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Efforts to Control Blood Pressure for Prolanis Hypertension Members through the Utilization of Bay Leaf Decoction

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ABSTRACT Hypertension remains a significant public health concern in coastal communities, particularly among fisher populations with high dietary sodium intake. Bay leaves (*Syzygium polyanthum*), a readily available and affordable culinary herb, contain bioactive compounds that demonstrate antihypertensive properties, offering a safer alternative to conventional pharmacological interventions. This study addresses the elevated hypertension prevalence among residents of Sreseh, where occupational patterns contribute to unhealthy dietary practices. This community service initiative aimed to enhance health literacy regarding hypertension management through herbal remedies and to evaluate the efficacy of bay leaf decoction in reducing blood pressure among hypertensive patients enrolled in the Chronic Disease Management Program (PROLANIS) at Sreseh Health Center, Sampang, Madura. The intervention employed a dual-approach methodology incorporating educational lectures and practical demonstrations. Educational sessions covered hypertension prevention strategies, the therapeutic properties of bay leaves, and evidence-based preparation techniques for bay leaf decoction. Practical demonstrations illustrated proper processing methods for optimal therapeutic benefit. The target population comprised PROLANIS hypertensive members from Noreh Village. Participants demonstrated high engagement throughout the intervention phases, including baseline blood pressure assessment, exercise programs, and educational sessions. Post-intervention blood pressure monitoring revealed a significant reduction in hypertension prevalence, decreasing from 76.67% to 46.67%, representing a 30% relative reduction among PROLANIS members following regular consumption of bay leaf decoction. The integration of bay leaf decoction into hypertension management protocols demonstrates promising therapeutic potential within community health programs. This cost-effective, culturally acceptable intervention warrants further investigation through controlled clinical trials to establish standardized dosing regimens and long-term efficacy.

INDEX TERMS Hypertension Management, Bay Leaf Decoction, Herbal Antihypertensive, Community Health Intervention, PROLANIS Program

I. INTRODUCTION

Hypertension, characterized by persistent elevation of systolic blood pressure exceeding 140 mmHg and diastolic blood pressure surpassing 90 mmHg, represents a critical non-communicable disease (NCD) with substantial global health implications [1]. This chronic cardiovascular condition not only compromises quality of life but also significantly increases mortality risk among affected populations [2]. The World Health Organization projects that by 2020, NCDs will account for approximately 73% of global mortality and 60% of worldwide morbidity [3]. Within the Indonesian context, hypertension poses a particularly severe public health challenge, with NCDs responsible for approximately 1.3 million deaths among the nation's 261 million inhabitants [4]. The pathophysiological consequences of inadequately controlled hypertension extend to multiple organ systems,

precipitating myocardial infarction, cerebrovascular accidents, renal dysfunction, and visual impairment [5]. As a primary risk factor for cardiovascular disease, early identification and management of hypertension are imperative for preventing advanced cardiovascular complications and associated morbidities [6]. The etiology of hypertension encompasses multifactorial determinants, including advancing age, biological sex, lifestyle behaviors, sedentary habits, hypercholesterolemia, and diabetes mellitus [7]. Sreseh sub-district in Sampang Regency constitutes a coastal community where fishing serves as the predominant livelihood. Within the Sreseh Community Health Center catchment area, the prevalence of hypertension among Prolanis (Chronic Disease Management Program) participants, including those with concurrent diabetes mellitus, exceeds 60 individuals. Dietary patterns

characterized by excessive sodium consumption in both solid and liquid forms, tobacco use, overconsumption of instant dietary supplements, habitual coffee intake, and insufficient physical activity contribute substantially to the elevated hypertension burden [8]. The coexistence of hypertension and hypercholesterolemia significantly amplifies cerebrovascular and cardiovascular event risks [9]. Furthermore, the prevalent practice of consuming well water with elevated mineral hardness and sodium content among coastal populations exacerbates hypertension prevalence [10]. Epidemiological evidence demonstrates a significant correlation between elevated sodium intake and hypertension incidence [11]. Clinical guidelines recommend limiting daily sodium consumption to 2.4 grams or 6 grams of sodium chloride for hypertensive individuals, with approximately two tablespoons of table salt considered acceptable for the Indonesian population [12].

The Prolanis program provides systematic management for patients with chronic NCDs, including hypertension and diabetes mellitus [13]. Monthly activities encompass medical consultations, blood pressure monitoring, structured physical exercise, and pharmaceutical distribution at the Sresheh Community Health Center. However, suboptimal adherence to antihypertensive medication regimens and limited health literacy regarding lifestyle modifications result in more than 50% of Prolanis participants maintaining blood pressure readings above therapeutic targets. This high prevalence of uncontrolled hypertension, attributable to medication non-compliance, necessitates the exploration of accessible complementary therapeutic alternatives. Bay leaves (*Syzygium polyanthum*) represent a promising phytotherapeutic intervention for hypertension management. These botanicals are readily available, economically accessible, and traditionally utilized as culinary herbs [14]. The antihypertensive properties of bay leaves are attributed to bioactive compounds, including flavonoids, essential oils, potassium, and alkaloids, which exhibit diuretic effects [15]. Flavonoids enhance systemic circulation and prevent atherosclerotic vascular changes [16]. Additionally, these compounds reduce systemic vascular resistance, induce vasodilation, and modulate angiotensin-converting enzyme (ACE) activity by inhibiting angiotensin I conversion to angiotensin II, thereby reducing blood pressure through vasodilatory and ACE-inhibitory mechanisms [17]. The antioxidant properties of flavonoids contribute to hypertension prevention and cholesterol reduction [18]. Tannins function as antioxidants and hypocholesterolemic agents through interaction with intestinal mucosal proteins and epithelial cells, inhibiting lipid absorption [19]. Saponins facilitate cholesterol binding to bile acids, promoting cholesterol reduction and maintaining vascular elasticity [20].

Previous investigations have demonstrated the efficacy of bay leaf decoction in reducing blood pressure among hypertensive populations [21][22]. Research by Silalahi (2020) documented significant reductions in mean systolic/diastolic blood pressure from 166.50/104.00 mmHg to 137.50/79.00 mmHg following bay leaf extract

administration in elderly hypertensive patients [23]. Despite these promising findings, a research gap exists regarding the systematic implementation and evaluation of bay leaf interventions within structured community health programs, particularly among Prolanis participants in coastal Indonesian communities [24], [25], [26]. This study aimed to evaluate the effectiveness of bay leaf decoction as a complementary intervention for blood pressure control among hypertensive Prolanis members in the Sresheh Community Health Center service area, Sampang, Madura. The contributions of this research include:

1. Providing empirical evidence on the efficacy of an accessible, cost-effective herbal intervention for hypertension management in resource-limited settings.
2. Demonstrating a systematic community-based implementation model integrating traditional phytotherapy with conventional Prolanis activities.
3. Offering insights into culturally appropriate health interventions for coastal communities with high hypertension prevalence.

The remainder of this article is organized as follows: Section II describes the methodology employed in this community service initiative; Section III presents the results and findings; Section IV discusses the implications and limitations; and Section V concludes with recommendations for future research and practice.

II. METHOD

A. STUDY DESIGN AND POPULATION SAMPLING

This study employed a prospective quasi-experimental design with pre-post intervention assessment [27]. The intervention utilized a mixed-methods approach combining educational lectures, practical demonstrations, and supervised herbal supplementation to evaluate the efficacy of bay leaf decoction in reducing blood pressure among hypertensive patients enrolled in the Chronic Disease Management Program (PROLANIS) [28]. The study was conducted at Sresheh Community Health Center (Puskesmas), Sampang Regency, Madura, Indonesia. The target population comprised PROLANIS members diagnosed with hypertension residing in Noreh Village within the Sresheh Health Center catchment area. This coastal community is characterized by a predominantly fishing-based economy with high dietary sodium intake patterns [29]. Inclusion criteria: (1) registered PROLANIS members with documented hypertension diagnosis (systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg); (2) aged 18 years or older; (3) willing to participate in all intervention phases; (4) able to provide informed consent. Exclusion criteria: (1) pregnant or lactating women; (2) individuals with known allergies to bay leaves or related botanical species; (3) patients with severe comorbidities requiring intensive medical management; (4) inability to attend scheduled program activities. The study population was recruited through convenience sampling, with all eligible PROLANIS members invited to participate. A total of 30 hypertensive patients were enrolled after meeting eligibility criteria and providing voluntary consent [30].

B. INTERVENTION COMPONENTS

Initial coordination was established with the Sresheh Community Health Center administration to ensure alignment with existing PROLANIS operational protocols and obtain institutional approval [31]. Baseline assessment encompassed: (a) blood pressure measurement using standardized protocols with calibrated digital sphygmomanometers; (b) pre-test evaluation of participants' knowledge regarding hypertension management, lifestyle modification strategies, and herbal remedies; (c) documentation of demographic characteristics, medication history, and comorbid conditions. Structured educational sessions were delivered through didactic lectures utilizing multimedia presentations covering: (a) pathophysiology and complications of uncontrolled hypertension; (b) evidence-based prevention and management strategies; (c) pharmacological and non-pharmacological treatment modalities; (d) phytochemical composition and antihypertensive mechanisms of *Syzygium polyanthum*; (e) proper preparation techniques for bay leaf decoction [32]. Educational materials, including illustrated modules on hypertension management and bay leaf preparation protocols, were distributed to all participants to facilitate knowledge retention and home implementation. Interactive question-and-answer sessions followed each lecture to address participant queries and clarify misconceptions.

Standardized demonstration sessions illustrated the evidence-based preparation method for therapeutic bay leaf decoction. The protocol consisted of: (a) selecting 10-15 fresh bay leaves (*Syzygium polyanthum*), thoroughly washed; (b) boiling leaves in 400 mL of water for 15 minutes until the volume reduced to approximately 200 mL; (c) straining the decoction and allowing it to cool to room temperature; (d) consuming 100 mL of the decoction twice daily (morning and evening) before meals [33]. Participants practiced the preparation technique under supervision to ensure proper methodology and were provided with standardized measurement tools and instruction sheets for home preparation. Participants consumed bay leaf decoction following the standardized protocol for 30 consecutive days while maintaining their prescribed antihypertensive medications. Compliance was monitored through daily self-reported logs and weekly telephone follow-ups. Participants were instructed to report any adverse effects immediately [34]. Throughout the intervention period, ongoing educational support and consultation were provided during weekly PROLANIS meetings and through designated communication channels to reinforce adherence and address concerns regarding blood pressure management and complication prevention.

C. DATA COLLECTION AND DATA ANALYSIS

The primary outcome measure was the change in blood pressure from baseline to post-intervention (Day 30). Blood pressure was measured following standardized protocols: participants rested for 5 minutes in a seated position, measurements were taken on the right arm at heart level

using calibrated digital sphygmomanometers, and three consecutive readings were obtained with 1-minute intervals, with the average recorded [35]. Secondary outcomes included: (a) proportion of participants achieving blood pressure control (systolic BP <140 mmHg and diastolic BP <90 mmHg); (b) post-intervention knowledge assessment scores; (c) participant-reported adherence to bay leaf decoction protocol; (d) adverse event documentation. Descriptive statistics were calculated to summarize demographic characteristics and baseline parameters. Pre- and post-intervention blood pressure values were compared to determine the proportion of participants achieving hypertension control. Knowledge assessment scores were analyzed to evaluate educational intervention effectiveness [36].

III. RESULTS



FIGURE 1. Blood Pressure Measurement Activities Conducted in Noreh Village Community, Madura



FIGURE 2. Community-Based Exercise Program for Elderly Hypertension Prevention and Functional Mobility

The community service intervention was implemented in Noreh Village within the Sresheh Community Health Center catchment area, Sampang Regency, Madura, from March to June 2022. Following preliminary coordination with institutional stakeholders, including the Sresheh Health Center administration and village leadership, 40 PROLANIS members diagnosed with hypertension were invited to participate in the intervention program. Of these, 30 participants attended the scheduled activities, yielding a participation rate of 75%. Initial assessment activities were conducted on April 5, 2022, to establish baseline parameters and evaluate participants' existing knowledge regarding hypertension management and dietary modifications. The assessment revealed suboptimal understanding of therapeutic nutritional strategies among PROLANIS members, which correlated with persistently elevated blood pressure readings despite ongoing participation in monthly PROLANIS monitoring activities. Baseline blood pressure measurements were obtained for all 30 participants following standardized protocols. Pre-intervention screening

demonstrated that the majority of participants exhibited uncontrolled hypertension, with 23 individuals (76.67%) presenting blood pressure values exceeding threshold criteria (systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg), while 7 participants (23.33%) demonstrated normotensive readings (Table 1). The comprehensive intervention was delivered on May 7, 2022, through a structured multi-component program encompassing four sequential phases: Initial blood pressure assessment was conducted for all participants using calibrated digital sphygmomanometers, establishing baseline hypertensive status prior to educational and therapeutic interventions (FIGURE 1). The measurements confirmed an elevated prevalence of uncontrolled hypertension within the study cohort. A supervised 20-minute exercise session specifically designed for elderly populations was implemented to promote cardiovascular circulation, enhance joint mobility, and mitigate hypertension risk factors (FIGURE 2). Participants demonstrated high engagement levels, actively performing prescribed light-intensity movements throughout the session. The exercise component was well-tolerated, with no adverse events reported. Structured educational sessions addressed hypertension pathophysiology, prevention strategies, and potential complications of inadequately controlled blood pressure. The didactic presentation utilized evidence-based content delivered through an interactive lecture format (FIGURE 3).



FIGURE 3. Counseling for Prolanis Members with Hypertension Use of Bay Leaves

Participant attention and engagement were maintained throughout the educational component, as evidenced by active participation and spontaneous questioning during the session. Comprehensive instruction on the therapeutic application of bay leaves (*Syzygium polyanthum*) for hypertension management was provided, encompassing: (a) phytochemical composition and antihypertensive mechanisms; (b) additional health benefits, including glycemic control, lipid reduction, weight management, and antioxidant properties; (c) standardized preparation methodology. Live demonstration illustrated proper techniques for ingredient selection, washing protocols, and decoction preparation (FIGURE 4). Participants exhibited sustained attention throughout the demonstration, carefully observing each procedural step and actively engaging with the presented information regarding therapeutic benefits. Following the educational intervention, participants were instructed to consume standardized bay leaf decoction twice daily for a 30-day period while maintaining prescribed antihypertensive medication regimens. An evaluation assessment was conducted on June 10, 2022, approximately one month following intervention implementation. Post-intervention blood pressure measurements were obtained

using identical protocols employed during baseline assessment to ensure methodological consistency. Comparative analysis of pre- and post-intervention blood pressure distributions revealed substantial improvement in hypertension control rates.

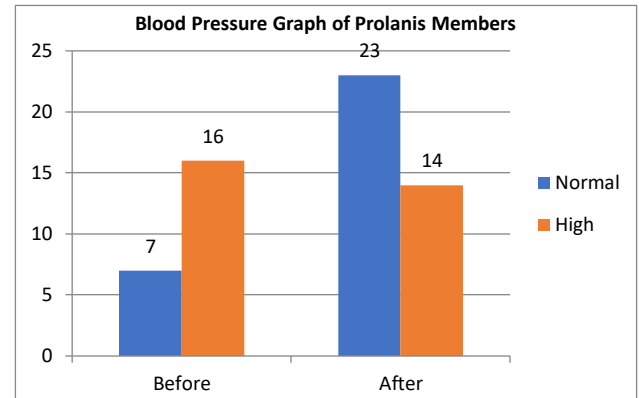


FIGURE 4. Counseling for Prolanis Members with Hypertension Use of Bay Leaves

TABLE 1

Blood Pressure Results Of Prolanis Hypertension Members In The Working Area Of Sreseh Health Center, Sampang, Madura, Before And After The Education Program

Blood Pressure Examination Results	Before		After	
	Frequency	Percentage	Frequency	Percentage
Normal	7	23.33	16	53.33
High	23	76.67	14	46.67
Total	30	100	30	100

Following the 30-day intervention period incorporating bay leaf decoction supplementation and lifestyle education, 16 participants (53.33%) achieved normotensive status, while 14 individuals (46.67%) remained hypertensive. This represented an absolute reduction of 9 participants transitioning from hypertensive to normotensive classification. The intervention yielded a 30% relative reduction in the proportion of participants with uncontrolled hypertension, calculated as:

$$\left(\frac{23 - 14}{23} \times 100\% \right) = 39.13\%$$

Qualitative assessment indicated enhanced participant motivation for blood pressure management through both dietary modifications and complementary herbal interventions. Participants demonstrated improved understanding of hypertension control strategies, as evidenced by engagement levels throughout intervention phases and reported adherence to bay leaf decoction protocols. No adverse events attributable to bay leaf consumption were documented during the study period. The integrated intervention combining health education, physical activity, and standardized bay leaf decoction supplementation demonstrated measurable efficacy in reducing hypertension prevalence among PROLANIS participants. The substantial proportion of participants achieving blood pressure normalization suggests potential value for incorporating culturally appropriate phytotherapeutic modalities within structured chronic disease management frameworks in primary healthcare settings (TABLE 1).

IV. DISCUSSION

The present community-based intervention demonstrated significant therapeutic efficacy in hypertension management among PROLANIS participants, with blood pressure normalization achieved in 30% of initially hypertensive individuals following a 30-day bay leaf decoction supplementation protocol combined with health education and physical activity components. Pre-intervention assessment revealed that 76.67% of participants exhibited uncontrolled hypertension despite ongoing enrollment in the chronic disease management program and regular pharmacological treatment. Post-intervention evaluation demonstrated a reduction to 46.67% hypertensive prevalence, representing a clinically meaningful improvement in blood pressure control within this high-risk coastal population. The observed therapeutic outcomes can be attributed to the synergistic interaction of multiple intervention components and the biochemical properties of *Syzygium polyanthum*. The primary antihypertensive mechanism involves flavonoid compounds present in bay leaves, which function as natural angiotensin-converting enzyme (ACE) inhibitors [37]. By preventing the conversion of angiotensin I to angiotensin II, a potent vasoconstrictor, flavonoids promote vasodilation and reduce peripheral vascular resistance. This mechanism of action parallels that of pharmaceutical ACE inhibitors, suggesting that bay leaf supplementation may provide complementary therapeutic effects when administered alongside conventional antihypertensive medications [38].

Additionally, flavonoids enhance endothelial nitric oxide production, which further contributes to vascular smooth muscle relaxation and improved arterial compliance. The potassium content in bay leaves exerts diuretic effects that facilitate sodium excretion, addressing a critical pathophysiological factor particularly relevant to the study population. Given that Sreseh residents predominantly engage in fishing occupations characterized by high dietary sodium intake through preserved seafood consumption, coupled with elevated mineral content in local groundwater sources, the natriuretic properties of bay leaf decoction may prove especially beneficial in this epidemiological context [39]. Furthermore, saponin and tannin compounds present in bay leaves contribute to lipid metabolism regulation and cholesterol reduction. These constituents inhibit intestinal fat absorption and promote bile acid binding, thereby reducing serum cholesterol levels and improving vascular endothelial function. The reduction in atherosclerotic burden subsequently diminishes arterial stiffness and supports blood pressure normalization [40]. The antioxidant properties of bay leaf phytochemicals also protect against oxidative stress-induced endothelial dysfunction, a key contributor to hypertension pathophysiology. Beyond the direct pharmacological effects of bay leaf bioactive compounds, the comprehensive educational intervention likely enhanced participants' health literacy and motivation for lifestyle modification. The structured sessions addressing hypertension pathophysiology, dietary management strategies, and complication prevention empowered participants with the knowledge necessary for informed

health decision-making. The supervised exercise component provided immediate cardiovascular benefits while establishing sustainable physical activity patterns that independently contribute to blood pressure reduction. This multi-modal intervention approach addresses the complex, multifactorial etiology of hypertension more comprehensively than single-modality treatments, potentially explaining the substantial blood pressure improvement achieved within a relatively brief intervention period. The high participant engagement and sustained adherence throughout the program phases reflect the cultural acceptability and practical feasibility of integrating traditional herbal medicine with contemporary healthcare delivery systems. Unlike conventional pharmaceutical regimens that may encounter barriers related to cost, adverse effects, or complex dosing schedules, bay leaf decoction represents an affordable, accessible, and culturally congruent therapeutic option for resource-limited communities. The observed enthusiasm among PROLANIS members suggests that phytotherapeutic interventions aligned with local cultural practices may enhance treatment adherence and long-term health outcomes.

The findings of this community service intervention align with accumulating evidence supporting the antihypertensive efficacy of *Syzygium polyanthum* across diverse clinical contexts and populations. Nurtanti et al. (2022) conducted a community-based study in Wonogiri Regency and reported significant blood pressure reductions among hypertensive patients consuming bay leaf decoction, corroborating the therapeutic potential observed in the present investigation [41]. The consistency between their findings and our results, despite geographic and demographic differences between the study populations, suggests robust therapeutic effects that generalize across Indonesian hypertensive cohorts. Similarly, Ramadhan et al. (2022) documented comparable outcomes in their examination of bay leaf effects on hypertensive patients in Pasirlaja Village [42]. Their research demonstrated measurable blood pressure reductions following standardized bay leaf decoction administration, reinforcing the reproducibility of these therapeutic effects across different community settings. The concordance among multiple independent investigations conducted in varied Indonesian regions provides compelling evidence for the consistent antihypertensive properties of bay leaves and supports their potential integration into primary healthcare protocols. Particularly noteworthy is the alignment between the current results and those reported by Silalahi et al. (2020), who investigated bay leaf extract effects specifically in elderly hypertensive populations [43]. Their study documented substantial blood pressure decreases from baseline values of 166.50/104.00 mmHg to 137.50/79.00 mmHg following intervention. The magnitude of blood pressure reduction achieved in Silalahi's research represents clinically significant improvements comparable to those expected with conventional pharmacotherapy and demonstrates therapeutic efficacy extending beyond the general adult population to include elderly individuals who often experience more refractory hypertension and increased cardiovascular risk.

However, important methodological distinctions exist between the present intervention and previously reported studies that warrant consideration. Most prior investigations employed controlled experimental designs with rigorous inclusion criteria, randomized group allocation, and standardized outcome measurement protocols. In contrast, the current community service program utilized a pragmatic quasi-experimental approach reflecting real-world implementation conditions typical of resource-constrained primary healthcare settings. While this methodological difference potentially reduces internal validity and confounding control, it substantially enhances external validity and practical applicability for community health centers operating with limited resources and infrastructure. The 30% relative reduction in hypertension prevalence observed in this study compares favorably with outcomes reported for other phytotherapeutic interventions. Systematic reviews examining herbal antihypertensive agents typically report blood pressure reductions ranging from 5-15 mmHg for systolic pressure and 3-8 mmHg for diastolic pressure, with considerable heterogeneity across botanical species, preparation methods, and dosing regimens [44]. Although the present study assessed categorical blood pressure control rather than continuous pressure measurements, the substantial proportion of participants achieving normotensive status suggests a therapeutic magnitude consistent with or potentially exceeding typical herbal medicine efficacy benchmarks documented in meta-analytic literature.

An important consideration in interpreting these comparative findings involves the integrated nature of the current intervention, which combined herbal supplementation with educational and exercise components. This comprehensive approach contrasts with some prior studies that examined isolated phytotherapeutic effects without concomitant lifestyle interventions. While the multi-modal design complicates direct attribution of outcomes solely to bay leaf consumption, it more accurately reflects optimal clinical practice wherein multiple evidence-based modalities are implemented synergistically rather than in isolation [45]. The superior blood pressure control achieved through integrated interventions compared to single-modality approaches has been well-documented in chronic disease management literature, suggesting that the comprehensive strategy employed in this study may have contributed substantially to the observed outcomes. Several methodological limitations must be acknowledged when interpreting the findings of this community service intervention.

First, the quasi-experimental design without randomized control group allocation precludes definitive causal inference regarding bay leaf efficacy independent of confounding variables. Participants simultaneously received educational interventions, exercise programming, and continued pharmacological treatment, making it impossible to isolate the specific contribution of bay leaf decoction to blood pressure reductions. The absence of a control group receiving identical interventions except for bay leaf supplementation limits the ability to definitively attribute

observed outcomes to the herbal intervention. Future research should employ randomized controlled trial designs with parallel groups to establish more rigorous evidence regarding specific therapeutic effects and the mechanism of action. Second, the relatively small sample size ($n=30$) and convenience sampling methodology constrain statistical power and limit the generalizability of findings beyond the immediate study population. The absence of formal sample size calculation based on anticipated effect sizes and desired statistical significance levels represents a common limitation of pilot and feasibility studies, but nonetheless reduces confidence in the precision and reproducibility of results. Larger-scale investigations utilizing probability sampling techniques across multiple community health centers would enhance representativeness and external validity, enabling more confident extrapolation to broader hypertensive populations in similar coastal fishing communities. Third, the one-month intervention duration, while demonstrating short-term efficacy, provides no information regarding long-term sustainability of blood pressure control or potential adverse effects associated with prolonged bay leaf consumption. Hypertension management requires lifelong treatment, necessitating evaluation of extended supplementation protocols spanning months to years. The initial blood pressure reduction observed in this study may not persist over time without continued adherence to bay leaf consumption and lifestyle modifications. Longitudinal follow-up studies assessing blood pressure trajectories, cardiovascular event rates, medication requirements, and comprehensive safety parameters over extended timeframes would substantially strengthen the evidence base supporting bay leaf integration into chronic disease management programs. Fourth, the study relied on self-reported adherence to the bay leaf decoction protocol without objective verification measures. While self-report represents a pragmatic approach commonly employed in community interventions, it is subject to social desirability bias and recall error, potentially overestimating actual adherence rates. The absence of objective adherence monitoring, such as returned unused materials, electronic tracking systems, or plasma biomarker measurements of bay leaf constituents, limits understanding of dose-response relationships and prevents accurate assessment of the association between consumption patterns and therapeutic outcomes. Future investigations should incorporate validated adherence measurement tools to establish more precise efficacy estimates. Fifth, the intervention did not include standardized phytochemical analysis of the bay leaves utilized, introducing potential variability in bioactive constituent content based on factors such as plant maturity, growing conditions, seasonal variation, harvest timing, and storage duration. Pharmaceutical-grade herbal medicine development requires rigorous quality control and standardization protocols to ensure consistent therapeutic potency across batches. The absence of high-performance liquid chromatography or similar analytical techniques to quantify flavonoid, saponin, and alkaloid concentrations precludes dose standardization and quality assurance. Future research should incorporate comprehensive phytochemical profiling to establish

standardized dosing recommendations and ensure reproducible therapeutic effects.

Despite these limitations, the findings hold significant implications for public health practice and health policy in resource-constrained settings. The demonstrated feasibility of integrating affordable, culturally acceptable herbal interventions within existing chronic disease management infrastructure suggests scalable strategies for addressing inadequate hypertension control rates in underserved populations. Bay leaf decoction preparation requires only readily available botanical materials and basic cooking equipment, representing a negligible financial burden compared to lifetime pharmaceutical expenses. This cost-effectiveness may improve treatment accessibility for economically disadvantaged communities where medication costs represent significant barriers to adherence. From a policy perspective, these results support the incorporation of evidence-based phytotherapeutic modalities into national health guidelines and primary care protocols, particularly in regions with established cultural traditions of herbal medicine utilization. However, such integration must be accompanied by appropriate quality control standards, healthcare provider training programs, and patient safety monitoring systems. Regulatory frameworks should ensure botanical product purity, potency standardization, and appropriate labeling while monitoring for potential herb-drug interactions or adverse effects. Healthcare providers require education on evidence-based herbal medicine applications, appropriate patient selection criteria, and safety precautions to optimize therapeutic benefits while minimizing risks.

Future research priorities should include: (1) multi-center randomized controlled trials with adequate statistical power, blinded outcome assessment, and extended follow-up periods; (2) mechanistic investigations elucidating molecular pathways and receptor interactions underlying antihypertensive effects; (3) pharmacokinetic studies characterizing absorption, distribution, metabolism, and excretion of bioactive constituents; (4) systematic evaluation of potential herb-drug interactions with common antihypertensive medications; (5) cost-effectiveness analyses comparing bay leaf supplementation strategies against standard pharmacological approaches; and (6) qualitative research examining patient perceptions, cultural beliefs, and facilitators or barriers to herbal medicine integration in chronic disease management. In conclusion, this community-based intervention provides preliminary evidence supporting the therapeutic potential of standardized bay leaf decoction as a complementary modality in hypertension management within primary healthcare settings. The 30% reduction in hypertension prevalence achieved through integrated intervention combining phytotherapy, education, and physical activity demonstrates clinically meaningful improvement in blood pressure control among a previously poorly-controlled hypertensive population. While methodological limitations preclude definitive causal conclusions, the observed outcomes justify continued investigation through more rigorous experimental designs to establish evidence-based protocols for safe and

effective phytotherapeutic integration in chronic disease care delivery systems.

V. CONCLUSION

This community service initiative aimed to evaluate the effectiveness of bay leaf (*Syzygium polyanthum*) decoction as a complementary intervention for hypertension management among Prolanis (Program Pengelolaan Penyakit Kronis) participants in the Sresih Community Health Center catchment area, Sampang, Madura. The program was successfully implemented through a systematic approach encompassing preliminary surveys, stakeholder coordination, baseline assessments, intervention delivery, and outcome evaluation. Throughout the implementation phases, Prolanis participants, particularly those diagnosed with hypertension, demonstrated considerable enthusiasm and active participation in all program components, including blood pressure monitoring, Prolanis-prescribed physical exercise regimens, and educational sessions regarding the therapeutic properties of bay leaves. The evaluation of intervention outcomes revealed a substantial 30% reduction in the proportion of participants presenting with elevated blood pressure following regular consumption of bay leaf decoction, with prevalence decreasing from 76.67% to 46.67%. These findings provide empirical evidence supporting the efficacy of bay leaf decoction as an accessible and cost-effective adjunctive therapy for blood pressure regulation among the target population within the Sresih Community Health Center service area. The structured implementation methodology, progressing systematically from initial community surveys and inter-organizational coordination through baseline health assessments, intervention execution, and comprehensive outcome evaluation, ensured program fidelity and reliability of findings. Future research should focus on longitudinal studies to assess the sustained effectiveness of bay leaf decoction over extended periods, investigate optimal dosage protocols and preparation methods, examine potential interactions with conventional antihypertensive medications, and explore the scalability of this intervention across diverse populations and geographical settings. Additionally, further investigation into the underlying phytochemical mechanisms responsible for the observed antihypertensive effects would strengthen the scientific foundation for integrating traditional botanical remedies into evidence-based clinical practice for chronic disease management in community health settings.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Anik Handayati conceptualized and designed the study, conducted data collection and analysis, and participated in manuscript writing and revisions. Suhariyadi contributed to the development of the intervention protocol, oversaw the implementation of community service activities, and provided critical feedback on the manuscript. Pestariati assisted with data collection, participated in the educational counseling sessions, and contributed to manuscript editing. All authors reviewed and approved the final version of the manuscript and agreed to be responsible for all aspects of the work, ensuring integrity and accuracy.

DECLARATIONS

ETHICAL APPROVAL

Ethical approval is not available.

CONSENT FOR PUBLICATION PARTICIPANTS

Consent for publication was obtained from all participants.

COMPETING INTERESTS

The authors declare no competing interests.

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