**Knowledge and Practices Regarding the Use of Supplements as Adjunctive Treatment and Management for Hypertension in Patients at Two Rural and Two Urban Health Centers in Guyana.**


## ABSTRACT

**Objective:** This study aimed to comparatively assess the knowledge and practices related to the use of dietary supplements as adjunctive treatment and management for hypertension among patients attending two rural and two urban health centers in Guyana.

**Methods:** A cross-sectional, mixed-methods design was employed to evaluate the prevalence, patterns, and motivations for dietary supplement use among 144 hypertensive adults (71 urban, 73 rural) in Guyana, with a focus on the influence of cultural practices on healthcare approaches. Data were collected using a structured questionnaire, which was pretested in a pilot study to ensure validity and reliability.

**Results:** The study sample consisted of 64% female and 36% male participants, with the majority (57%) being over 60 years of age. Urban participants predominantly used vitamin and mineral supplements, demonstrating a statistically significant association between supplement use and blood pressure classification ($\chi^2 = 7.16$, $p = .007$). Conversely, rural participants more frequently relied on herbal remedies, particularly for preventive purposes.

**Conclusion:**The findings highlight the need for larger-scale, longitudinal studies to comprehensively explore the interplay between cultural influences, dietary supplement use, and hypertension management in Guyana. Such research is essential for informing the development of culturally sensitive public health interventions to enhance hypertension care in diverse populations.

## INTRODUCTION

Hypertension, commonly referred to as high blood pressure, is a chronic medical condition characterized by consistently elevated blood pressure levels. This condition occurs when the force exerted by circulating blood against arterial walls is persistently high (CDC, 2020). It is a major public health challenge, identified as the leading cause of premature mortality and a significant contributor to cardiovascular diseases globally (WHO, 2022). As of 2022, approximately 1.13 billion individuals worldwide were affected by hypertension, accounting for nearly 10 million deaths annually (WHO, 2022). Within the Americas, an estimated 20-40% of the adult population, approximately 250 million individuals, are impacted by this condition (WHO, 2022).

Effective management of hypertension often involves a combination of lifestyle modifications, such as dietary changes, physical activity, and stress reduction, along with pharmacological interventions using antihypertensive medications to achieve optimal blood pressure control and mitigate associated health risks (WHO, 2022). However, in recent years, the use of dietary supplements as an adjunctive therapy has garnered increasing attention as a potential avenue for managing hypertension (Caligiuri & Pierce, 2017). Dietary supplements, defined as ingestible products containing vitamins, minerals, herbs, amino acids, enzymes, probiotics, or other beneficial compounds, are designed to complement the diet by providing additional nutrients or bioactive compounds that may be absent or insufficient in regular food intake (Food and Drug Administration [FDA], 2024).

There has been an increasing burden to the healthacre budgets across the world due to the increasing number of hypertenisve cases (Mills et al., 2020). To address the increasing global burden of hypertension, countries have implemented strategic measures to manage the condition, mitigate its complications, and reduce healthcare costs (Vedanthan et al., 2017). However, the rising prevalence of hypertension has also fueled a growing reliance on dietary supplements, used either as standalone treatments or adjuncts to conventional therapies (Harris et al. 2008). This trend has raised concerns regarding the safety and public health implications of herbal and dietary supplements as their usage continues to expand (Ekor, 2014).

### Conventional Management and the Emergence of Dietary Supplements

The traditional management of hypertension involves a combination of lifestyle modifications and antihypertensive medications aimed at lowering blood pressure and mitigating associated health risks (WHO, 2022). In recent years, the adjunctive use of dietary supplements has gained traction as a complementary approach.

Emerging evidence suggests that specific dietary supplements may contribute to blood pressure reduction. For example, systematic reviews have highlighted the potential benefits of potassium and magnesium supplementation in reducing both systolic and diastolic blood pressure in hypertensive individuals (Juraschek, 2023; Dibaba et al., 2017; Nicholls et al., 2020). Similarly, omega-3 fatty acids, widely recognized for their cardiovascular benefits, have demonstrated modest but significant antihypertensive effects in both randomized controlled trials and meta-analyses (Miller, 2020). Despite these promising findings, the efficacy and safety of dietary supplements in hypertension management remain areas of ongoing investigation (Jalili et al, 2013;

Satia-Abouta, 2003) . The optimal dosages, long-term effects, and potential interactions between supplements and conventional antihypertensive medications require further exploration to ensure safe and effective clinical applications (Miller, 2020).

Moreover, the use of dietary supplements is not without risks. Adverse interactions between supplements and prescription medications have been documented, sometimes with serious consequences (Dunnick & Nyska, 2012). For instance, combining hawthorn with antihypertensive drugs has been reported to cause significant fluctuations in blood pressure (Alexa, 2020). Similarly, the concurrent use of garlic supplements and anticoagulant medications like warfarin has been associated with an increased risk of bleeding (Hareera, 2022). These findings emphasize the importance of healthcare providers being informed about patients' use of dietary supplements and incorporating this information into clinical decision-making to avoid adverse outcomes.

**Global and Regional Perspectives**

Globally, the use of herbal supplements for managing medical conditions is widespread, with a strong reliance on empirical knowledge rather than scientific evidence (Chrysant & Chrysant, 2017). In regions such as Africa, Asia, and Latin America, herbal medicines often serve as primary healthcare solutions. For example, up to 80% of Africans rely on herbal remedies as first-line treatments for various ailments, including hypertension (van Andel & Carvalheiro, 2013).

Regionally, a study in Suriname revealed that 86% of participants had used herbal medicines at least once, with health status and plant knowledge being key determinants of usage (van Andel & Carvalheiro, 2013). Conversely, studies in the United Kingdom report a lower prevalence of supplement use, possibly due to differences in dietary awareness and accessibility (Adegboye et al., 2020).

While some studies highlight the potential benefits of supplements such as vitamin C, fish oil, garlic, and lemongrass in reducing blood pressure, others, like those evaluating pomegranate, present conflicting evidence (Gbinigie et al., 2017). Moreover, the quality and safety of dietary supplements remain significant concerns, as these products are not subjected to the same rigorous testing and regulatory oversight as pharmaceutical drugs (Chrysant & Chrysant, 2017).

The growing interest in dietary supplements for hypertension management reflects a desire for natural, cost-effective solutions (Madhavan et al, 2019). However, the evidence supporting their efficacy is often limited or conflicting, and safety concerns persist due to potential adverse effects and interactions with conventional medications.

Healthcare professionals and patients alike must approach supplement use with caution, ensuring it is informed by scientific evidence and conducted under medical supervision (Zhang & Juraschek, 2023). Further research is necessary to establish standardized guidelines for supplement use, addressing issues such as optimal dosages, long-term effects, and interactions with conventional therapies. Only through rigorous investigation can the safe and effective integration of supplements into hypertension management be achieved.

In the context of Guyana, the use of dietary supplements for managing chronic diseases, including hypertension, is deeply rooted in cultural practices. However, there is a paucity of research exploring the prevalence, efficacy, and safety of these practices in the local population. This gap in knowledge underscores the need for systematic investigations into the role of dietary supplements in hypertension management, particularly in resource-limited settings where access to conventional healthcare may be constrained.

This study aims to contribute to the growing body of literature on the use of dietary supplements in hypertension management by examining their potential benefits, risks, and implications for clinical practice. By integrating evidence-based research with an understanding of local health practices, this investigation seeks to inform public health strategies and clinical guidelines to optimize hypertension management in diverse populations.

## METHODOLOGY

This prospective study employed a mixed method research design to systematically examine the knowledge and practices associated with the use of dietary supplements as adjunctive therapy in the management of hypertension.

### Population and Sample

Participants for this study were recruited through a systematic random sampling process from two urban and two rural health centers in Guyana. The study population comprised individuals diagnosed with hypertension who were actively receiving care at the selected healthcare facilities. The sample size was determined using **power analysis**, a statistical technique designed to estimate the minimum number of participants required to detect significant effects with an acceptable level of confidence and precision. This process accounted for the expected prevalence of supplement use, variability within the population, and the desired confidence level and statistical power. The sample size was determined to be 144 participants, with 71 individuals recruited from the urban healthcare facilities and 73 from the rural healthcare facilities.

The study population comprised adults (18 years and older) diagnosed with hypertension for more than six (6) and actively managing their condition with conventional medication. Participants were also required to meet additional inclusion criteria before being enrolled in the study.

### Data Collection

Data collection for this study was conducted using a rigorously designed, self-administered structured questionnaire. The instrument was developed based on a comprehensive review of existing literature and underwent validation through a pilot study with a representative subset of the target population. The pilot study aimed to ensure the questionnaire's readability, clarity, and usability while confirming its alignment with the study objectives. Feedback from the pilot was

used to refine the tool, enhancing its reliability and validity. The final version of the questionnaire consisted of three meticulously crafted sections:

1. Demographic Information
2. Knowledge of Dietary Supplements
3. Current Practices in Supplement Usage

**Data Collection Process:**

Data collection spanned a four-month period, during which survey sessions were scheduled at healthcare facilities coinciding with routine hypertension management clinics. This timing ensured the availability and convenience of participants, facilitating a robust response rate. The structured questionnaires were distributed to eligible individuals, accompanied by a participant information sheet along with detailed instructions to promote accurate and consistent responses (Faridah et al, 2017). Trained research assistants were present during survey sessions to clarify questions and address any concerns, ensuring data quality and participant engagement.

**Data Analysis**

Data analysis for this study was conducted using the advanced statistical software package IBM SPSS, version 29. The analysis involved both descriptive and inferential statistical techniques to provide a robust evaluation of the data and uncover meaningful patterns and relationships among variables. This dual approach ensured a comprehensive assessment of the quantitative aspects of dietary supplement use in the management of hypertension. All statistical tests were conducted with a significance threshold set at a p-value of 0.05.

**Ethics**

The study was conducted in full compliance with recognized ethical principles to safeguard the rights, dignity, and well-being of all participants. Ethical approval was secured from the Institutional Review Board (IRB) at the Ministry of Health (Guyana).

**Informed Consent Process**

A comprehensive informed consent process was implemented to guarantee that participants were fully aware of the study's nature and their role within it. Participants were provided with a detailed particpant information sheet.

## RESULTS AND DISCUSSION

### Demographic Profile of Study Participants

The study's participants represented a diverse range of ethnicities, reflecting the multicultural composition of the population. Among the 144 individuals surveyed, the majority were of African and East Indian descent, while Amerindians accounted for 10%, and Chinese and Portuguese participants constituted 1% each. From a socioeconomic perspective, 80% (115 participants) were employed, whereas 20% (29 participants) were unemployed. The participants' residential distribution revealed that 51% (73 participants) resided in rural areas, while 49% (71 participants) lived in urban settings. It should also be noted that of the study population 64% weere female while 36% were male. Regarding the age distribution, 57% >60 years old, 33% 41-60 years old and 10% <40 years old.

In terms of educational attainment, approximately 50% of the participants had completed secondary-level education, 30% had attained primary education, and 15% had tertiary qualifications. A minority of 5% reported no formal education. This demographic composition provides valuable insight into the interplay between socioeconomic factors, education, and health behaviors, particularly in the context of dietary supplement use and natural remedies.\

### Ethnicity and the Use of Herbal Medicines

Ethnic and cultural backgrounds significantly influence health practices, particularly in regions where traditional remedies are prevalent. In African rural settings, for example, herbal treatments are a primary healthcare approach, with an estimated 80% of individuals resorting to herbal medicines as their first line of treatment (World Health Organization, 2004). This trend aligns with a global shift towards natural remedies and supplements, underscoring the need to understand cultural perspectives in healthcare practices.

The study’s findings suggest that the participants' diverse ethnic backgrounds may play a role in shaping their health practices, particularly their reliance on dietary supplements. This observation is consistent with global trends where natural remedies are often perceived as cost-effective alternatives to conventional medical treatments.

### Socioeconomic and Educational Influence on Health Decisions

The high employment rate (80%) observed among participants suggests greater access to resources, including healthcare and education, which may influence health-related decisions. Educational attainment, particularly at the secondary and tertiary levels, is associated with increased health literacy. Health-literate individuals are more likely to make informed decisions about their treatment options, including the use of dietary supplements (Adegboye et al., 2020).

However, despite the potential benefits of health literacy, the literature also highlights concerns regarding the misuse of dietary supplements. Many individuals rely on anecdotal evidence or cultural beliefs rather than scientific validation when choosing supplements. This overreliance on unproven remedies raises safety concerns, particularly given the lack of rigorous regulation and testing compared to pharmaceutical drugs (So & O, 2018).

**Patterns of Supplement Use: A Rural-Urban Divide**

The prevalence of supplement use among hypertensive patients was notable, with distinct variations between rural and urban settings. In urban clinics, B-complex vitamins and multivitamins were the most commonly used supplements, aligning with global trends where multivitamins are popular due to their potential to mitigate cardiovascular risks (Chrysant, 2015). In contrast, rural patients demonstrated a preference for herbal remedies, such as lemon fruit, lime leaves, and fever grass, reflecting the integration of traditional medicine into hypertension management. These findings align with observations in other regions where herbal medicine serves as a primary healthcare approach (van Andel & Carvalheiro, 2013).

The motivations for supplement use also varied significantly between settings. Urban patients primarily used supplements to manage existing conditions, while rural patients were more likely to use them for preventative purposes. This divergence highlights differing healthcare approaches: urban patients focus on disease control, whereas rural patients adopt a more proactive, preventive strategy.

**Association with Blood Pressure and Demographic Factors**

The relationship between supplement use and blood pressure classification differed between urban and rural areas. In urban settings, a statistically significant association was found between vitamin/mineral supplement use and blood pressure levels ($\chi^2 = 7.16, p = .007$), suggesting a potential link between supplement use and worsening hypertension.

Both rural and urban data indicated a trend where older participants were more likely to use supplements. Although gender differences in supplement use were observed, they were not statistically significant in either setting. These findings warrant further analysis using more refined statistical techniques to confirm any underlying trends.

**Comparison with Existing Literature**

The study's findings are consistent with global observations of high dietary supplement use among hypertensive patients, often influenced by cultural practices, availability, and affordability (Chrysant & Chrysant, 2017). The increased use of supplements for managing or preventing hypertension reflects broader global trends documented in previous studies (World Health Organization, 2004).

The urban focus on disease management through supplementation contrasts with the rural emphasis on prevention. This distinction highlights the need for further research to evaluate how health-seeking behaviors and care systems influence supplement use. The rural reliance on preventive approaches aligns with traditional healthcare practices, whereas urban patients' disease-focused use may reflect greater exposure to clinical healthcare systems.

**Risks Associated with Self-Regulated Supplementation**

The intersection of education, supplementation practices, and health outcomes warrants careful consideration, particularly regarding the risks of self-regulated herbal supplementation. Unchecked use of herbal products can lead to adverse effects and drug interactions. For instance,

garlic has been shown to interact with anticoagulant medications, increasing the risk of bleeding (Saif et al., 2020). Similarly, other supplements, such as St. John's Wort, have demonstrated interactions that can diminish the efficacy of prescription medications (Davis et al., 2014). These risks highlight the importance of regulatory oversight and patient education in ensuring the safe use of supplements.

## CONCLUSION

This study provides valuable insights into the contextual factors driving supplement use among Guyanese populations, emphasizing the importance of culturally sensitive and scientifically grounded approaches to hypertension management. The findings also call for interventions tailored to the specific needs and challenges of urban and rural communities to improve health outcomes while preserving cultural heritage and promoting best practices.

The comparative analysis of dietary supplement use among hypertensive patients in rural and urban Guyana highlights significant differences in usage patterns and motivations, shaped by cultural, socioeconomic, and demographic factors. Urban participants primarily used supplements for disease control, while rural participants focused on prevention, reflecting broader global trends in health-seeking behaviors. These findings align with patterns observed in regions like Africa and Asia, where cultural practices and natural remedies significantly influence healthcare choices (World Health Organization, 2004).

Despite the growing evidence supporting the potential benefits of certain supplements, such as omega-3 fatty acids (Miller et al., 2014; Chrysant, 2015), their safety and efficacy remain inconclusive. The study underscores the need for further research to address gaps in understanding the long-term effects, safety concerns, and interactions between dietary supplements and prescribed medications. Robust patient education and evidence-based healthcare practices are essential to optimizing the safe use of supplements in managing hypertension.

## RECOMMENDATIONS

1. **Increase Sample Size and Stratification**
   Future studies should involve a larger and more diverse sample size, particularly in rural areas, to improve statistical power. Stratification by socioeconomic status, ethnicity, and healthcare access can further illuminate the interplay of these factors in supplement use and health outcomes.

2. **Adopt Longitudinal Study Designs**
   A longitudinal approach would allow researchers to assess the long-term effects of supplement use on hypertension management and related health outcomes. Such studies would help determine whether supplement use contributes to sustained blood pressure control or adverse effects over time.

3. **Integrate Qualitative Research**
   Incorporating qualitative methods, such as focus groups and in-depth interviews, can provide deeper insights into patients' beliefs, cultural practices, and experiences with supplement use. This would enrich understanding of the social and cultural drivers of health behaviors.

4. **Conduct Biochemical Analyses**
   Objective measurements of vitamin, mineral, and compound levels in blood samples would offer empirical evidence of supplement efficacy, metabolism, and absorption, reducing reliance on self-reported data.

5. **Analyze Medication Interactions**
   Comprehensive pharmacokinetic and pharmacodynamic studies are necessary to evaluate the potential interactions between supplements and prescribed antihypertensive medications, ensuring patient safety and optimal treatment outcomes.

6. **Ensure Supplement Quality Control**
   Standardized evaluation of the purity, potency, and composition of

7. **Standardize Blood Pressure Measurement**
   Clinical settings should adopt uniform protocols for blood pressure measurement using certified devices operated by trained personnel. This standardization would enhance the accuracy, reliability, and replicability of future studies.

8. **Explore Ethnic and Cultural Differences**
   Investigating supplement use patterns across the diverse ethnic groups in Guyana would provide nuanced insights into how cultural practices influence health behaviors, enabling more targeted and inclusive interventions.

9. **Evaluate Economic Impacts**
   Future studies should assess the financial implications of supplement use, including costs to patients and the healthcare system, as well as the economic burden of managing side effects or adverse reactions related to supplementation.

10. **Implement Public Health Interventions**
    Evidence-based public health initiatives should focus on educating patients about safe supplementation practices, monitoring supplement quality, and accrediting reliable products. Tailored education programs and community outreach can help bridge knowledge gaps and promote informed decision-making.

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