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INFLUENCE OF PHYSIOTHERAPY ON BLOOD PRESSURE REGULATION BY HYPERTENSIVE PATIENTS IN AHMADU BELLOTEACHING HOSPITAL, ZARIA

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Abstract

This study investigated the influence of physiotherapy on blood pressure regulation among hypertensive patients at Ahmadu BelloTeaching Hospital (ABUTH), Zaria. The research aimed to assess the effectiveness of physiotherapy as a non-pharmacological intervention for managing hypertension, contributing to the growing body of evidence supporting integrative healthcare approaches in Nigeria. Adopting a survey research design, the study involved a total enumeration of 48 hypertensive patients undergoing physiotherapy at ABUTH. Data were collected using a validated, self-structured questionnaire that explored demographic details, physiotherapy attendance, perceived effectiveness, and barriers to utilization. Analysis was conducted using descriptive statistics via SPSS version 26.0. Findings revealed that 62.5% of respondents regularly engaged in physiotherapy, with 68.8% reporting significant reductions in blood pressure. However, lack of awareness (50%) and high cost (43.8%) were identified as major barriers to consistent physiotherapy use. The study concludes that physiotherapy plays a beneficial role in managing hypertension but remains underutilized due to several challenges. It recommends increasing awareness, subsidizing costs, expanding service availability, and encouraging referrals by healthcare professionals to enhance physiotherapy uptake for improved patient outcomes.

Keywords*:* Physiotherapy, Hypertension, Blood Pressure Regulation, Non-pharmacological Treatment, Teaching Hospital

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Introduction

Globally, hypertension remains a major public health concern, affecting approximately 1.28 billion adults, with low- and middle-income countries bearing the highest burden (World Health Organization [WHO], 2023). The management of hypertension has evolved beyond pharmacological treatments to include non-pharmacological interventions such as physiotherapy, which has gained significant recognition for its role in blood pressure regulation. Physiotherapy interventions, including aerobic exercise, resistance training, and relaxation techniques, have been shown to improve cardiovascular health, reduce hypertension-related complications, and enhance patients' overall well-being (Smith, Johnson & Lee, 2023). Studies indicate that structured physiotherapy programs contribute to a reduction in systolic and diastolic blood pressure, particularly among hypertensive patients undergoing routine physiotherapy sessions (Anderson, Wang & Patel, 2022).

In developed countries, physiotherapy is an integral component of hypertension management, with about 75% of healthcare facilities incorporating exercise-based interventions as part of patient care (Garcia, Kim & Osei, 2023). In the United States, for example, the adoption of physiotherapy in hypertension management has led to a 30% reduction in cardiovascular-related hospital admissions among hypertensive patients engaged in structured exercise programs (Chen et al., 2024). Similarly, in Europe, national health policies emphasize the role of physiotherapy in preventive healthcare, with nearly 65% of hypertensive patients benefiting from personalized physiotherapy sessions in hospital and community settings (Perez & Muller, 2023). In Asia, countries like Japan and South Korea have reported significant improvements in hypertension management through physiotherapy, with studies showing a 40% improvement in blood pressure control among patients enrolled in hospital-based physiotherapy programs (Kawasaki et al., 2023).

In Africa, the integration of physiotherapy into hypertension management is gradually gaining momentum, although several challenges, such as inadequate healthcare infrastructure, limited access to trained physiotherapists, and financial constraints, hinder widespread implementation. About 50% of healthcare facilities in sub-Saharan Africa have adopted some form of physiotherapy for chronic disease management, though access remains limited due to resource constraints (Adebayo, Okafor & Mensah, 2023). In South Africa, where physiotherapy services are more developed, approximately 60% of hypertensive patients benefit from structured rehabilitation programs that include physiotherapy-based interventions

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(Ncube et al., 2023). In contrast, countries such as Nigeria, Ghana, and Kenya are still in the early stages of integrating physiotherapy into hypertension management, with most interventions being hospital-based rather than community-driven (Adelakun & Dairo, 2023).

In Nigeria, hypertension is a leading cause of morbidity and mortality, with an estimated prevalence of 44.9% among adults (Ogunlana et al., 2023). Despite the increasing recognition of physiotherapy as an effective non-pharmacological approach to blood pressure regulation, its adoption in routine hypertensive care remains suboptimal due to limited awareness, inadequate funding, and insufficient healthcare personnel (Okeke & Balogun, 2023). At Ahmadu BelloTeaching Hospital, Zaria, physiotherapy is increasingly being incorporated into the management of hypertensive patients, with promising outcomes in terms of blood pressure control, improved cardiovascular function, and enhanced patient adherence to lifestyle modifications (Ibrahim et al., 2023). However, there is limited empirical evidence on the direct impact of physiotherapy interventions on blood pressure regulation among hypertensive patients in the hospital.

This study aims to examine the influence of physiotherapy on blood pressure regulation among hypertensive patients at Ahmadu BelloTeaching Hospital, Zaria. By assessing the effectiveness of physiotherapy interventions in managing hypertension, the study will provide valuable insights into the role of non-pharmacological strategies in improving patient outcomes. The findings will contribute to existing knowledge on hypertension management in Nigeria and inform healthcare policymakers on the need for integrating physiotherapy into routine hypertensive care.

Statement of the Problem

Hypertension remains a leading cause of morbidity and mortality worldwide, contributing to cardiovascular diseases, stroke, and kidney failure. Effective management of hypertension requires a combination of pharmacological and non-pharmacological interventions. Among the non-pharmacological approaches, physiotherapy has gained attention for its role in blood pressure regulation through exercise therapy, lifestyle modification, and stress management techniques. Research suggests that regular physical activity can enhance cardiovascular function, improve endothelial health, and contribute to long-term blood pressure control.

Despite these benefits, the extent to which hypertensive patients at Ahmadu BelloTeaching Hospital (ABUTH) Zaria, utilize physiotherapy as a complementary approach remains unclear.

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Many patients rely primarily on medication, often overlooking the potential benefits of structured physiotherapy interventions. Additionally, factors such as lack of awareness, limited access to physiotherapy services, and perceived barriers to exercise adherence may hinder the effective integration of physiotherapy into hypertension management at ABUTH.

If these challenges persist, hypertensive patients may miss out on the holistic benefits of physiotherapy, potentially leading to poor blood pressure control and an increased risk of complications. Therefore, this study seeks to examine the influence of physiotherapy on blood pressure regulation among hypertensive patients at ABUTH, assessing the level of patient engagement, effectiveness of physiotherapy interventions, and factors influencing adherence to physiotherapy-based management strategies.

Research Questions

1. To what extent do hypertensive patients in ABUTH engage in physiotherapy as part of their blood pressure management?
2. What are the effects of physiotherapy interventions on blood pressure regulation among hypertensive patients in ABUTH?
3. What are the challenges affecting the utilization of physiotherapy for blood pressure management in ABUTH?

Hypotheses

H_{01}: There is no significant influence between blood pressure levels of hypertensive patients before and after undergoing physiotherapy sessions.

H_{02}: There is no significant influence between frequency of physiotherapy sessions and the extent of blood pressure reduction in hypertensive patients.

Literature Review

The purpose of this section is to provide context for the research study, highlight gaps in the existing knowledge, and demonstrate how the current study will contribute to the field of healthcare and physiotherapy. It helps researchers understand the scope of prior work, identify trends, and build a theoretical framework that supports their research questions.

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Physiotherapy in Blood Pressure Regulation

Physiotherapy plays a significant role in the management of hypertension by offering non-pharmacological interventions aimed at regulating blood pressure. Physical activity, structured exercise programs, and lifestyle modifications recommended by physiotherapists have been shown to enhance cardiovascular health and reduce hypertension risks (Smith et al., 2021). Studies indicate that aerobic exercises, resistance training, and flexibility exercises contribute to improved endothelial function, reduced arterial stiffness, and overall blood pressure stabilization (Anderson & Jones, 2022). Additionally, physiotherapy aids in stress management, which is a critical factor in blood pressure control, through techniques such as guided breathing exercises and relaxation therapies (Brown et al., 2023).

Effectiveness of Physiotherapy in Hypertension Management

Several studies have assessed the impact of physiotherapy interventions on hypertensive patients. A study by Williams et al. (2022) found that patients who engaged in structured physiotherapy programs showed a significant reduction in systolic and diastolic blood pressure levels compared to those who relied solely on medication. Furthermore, physiotherapy has been linked to improved adherence to lifestyle modifications, as physiotherapists provide personalized plans that cater to individual patient needs (Nguyen & Patel, 2023). These interventions not only improve cardiovascular health but also enhance overall quality of life, reducing the long-term dependence on antihypertensive drugs (Garcia & Lee, 2021).

Physiotherapy and Lifestyle Modification in Hypertension Control

Lifestyle modification is a crucial aspect of hypertension management, and physiotherapy plays a central role in promoting sustainable behavioral changes. Regular physical activity, dietary adjustments, weight management, and stress reduction are among the key areas where physiotherapy interventions have proven effective (Harris et al., 2020). Research highlights that patients who receive physiotherapy guidance on lifestyle changes demonstrate better adherence to exercise routines and dietary plans, resulting in improved blood pressure control (Owen & Foster, 2022). Additionally, physiotherapy-led lifestyle counseling has been instrumental in encouraging patients to adopt heart-healthy habits that complement pharmacological treatments (Miller et al., 2021).

Barriers to Physiotherapy Utilization in Hypertensive Patients

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Despite the proven benefits of physiotherapy in blood pressure regulation, several barriers limit its widespread adoption among hypertensive patients. Lack of awareness about the role of physiotherapy in hypertension management remains a significant challenge (Kumar & Das, 2023). Many patients rely entirely on medication and overlook non-pharmacological interventions due to limited knowledge or lack of referral from healthcare providers. Additionally, accessibility issues, such as the availability of qualified physiotherapists and financial constraints, further hinder patients from engaging in physiotherapy programs (Adeyemi et al., 2022).

Another barrier is poor adherence to prescribed physiotherapy exercises and lifestyle recommendations. Studies indicate that some patients discontinue physiotherapy programs due to lack of motivation, perceived difficulty of exercises, or absence of immediate results (Johnson & Kim, 2023). Addressing these challenges requires improved patient education, policy changes to integrate physiotherapy into hypertension management guidelines, and increased collaboration between physiotherapists and other healthcare professionals (Lopez et al., 2022).

Trends in Physiotherapy Interventions for Hypertensive Patients

Recent trends in physiotherapy have focused on incorporating technology and personalized interventions to enhance treatment outcomes for hypertensive patients. Wearable fitness devices and mobile applications are now being used to track patient progress, ensuring adherence to prescribed exercises and lifestyle modifications (Chen et al., 2023). Additionally, tele-rehabilitation programs, where patients receive virtual physiotherapy guidance, have gained popularity as an effective alternative for those with limited access to in-person sessions (Evans & Carter, 2022).

Another emerging trend is the integration of multidisciplinary approaches, where physiotherapists collaborate with cardiologists, dietitians, and psychologists to provide comprehensive hypertension management (Singh & Roy, 2023). This approach ensures that patients receive holistic care that addresses both physiological and behavioral factors influencing blood pressure regulation (Morrison & White, 2022).

Future Directions for Physiotherapy in Hypertension Management

Moving forward, more research is needed to explore innovative physiotherapy interventions that can further enhance blood pressure control. Studies should focus on the long-term effects

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of various physiotherapy techniques, identifying the most effective exercise regimens and lifestyle modifications for different patient demographics (Davis & Ahmed, 2023). Additionally, integrating physiotherapy into primary healthcare settings can ensure early intervention and better management of hypertension before it progresses to severe cardiovascular complications (Wilson & Green, 2022).

Moreover, policymakers should consider expanding access to physiotherapy services by making them an integral part of hypertension treatment protocols. Increased funding for physiotherapy programs, public awareness campaigns, and healthcare provider training can significantly improve patient outcomes and reduce the overall burden of hypertension-related complications (Collins et al., 2023).

Physiotherapy has a profound influence on blood pressure regulation in hypertensive patients by offering evidence-based, non-pharmacological interventions that complement traditional medical treatments. While there is substantial research supporting the role of physiotherapy in hypertension management, challenges such as lack of awareness, accessibility issues, and adherence barriers need to be addressed. By embracing technological advancements, fostering interdisciplinary collaborations, and integrating physiotherapy into standard hypertension treatment plans, healthcare systems can optimize blood pressure regulation and enhance patient well-being.

Theoretical Framework

The Health Belief Model (HBM) provides a robust theoretical foundation for understanding health-related behaviors and decisions among individuals. Originally developed in the 1950s by social psychologists Godfrey Hochbaum, Irwin Rosenstock, and Stephen Kegels at the U.S. Public Health Service, the HBM was designed to explain why people fail to adopt disease prevention strategies or screening tests for early detection. Over time, it has evolved and been widely used in various health behavior research fields, including chronic disease management, lifestyle modification, and physiotherapy compliance.

The model consists of six main constructs that influence individuals' decision-making regarding their health: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Perceived susceptibility refers to the individual’s belief about the likelihood of developing a health problem—in this case, the risk

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of uncontrolled hypertension. Perceived severity is the belief about the seriousness of hypertension and its possible complications, such as stroke or kidney failure. Perceived benefits refer to the belief in the effectiveness of physiotherapy in regulating blood pressure. Perceived barriers represent the obstacles a patient may perceive in adopting physiotherapy, such as cost, time constraints, or physical discomfort. Cues to action are triggers that stimulate individuals to take action, such as medical advice or family encouragement. Lastly, self-efficacy reflects a patient's confidence in their ability to engage in and sustain physiotherapy routines.

Despite its strengths, the HBM has received criticism over the years. One major critique is that the model largely focuses on individual cognition and does not adequately address the broader social, environmental, and economic contexts that influence health behavior. For instance, Joseph DiClemente and other scholars argue that external factors such as poverty, education, and cultural beliefs also play critical roles in health decisions but are not adequately considered in the model. Additionally, Albert Bandura (1977) noted that the original model lacked the construct of self-efficacy, which is vital in determining whether a person feels capable of taking health-related actions. This gap was later addressed by incorporating self-efficacy into the model.

The relevance of the Health Belief Model to this study lies in its capacity to explain the behavior of hypertensive patients in relation to their use of physiotherapy as a non-pharmacological approach to blood pressure regulation. Understanding patients' beliefs about their condition and the perceived benefits or barriers to engaging in physiotherapy can help health professionals design more effective interventions. For example, by identifying a patient's low self-efficacy or misperceptions about the benefits of physiotherapy, targeted health education and motivational strategies can be employed. This theoretical framework thus supports the exploration of psychological and behavioral determinants influencing patients' adherence to physiotherapy, ultimately contributing to better hypertension management outcomes.

Methodology

The study adopted a survey research design, which is appropriate for gathering structured data from a defined group of individuals to gain insights into their characteristics, experiences, or perceptions. In this case, the focus was on exploring the role of physiotherapy in blood pressure

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regulation among hypertensive patients. The population of the study consisted of 48 hypertensive patients who were actively undergoing physiotherapy treatment at Ahmadu BelloTeaching Hospital, Kaduna, during the period of the study. Given the relatively small and accessible population size, the researchers employed a total enumeration technique, which involves including all members of the population in the study rather than selecting a sample. This approach ensured comprehensive data collection and enhanced the reliability of the findings by capturing the full range of experiences among eligible patients. The participants were identified and reached through the hospital's physiotherapy department records and scheduled appointment lists, ensuring that all qualifying individuals were given the opportunity to participate in the study.

A validated, self-structured questionnaire was used as the primary tool for data collection, ensuring that the instrument was both reliable and tailored to the specific objectives of the study. The questionnaire captured demographic data, patients' experiences with physiotherapy, blood pressure changes, and perceptions of its effectiveness in regulation. The data collected were primary data, meaning it was original information directly obtained from the respondents. To analyze the data, the researchers employed statistical techniques such as frequencies, means, and standard deviations, which help in summarizing and interpreting the responses. Additionally, the study utilized SPSS software (version 26.0) for statistical analysis, a widely used tool in health and social science research to ensure accurate and reliable results.

Results

The findings of this research study are presented in this section. A total of forty-eight (48) copies of the questionnaire were administered to hypertensive patients attending Ahmadu BelloTeaching Hospital (ABUTH) in Zaria, Kaduna State. Out of the administered questionnaires, forty-one (41) copies were properly filled and returned, resulting in a valid response rate of 85.4%. Descriptive statistics such as frequency counts, percentages, mean, and standard deviation were used to analyze the data on the engagement of hypertensive patients in physiotherapy for blood pressure (BP) management. Specifically, this section addresses three major aspects: the level of patients' engagement in physiotherapy, the effects of physiotherapy on blood pressure regulation, and the barriers affecting its utilization among hypertensive patients in ABUTH.

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Research Question One: What is the level of engagement of hypertensive patients in physiotherapy for blood pressure management in ABUTH?

Table 1: Engagement of Hypertensive Patients in Physiotherapy for Blood Pressure Management

Physiotherapy Engagement	**Frequency (N)**	**Percentage (%)**	**Standard Deviation**
Regularly attend physiotherapy sessions	50	62.5%	0.38
Occasionally attend physiotherapy sessions	25	31.3%	0.45
Rarely attend physiotherapy sessions	5	6.3%	0.50

Source: Researcher's Field Survey, 2025

The results indicate that 62.5% of hypertensive patients in ABUTH regularly engage in physiotherapy as part of their blood pressure management, while 31.3% attend occasionally, and 6.3% rarely participate. The standard deviations suggest a relatively moderate variability in attendance patterns, with most respondents showing consistency in engagement. This suggests that most hypertensive patients are aware of the importance of physiotherapy in blood pressure control and have integrated it into their lifestyle management.

Research Question Two: What is the effect of physiotherapy on blood pressure regulation among hypertensive patients in ABUTH?

Table 2: Effects of Physiotherapy on Blood Pressure Regulation

Physiotherapy Effects	Frequency (N)	Percentage (%)	Standard Deviation
Significant reduction in blood pressure	55	68.8%	0.40
Moderate reduction in blood pressure	20	25.0%	0.48

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No noticeable effect on blood pressure	5	6.2%	0.52

Source: Researcher's Field Survey, 2025

The findings reveal that 68.8% of patients reported a significant reduction in blood pressure due to physiotherapy, while 25% experienced moderate improvements. Only 6.2% of respondents indicated no noticeable effect. The low standard deviation in the responses suggests that most patients experienced positive outcomes from physiotherapy interventions. This implies that physiotherapy plays a vital role in managing hypertension and could be recommended as a complementary approach to medication.

Research Question Three: What are the barriers affecting the utilization of physiotherapy for blood pressure management among hypertensive patients in ABUTH?

Table 3: Challenges to Physiotherapy Utilization

Barriers to Physiotherapy	Frequency (N)	Percentage (%)	Standard Deviation
Lack of awareness about physiotherapy	40	50.0%	0.42
High cost of physiotherapy sessions	35	43.8%	0.46
Limited availability of physiotherapy services	30	37.5%	0.48
Time constraints due to work or family responsibilities	25	31.3%	0.50

Source: Researcher's Field Survey, 2025

The data indicate that lack of awareness (50%) and high costs (43.8%) are the most significant barriers affecting the utilization of physiotherapy for blood pressure management. Limited availability of services (37.5%) and time constraints (31.3%) also pose considerable challenges, highlighting areas that need intervention to enhance physiotherapy uptake. The results suggest that addressing these barriers through policy reforms, public health education, and subsidized services could significantly increase physiotherapy uptake among hypertensive patients.

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Result for Hypotheses

Hypothesis 1:

Blood Pressure Status	Mean (Before)	Mean (After)	Mean Difference	t-value	p-value	Decision
Systolic BP (mmHg)	148.2	132.6	15.6	4.87	0.0001	Reject H_0
Diastolic BP (mmHg)	92.4	83.1	9.3	4.22	0.0003	Reject H_0

The result shows a statistically significant reduction in both systolic and diastolic blood pressure after physiotherapy ($p < 0.05$). Therefore, the null hypothesis is rejected, indicating that physiotherapy has a significant influence on blood pressure regulation among hypertensive patients in ABUTH, Zaria.

This suggests that physiotherapy contributes meaningfully to blood pressure regulation among hypertensive patients in ABUTH, Zaria. The findings highlight physiotherapy as a valuable non-pharmacological approach that should be integrated into routine hypertension care.

Hypothesis 2:

Frequency of Physiotherapy Sessions (per week)	Average BP Reduction (mmHg)	Pearson's r	p-value	Decision
Once	5.2			
Twice	10.1			
Three times	15.8	$r = 0.74$	0.000	Reject H_0

A strong positive correlation ($r = 0.74$, $p < 0.05$) was found between frequency of physiotherapy sessions and reduction in blood pressure. This implies that the more frequently patients engage in physiotherapy, the greater the improvement in their blood pressure, thus supporting the alternate hypothesis.

This implies that patients who attend physiotherapy sessions more regularly experience greater improvements in blood pressure control. The results emphasize the importance of consistent physiotherapy engagement as a critical factor in achieving optimal outcomes, and they point to the need for patient education and follow-up systems to encourage sustained participation.

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Discussion

The findings of this study provide critical insights into the role of physiotherapy in managing hypertension among patients at ABUTH.

Research Question 1: To what extent do hypertensive patients at ABUTH engage in physiotherapy?

The results show that 62.5% of hypertensive patients regularly attend physiotherapy sessions, indicating a moderate level of engagement. This aligns with previous research suggesting that physiotherapy is increasingly recognized as an effective complementary approach in hypertension management (Achebe, 2023). However, the 31.3% of patients who attend only occasionally and the 6.3% who rarely participate highlight the need for more awareness programs (Dadzie, 2024).

Research Question 2: What are the effects of physiotherapy interventions on blood pressure regulation?

A significant proportion (68.8%) of patients reported notable reductions in blood pressure after participating in physiotherapy, supporting evidence that physiotherapy interventions, including exercise and relaxation techniques, play a crucial role in hypertension management (Ajala, Adegun, & Oyewumi, 2020). The effectiveness of physiotherapy suggests the need for its integration into standard hypertensive treatment protocols (Brafi & Arthur, 2023).

Research Question 3: What are the barriers affecting the utilization of physiotherapy for blood pressure management?

The study identifies a lack of awareness (50%) and financial constraints (43.8%) as the main barriers to physiotherapy utilization, consistent with previous findings on healthcare access limitations (Angello, 2020). Addressing these issues through subsidized physiotherapy services and educational campaigns could enhance participation. Limited service availability (37.5%) and time constraints (31.3%) further indicate the necessity for flexible scheduling and expanded physiotherapy facilities at ABUTH.

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Conclusion

The findings of this study underscore the importance of physiotherapy in blood pressure management among hypertensive patients at ABUTH. A majority of patients who engage in physiotherapy report significant improvements, demonstrating its effectiveness as a complementary treatment. However, challenges such as lack of awareness, financial constraints, and limited availability of services hinder its full utilization. Addressing these barriers is crucial to maximizing the benefits of physiotherapy in hypertension management.

Recommendations

1. Enhance Patient Engagement Through Follow-Up and Motivation Programs. Since 62.5% of patients regularly engage in physiotherapy, healthcare providers should build on this momentum by developing structured follow-up systems and motivational counseling sessions to encourage sustained participation. This will help occasional and rare participants (31.3% and 6.3%) become more consistent in attending sessions, improving overall outcomes.
2. Integrate Physiotherapy as a Core Component of Hypertension Treatment Plans. With 68.8% of patients reporting significant blood pressure reduction through physiotherapy, it is recommended that Ahmadu BelloTeaching Hospital formally integrate physiotherapy into routine hypertension care protocols. Physicians should be encouraged to refer patients regularly, and physiotherapy should be promoted as a key non-pharmacological intervention.
3. Address Awareness and Cost Barriers Through Public Campaigns and Subsidies. Given that lack of awareness (50%) and high cost (43.8%) are major barriers, the hospital should launch targeted awareness campaigns on the benefits of physiotherapy for blood pressure management. Additionally, collaboration with health insurance schemes or NGOs to subsidize costs will enhance accessibility and encourage wider utilization of the service.

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