a healthier population in Peru.

The ongoing situation in Peru is a great example of how different things can affect people's health, especially when it comes to high blood pressure. For one, it is really hard for Peruvians in rural areas like the Andes to get checked for high blood pressure because they live far away from doctors and hospitals. And even when they do get checked, they might not know much about the condition, which can delay them getting the help they need. Also, the environment and the way doctors diagnose high blood pressure can sometimes lead to mistakes in figuring out who has the condition and who doesn't. Lastly, as Peruvian citizens move from the countryside to cities and start eating differently, their risk of getting high blood pressure goes up. So, all these factors - like not having equal access to healthcare and cultural differences - play a significant role in how high blood pressure is diagnosed and treated in Peru.

SPAIN

Spain is vastly different from the rest of the world, including healthcare. They have a system that covers almost everyone and makes it easy for people to see a doctor, which helps with finding out if someone has high blood pressure. But even with all this, a lot of Spanish citizens still have high blood pressure, mostly because of how they live their lives. Research shows that about a third of adults in Spain have high blood pressure, and while many of them know they have it, a lot of people struggle to keep it under control (Banegas et al., 2024). The good thing is that because healthcare is so accessible, people can get checked regularly and problems can be found earlier. However, the way a lot of Spanish natives live, including what they eat, how much alcohol they drink, and how much they exercise, makes high blood pressure more likely. It's interesting that in Spain, where the traditional Mediterranean diet is known for being healthy, moving away from this diet has been linked to higher rates of high blood pressure and heart problems (Abellán Alemán et al., 2016). It is clear that having a good healthcare system is important, but it's not the only thing that matters. How people choose to live their lives, including what they eat and how active they are, has a big impact on their health. In Spain, like in many other places, finding a balance between taking care of one's health and enjoying life is key to staying healthy. By understanding these factors, Spanish communities can work towards creating healthier communities where people can thrive.

Following a traditional Mediterranean diet can really help lower the risk of high blood pressure in Spain. This diet is all about eating lots of fruits, vegetables, legumes, and olive oil, and having fish and wine in moderation. It has been shown to be good for a person's heart and can even help lower their blood pressure (Estruch et al., 2013). But sadly, not as many people in Spain are eating this way as they used to, especially younger Spanish citizens and those in certain areas. They're starting to eat more like people in Western countries, which means more processed and meat-heavy foods (Abellán Alemán et al., 2016). This change in eating habits is linked to higher rates of high blood pressure in Spain. If a person does not eat many plant-based foods and fish, and instead eats a lot of processed or meat-heavy foods, they are more likely to have high blood pressure. In the southeast of Spain, where people don't eat as many vegetables and fish, high blood pressure is a bigger problem. But here's the thing: the Mediterranean diet is even better for someone if they combine it with other traditional lifestyle habits. For example, if a teenager eats a Mediterranean diet and takes a break to rest during the day, like a "siesta," they are less likely to have high blood pressure (Mesas et al., 2022). Taking short breaks to rest during the day can be good for your heart, especially if you're active during the rest of the day. On the other hand, being inactive for long periods can increase your risk of high blood pressure (Mesas et al., 2022; Dempsey et al., 2018). In Spain, the risk of high blood pressure is affected by a combination of diet and lifestyle habits. Eating well and taking breaks to rest can both help keep your heart healthy. It's all about finding a balance and making healthy choices that work for you. By doing so, you can lower your risk of high blood pressure and stay healthy for years to come.

Alcohol consumption is also a significant contributor for hypertension in Spain, and it's not just about how much people drink, but also how they drink it. Research has found that people who drink in a traditional Mediterranean way, which means drinking moderately, mostly red wine, with meals, and

spreading it out over the week, are less likely to get high blood pressure (Hernández-Hernández et al., 2023). On the other hand, people who don't follow this pattern, like those who binge drink or drink a lot in a short time, are more likely to get high blood pressure - some studies say up to 81% more likely (Hernández-Hernández et al., 2023). It is truly the cultural drinking habits, rather than just the amount of alcohol, that play a big role in determining the risk of high blood pressure and heart health in the long run. For example, drinking a lot of alcohol at once can be bad for you, but drinking a small amount with dinner can be okay. It's all about finding a balance and being mindful of how you drink. The way people drink alcohol can have a big impact on their health, so it's worth paying attention to. By understanding how different drinking patterns affect the body, Spanish citizens can make informed choices about their alcohol consumption and reduce their risk of high blood pressure and other health problems. Overall, the key to healthy drinking is to do it in moderation and to pay attention to how you're drinking, not just how much. This can help reduce the risk of high blood pressure and other health issues, and promote overall well-being. In Spain, having a good healthcare system does not necessarily mean people are less likely to get hypertension. While it is great that the majority of people have the ability to see a doctor and get diagnosed early, the fact that many Spaniards are moving away from their traditional Mediterranean diet and drinking more alcohol is a big concern. It's interesting to note that taking a siesta, which is a common practice in Spain, can actually be good for you if it's part of a balanced lifestyle, but being sedentary for too long is not. This represents that not all downtime is created equal, and some habits can be really positive for someone while others can be negative.

All of these factors together suggest that in Spain, cultural habits play a huge role in whether or not people get hypertension, and that we need to think about lifestyle choices, not just healthcare access, when trying to manage this condition in the long term. By looking at how people live their daily lives, people can get a better understanding of why hypertension is still a problem in Spain, despite the country's strong healthcare system. This is important because it means that simply having good healthcare isn't enough - we also need to encourage healthy habits and lifestyles to really make a difference.

COMPARISON AMONG COUNTRIES

When comparing Ghana, India, Peru, and Spain, clear differences emerge in healthcare access. In Ghana and Peru, limited access to screening and healthcare facilities is related to financial barriers and geographic isolation (Tannor et al., 2022; Sanchez-Samaniego et al., 2023). India falls between these extremes, as access to healthcare varies significantly by region and population group. Urban populations have better access to healthcare, while rural populations experience infrastructure gaps and provider shortages (Anchala et al., 2014). In addition, social inequalities, such as caste and tribal status, also limit access to screening and early detection in India. In contrast, Spain has widespread access to healthcare services through its universal healthcare system (Banegas et al., 2024).

Differences in healthcare access are also reflected in patterns of hypertension diagnosis and awareness across the four countries. In Ghana and Peru, limited access to screening and healthcare facilities is associated with high levels of unawareness, with many individuals remaining undiagnosed (Tannor et al.,

2022; Sanchez-Samaniego et al., 2023). In India, diagnostic rates vary significantly by region and population group. Urban populations show higher detection rates due to better access to healthcare, while rural populations experience lower diagnosis rates due to infrastructure gaps and provider shortages (Anchala et al., 2014). In contrast, Spain demonstrates high rates of diagnosis and awareness alongside widespread access to healthcare services and routine screening (Banegas et al., 2024).

Disease management in these four countries represents how money and access to healthcare are associated with differences in hypertension treatment. In Ghana and Peru, it is difficult for people to control high blood pressure because they cannot afford medicine and do not have access to regular check-ups. Studies have found that financial barriers and limited access to care make it difficult for people to manage their condition (Sambah et al., 2025; Vera-Ponce et al., 2024). In India, the caste system creates unequal access to healthcare, which means that people from lower castes do not get the same level of care as others, even if they have more money and education. Research has shown that lower caste groups have poorer health outcomes despite improvements in other areas (Uddin et al., 2019). On the other hand, Spain has a universal healthcare system that provides good access to care and follow-up appointments. However, people in Spain still struggle with high blood pressure alongside lifestyle patterns such as alcohol consumption and reduced adherence to a healthy diet (Hernández-Hernández et al., 2023; Abellán Alemán et al., 2016).

Across all four countries, cultural and social factors are associated with how people manage high blood pressure. In Ghana, people often rely on traditional medicine and spiritual beliefs. In India, high-sodium dietary habits and social hierarchy are important factors. In Peru, people's diets are changing, with differences between traditional and modern dietary patterns. In Spain, certain habits such as alcohol consumption, compliance to the Mediterranean diet, and siesta patterns are important considerations. These comparisons exemplify that healthcare systems, economic conditions, cultural practices, and social factors all vary across the four countries and are associated with differences in hypertension diagnosis and management.

The following table summarizes key differences in diagnosis, management, and cultural factors across the four countries.

Table 1: Comparative Analysis of Hypertension Across Countries

Country	Diagnosis (Access)	Management (Treatment)	Cultural Factors
Ghana	Low awareness, limited screening	Financial barriers, medication shortages	Traditional medicine, spiritual beliefs
India	Urban-rural disparities, social inequality	Unequal outcomes due to the caste system	High-sodium diet, social hierarchy
Peru	Geographic barriers, altitude-related issues	Low awareness, inconsistent treatment	Traditional versus modern diet
Spain	High diagnosis (strong system)	Lifestyle-related management issues	Alcohol patterns, Mediterranean diet, siesta

DISCUSSION

Differences in healthcare infrastructure and cultural practices across Ghana, India, Peru, and Spain significantly influence both the diagnosis and management of hypertension. Countries with limited or uneven healthcare access, such as Ghana, India, and Peru, face numerous challenges in early detection due to reduced screening, financial barriers, geographic isolation, and social inequalities. On the other hand, Spain's universal healthcare system supports higher diagnostic rates through widespread access to screening and primary care services. These patterns exemplify that healthcare infrastructure and its impact may determine whether individuals are diagnosed, but access alone does not fully explain hypertension outcomes. Hypertension management is not just about medical treatment, it's also heavily influenced by cultural and social factors that vary from place to place. For instance, in Ghana, people often turn to traditional medicine and spiritual beliefs, which can sometimes delay or even replace proper medical care. In India, what someone eats and their social status can affect their risk of getting hypertension and how one is treated for it. Similarly, in Peru, the food people eat in different regions and the environment they live in can contribute to the development of hypertension, and even make it harder to diagnose correctly. And in Spain, lifestyle choices like drinking too much alcohol and not following the Mediterranean diet can increase the risk of hypertension.

All these examples represent that to truly tackle hypertension, people need to do more than just provide medical care. Nations need healthcare systems that make it easier for people to get diagnosed and treated, and that also take into account the local culture, beliefs, and way of life. This means finding ways to work with traditional healers, addressing social inequalities, and promoting healthy lifestyles that fit with the local context. By doing so, communities across the globe can create healthcare systems that are more effective and responsive to the needs of diverse populations, and ultimately, improve health outcomes for people with hypertension around the world. To tackle these challenges, the solutions need to focus on two main topics: making healthcare more accessible and adapting our approaches to fit in with local cultures. For instance, we could set up more affordable screening programs and make healthcare services more available in areas that are underserved, like rural Ghana and Peru. This would help with early diagnosis.

There is also a need to strengthen the healthcare system in India and reduce social inequalities so that people from all walks of life can get consistent treatment. Moreover, education programs that take into account the local culture are crucial in changing people's beliefs about hypertension, encouraging them to stick to their medication, and promoting healthier lifestyle choices. A good example of this is the community-based hypertension programs in Ghana that use local health workers and culturally relevant education, which have improved awareness and engagement with care. However, issues like the cost of medication and access to healthcare are still major obstacles to achieving long-term outcomes, as seen in a study by Nyaaba et al. in 2018. Similarly, in Spain, promoting the Mediterranean diet has been shown to have cardiovascular benefits, but people are finding it hard to stick to it due to changes in lifestyle and an increase in consumption of processed foods, as noted by Abellán Alemán et al. in 2016. These examples show that while interventions that are informed by local culture can improve awareness and lead to short-term changes in behavior, there are still significant challenges when it comes to overcoming structural barriers and achieving long-term adherence.

Overall, controlling hypertension effectively requires a two-pronged approach: improving the healthcare system and using strategies that are sensitive to local cultures. By combining these approaches, we can make a real difference in people's lives and help them manage this condition better.

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