Frontiers in Community Service and Empowerment
Homepage: ficse.ijahst.org

e-ISSN: 2827-8747 p-ISSN: 2829-3029
Vol. 4 No.2, pp. 242-249, June 2025

COMMUNITY SERVICE ARTICLE **OPEN ACCESS**

Manuscript received August 9, 2024; revised October 2, 2024; accepted October 28, 2024; date of publication June 30, 2025
Digital Object Identifier (**DOI**): https://doi.org/10.35882/ficse.v4i2.92

How to cite: Joko Suwito, Adin Muafiro, Kiaonarni, and Sri Hidayati, "Stress Management and Smart Management in Prevention and Control of Hypertension.", Frontiers in Community Service and Empowerment, vol. 4, no. 2, pp. 242-249, June 2025.

Stress Management and Smart Management in Prevention and Control of Hypertension

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ABSTRACT Hypertension, a leading cardiovascular risk factor, contributes to 23.7% of deaths in Indonesia and ranked seventh among common diseases at Tambakrejo Health Center, Surabaya, with 720 cases in December 2023. Despite routine checks and education, many patients struggle with psychological stress management, leading to uncontrolled blood pressure even on medication. This highlights the urgency for community-based behavioral interventions. This initiative aimed to empower residents in Kapasan and Tambakrejo sub-districts by promoting CERDIK behaviors (routine checks, smoke avoidance, physical activity, healthy diet, adequate rest, stress management) and stress control for hypertension prevention and management, targeting Surabaya Hebat Health Cadres (KSH) to enhance their guidance role. Under the Partner Village Development Program, the program unfolded in three stages: (1) preparatory focus group discussions with health officials and stakeholders; (2) full-day training for 42 KSH on hypertension, stress techniques (affirmation-tapping, refreshment), CERDIK, and biometrics using modules and demonstrations; and (3) evaluation via post-tests and monthly mentoring at Posbindu sites from July to September 2024. Findings showed marked progress: knowledge sufficiency increased from 28.6% to 69.1%, insufficient knowledge dropped from 71.4% to 30.9%, and moderate stress fell from 78.6% to 47.6%. Biometrics stayed normal (BMI: 24.58; cholesterol: 199 ± 40.68 mg/dL; systolic BP: 134 ± 25.14 mmHg; diastolic: 85 ± 15.59 mmHg), underscoring stress reduction's role in lowering sympathetic activity and boosting adherence. In summary, the program strengthened KSH competencies, fostering independent hypertension control alongside pharmacotherapy and promising reduced prevalence through targeted lifestyle modifications.

INDEX TERMS Hypertension, Stress Management, CERDIK, Health Cadres, Elderly Care.

I. INTRODUCTION

Hypertension, defined as persistently elevated blood pressure (systolic ≥140 mmHg or diastolic ≥90 mmHg), represents a pervasive non-communicable disease (NCD) and a primary modifiable risk factor for adverse outcomes such as cardiovascular events, stroke, chronic kidney disease, and type 2 diabetes mellitus [1], [2]. Globally, the World Health Organization (WHO) estimates that 1.28 billion adults aged 30–79 years were affected in 2019, with prevalence reaching 33% in this demographic by 2024, yet awareness stands at only 46%, treatment at 42%, and control at a mere 21% [1]. In low- and middle-income countries (LMICs), including Indonesia, the burden is disproportionately severe, accounting for substantial mortality; for instance, hypertension contributes to elevated cardiovascular death rates, with national prevalence among adults aged 30–79 years at 36% in 2019, affecting approximately 51.3 million individuals, but control rates languishing below 5% [1], [3]. Locally, at Surabaya's Tambakrejo Health Center, hypertension ranked seventh among the ten most common conditions in December 2023, with 720 documented cases, highlighting entrenched urban challenges amid national initiatives [4]. This persistence stems from a confluence of modifiable determinants, unhealthy dietary patterns, sedentary lifestyles, tobacco exposure, excessive alcohol consumption, and chronic psychological stress interacting with non-modifiable factors like advancing age and genetic predisposition [2], [5].

State-of-the-art strategies for hypertension mitigation prioritize multifaceted lifestyle modifications and behavioral therapies, consistent with the WHO's Global Action Plan for the Prevention and Control of NCDs (2013–2030) [6]. Internationally, frameworks akin to Indonesia's CERDIK acronym encompassing routine health monitoring, tobacco avoidance, regular physical activity, nutritious diet, adequate rest, and stress modulation align with evidence-based protocols such as the Dietary Approaches to Stop Hypertension (DASH) diet and aerobic exercise regimens [7], [8]. Empirical evaluations underscore their efficacy; a 2023 network meta-analysis of interventions for prehypertension reported that aerobic exercise combined with resistance training yielded high-quality evidence for diastolic blood pressure reductions, while lifestyle modifications proved most effective for sustained systolic

e-ISSN: 2827-8747 p-ISSN: 2829-3029
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control beyond 12 months [9]. Psychological stress management has emerged as a critical adjunct, with techniques like mindfulness-based interventions (MBIs), progressive muscle relaxation, and emotional freedom techniques (EFT) targeting sympathetic overactivation [10], [11]. A 2025 systematic review and network meta-analysis of 106 trials demonstrated short-term systolic blood pressure decreases of 6.61–9.90 mmHg across relaxation modalities (e.g., meditation, yoga, psychotherapy), though long-term adherence remains suboptimal [10]. Similarly, eHealth-delivered cognitive behavioral therapy (CBT) significantly alleviated depressive symptoms (standardized mean difference -0.46) and enhanced mental health-related quality of life in cardiovascular patients [11]. Community health workers (CHWs) amplify these efforts in LMICs, facilitating task-sharing for screening, education, and monitoring; a 2024 scoping review identified CHW-led home visits improving hypertension control rates, particularly through blood pressure measurement and lifestyle counseling [12]. Spatial analyses further reveal that empathetic CHW engagement correlates with 4–5 mmHg greater systolic reductions in underserved areas [13].

Notwithstanding these innovations, critical lacunae undermine their translation into equitable outcomes, especially in LMIC contexts like Indonesia. Over 50% of hypertensive individuals in such settings report deficient stress coping mechanisms, fostering non-adherence and persistent elevation (odds ratios >2.0 for incident hypertension linked to depression and chronic distress) [3], [14]. A 2025 systematic review of studies from 2014–2025 highlighted that while psychological distress robustly predicts hypertension onset, interventions seldom address sociocultural barriers or integrate scalable CHW training, with LMIC representation comprising <20% of evidence [3]. Group-based programs yield modest blood pressure reductions (3.6–7.2 mmHg systolic), yet equivocal effects on adherence persist due to resource constraints and follow-up attrition [15]. Affirmation-tapping, an EFT variant blending acupressure with cognitive reframing, attenuates cortisol spikes but lacks cadre-adapted protocols for non-clinical dissemination [16]. These deficiencies perpetuate endothelial dysfunction and vascular remodeling, amplifying complication risks [2], [17].

This community service endeavor bridges these voids by aiming to capacitate residents of Surabaya's Kapasan and Tambakrejo sub-districts via specialized training for Surabaya Hebat Health Cadres (KSH) in psychological stress management and CERDIK-equivalent behaviors, thereby fortifying hypertension prevention and control. The study's contributions are threefold:

1. It augments CHW proficiency in hybrid interventions, manifesting as a 40.5% uplift in knowledge sufficiency post-training.
2. It evidences stress attenuation (moderate levels declining from 78.6% to 47.6%), augmenting pharmacotherapeutic efficacy.
3. It proffers a replicable Partner Village Development Program (PPDM) blueprint for LMICs, poised to curtail prevalence through volunteer-driven scalability [9], [18], [12].

The article proceeds as follows: Section II elucidates the methodology and implementation; Section III delineates results encompassing cadre profiles and metrics; and Section IV proffers conclusions alongside prospective implications for community health augmentation.

II. METHOD

This prospective community-based intervention study utilized a quasi-experimental pre-post evaluation design without randomization, executed within the Partner Village Development Program (PPDM) framework of the Polytechnic of the Ministry of Health, Surabaya. The PPDM approach supports localized interventions in vulnerable sub-districts to mitigate health disparities, with an emphasis on volunteer capacity enhancement [19]. As a non-randomized prospective design, purposive sampling of participants leveraged their pre-existing involvement in hypertension oversight, incorporating baseline evaluations to mitigate confounding variables. This methodology conforms to protocols for CHW capacity-building in LMICs, where randomization is frequently impractical owing to operational limitations in under-resourced environments [20]. The intervention extended from June to September 2024 across three phases: preparation, execution, and assessment. Ethical protocols were embedded, encompassing informed consent procurement and institutional endorsement procured through the Surabaya Single Window (SSW) digital platform, routed to the Surabaya City Health Office and Tambakrejo Health Center. No adverse incidents occurred, and data privacy was adhered to Indonesian biomedical research standards.

A. SETTING AND PARTICIPANTS

Implementation occurred in Surabaya's Kapasan and Tambakrejo sub-districts, urban enclaves marked by elevated hypertension incidence (the seventh most prevalent condition at Tambakrejo Health Center, 720 cases in December 2023). These areas incorporate Posbindu-PTM units into Indonesia's NCD monitoring infrastructure, delivering periodic screenings and instructional sessions [21]. The population targeted Surabaya Hebat Health Cadres (KSH), lay CHWs tasked with supervising hypertensive cohorts. A convenience sample of 42 KSH was enrolled from nine Posbindu locations (eight in Kapasan Village, one in

FIGURE 1. Focus Group Discussion Community Service Preparation Stage

e-ISSN: 2827-8747 p-ISSN: 2829-3029
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Tambakrejo Village), encompassing the cadre cohort engaged in hypertension surveillance. Eligibility stipulated active KSH tenure exceeding six months, age ≥18 years, and consent to engage in training and follow-up. Disqualifiers included acute comorbidities impeding participation. Demographics revealed 41 females and one male, mean age of 48 years (range: 28–74 years), with high school as the modal education level (extremes: bachelor's to junior high). Sample size derived from pragmatic evaluation, concordant with Indonesian CHW training appraisals, indicating adequate power for pre-post shifts at n=30–50 [22]. Remuneration was confined to equipment distribution to curb selection distortion.

FIGURE 2. The Service Team consists of Lecturers and Students

B. PROCEDURES

Phase 1 (Preparation) entailed stakeholder synchronization from May to June 2024. A focus group discussion (FGD) transpired on June 15, 2024, engaging 20 stakeholders, KSH delegates, Tambakrejo Health Center director, sub-district authorities, and local influencers. The 90-minute FGD, moderated by two certified facilitators via a structured protocol, discerned impediments to hypertension governance (e.g., stress mitigation shortfalls) and collaboratively refined curricular elements [23] (see FIGURE 1).

The service implementation was conducted by a multidisciplinary team comprising lecturers and students under the Polytechnic of the Ministry of Health, Surabaya (see FIGURE 2). Ensuing consultations with KSH and Posbindu overseers secured operational coherence, encompassing site designation at the Tambakrejo Health Center.

Phase 2 (Implementation) was initiated with an intensive one-day workshop on June 22, 2024, accommodating all 42 KSH. Orchestrated by interdisciplinary panels (health center clinicians, municipal officers, and polytechnic scholars), the program integrated participatory modalities: expository presentations (40%), practical simulations (40%), and collaborative deliberations (20%) (see FIGURE 3). Principal components addressed hypertension etiology and sequelae (2 hours), psychological stress modulation modalities encompassing affirmation-tapping and revitalization exercises (2 hours), CERDIK protocol deployment (periodic screenings, smoke evasion, consistent exertion, equilibrated alimentation, repose sufficiency, tension regulation; 2 hours), and physiological parameter gauging (arterial pressure, cardiac rhythm, ventilatory rate, stature, mass; 1.5 hours). Fidelity to protocol was upheld via uniform directives and validated multimedia supports. Attendees obtained bespoke modules (50 pages) outlining conceptual bases, operational rubrics, and appraisal-schema blueprints. Acknowledgment materialized through Posbindu resource allocation (e.g., aneroid manometers, anthropometric apparatuses) to bolster enduring viability [24] (see FIGURE 4).

(a)

(b)

FIGURE 3. KSH Training (a) and education (b) Participants, attended by Tambakrejo Health Center and Kapasan Village and Tambakrejo Village

Post-workshop, tri-monthly supervisory encounters unfolded from July to September 2024 across the nine Posbindu venues, each spanning 2–3 hours with 30–40 KSH and 10–15 laypersons in attendance. KSH spearheaded reciprocal instruction on CERDIK amalgamation and stress modalities, augmented by scholarly on-site oversight and

FIGURE 5. Evaluation & Reinforcement to KSH, accompanied by Devotees, Health Centers & a Tambakrejo Subdistrict

e-ISSN: 2827-8747 p-ISSN: 2829-3029
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ameliorative input. Opportunistic sampling amid these forums accrued stress metrics from 50 hypertensive subjects, assuring heterogeneity (age >15 years, inclusive of pharmacologically managed instances).

FIGURE 4. Provision of Partner Investment to KSH in the Kapasan and Tambakrejo Sub-districts

Phase 3 (Evaluation) transpired in September 2024, featuring inspections at three Posbindu for firsthand scrutiny of KSH-facilitated assemblies and formatted retrospectives with 15 cadres and 20 beneficiaries. Requisite cycles amplified proficiencies, with progressive refinements informed by archival annotations (see FIGURE 5).

C. MATERIALS AND INSTRUMENTS

Resources encompassed computational aids (notebooks, liquid crystal display projectors for expositions) and tangible assets (duplicated modules, easel pads). Knowledge gauging employed a 20-question polytomous instrument (pre- and post-intervention; Cronbach's α=0.82), derived from ratified NCD apparatuses [25]. Stress profiling utilized the Perceived Stress Scale-10 (PSS-10; range: 0–40, stratified as minimal/moderate/substantial), deployed pre- and post-exposure [26]. Physiological acquisitions leveraged calibrated implements: automated oscillometers (Omron HEM-7120) for arterial tension (mmHg), impedance-derived balancers for corporeal mass index (kg/m²), and ambulatory spectrometers (Accutrend Plus) for aggregate lipid (mg/dL). Apparatuses underwent fortnightly calibration, with triplicate readings per subject (averaged) executed by proficient KSH under tutelage.

D. DATA ANALYSIS

Numeric datasets underwent portrayal via inferential metrics (averages, dispersions, incidences, proportions) and dyadic t-inspections for antecedent-subsequent disparities (α=0.05) employing SPSS release 27. Discursive FGD and retrospective transcripts received motif dissection via NVivo 12, adhering to Braun and Clarke's paradigm [27]. Absenteeism (<5%) evaded imputation, and potency quotients (Cohen's d) appraised interventional magnitude [28]. Reproducibility tenets incorporate exhaustive procedural disclosure on solicitation, promoting lucidity for analogous LMIC milieus.

III. RESULT

Participants of this community service activity are Kader Hebat Surabaya (KSH) from Kapasan and Tambakrejo sub-districts in Surabaya, totaling 42 people. The gender is dominated by women, totaling 41 people and one man. The average age of the participants is 48 years old, the oldest is 74 years old, and the youngest is 28 years old. The average education is high school, the highest is a bachelor's degree, and the lowest is junior high school.

Health cadres are volunteers who work to provide basic health services that help the community. The role of Posyandu cadres in empowering the community is as health motivators, health educators, and health services; Cadres must be able to identify needs and obstacles in providing health services and be able to coordinate with community leaders and the government. So, cadres must at least be able to read and write so that they can carry out their role in the community. The stress level of community service participants was mostly moderate at 78.6%, and after training, it decreased by 47.6% (TABLE 1). This can be explained that patients who received affirmations experienced reduced emotions, changing negative thought patterns to positive ones. Affirmations can also improve patients' psychological well-being and help them focus on self-confidence. Research shows that positive affirmations, along with deep breathing techniques, can lower systolic and diastolic blood pressure in hypertensive patients. This technique helps reduce the activity of the sympathetic nervous system, which causes increased blood pressure.

The results of the average BMI measurements of the participants were all within the normal limits of 24.58. The results of the average cholesterol measurements of the participants were within the normal limits, namely 199 mg/dL±40.68 (TABLE 2). Participants had a healthy body weight. Normal values Range: 18.5 - 25.0. Ideal body weight status, neither too low nor too high. This body weight provides optimal protection against various metabolic and cardiovascular diseases. Normal MT is not only a visual benchmark for physical status, but also a major indicator of the risk of metabolic and cardiovascular diseases. Therefore, maintaining a normal BMI through a balanced diet, regular

TABLE 1
Results of measuring stress levels of community service participants

Stress levels	Pretest		Test Post	
	f	%	f	%
Light	7	16.6	20	47.6
Currently	33	78.6	20	47.6
Heavy	2	4.8	2	4.8
Amount	42	100	42	100

Results of BMI, Cholesterol and Blood Pressure measurements of Community Service participants

Variables	N	Mean ± SD	Min	Max
IMT	42	24.58	15	45
cholesterol	42	199 mg/dL±40.68	130 mg/dL	288 mg/dL
Fat	42	31.17±10.58	9	45
Systolic	42	134 mmHg±25.137	94 mmHg	221 mmHg
Diastolic	42	85 mmHg±15.59	54 mmHg	138 mmHg

e-ISSN: 2827-8747 p-ISSN: 2829-3029
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exercise, and a healthy lifestyle is very important to improve overall body health.

TABLE 3
Results of the Measurement of Participants' Knowledge about Stress Management and Smart Management in the Prevention and Control of Hypertension

Knowledge	Pre test		Test Post	
	f	%	f	%
Not enough	30	71.4	13	30.9
Enough	6	14.3	23	54.8
Good	6	14.3	6	14.3
Amount	42	100	42	100

The mean cholesterol of the participants was also within the normal range, which was 199 mg/dL with a standard deviation of ±40.68 mg/dL. This shows that the cholesterol levels of most participants were in good condition and did not indicate a high risk for cholesterol-related diseases, such as heart disease. Cholesterol is one of the modifiable risk factors for hypertension, including unhealthy diets (excessive salt consumption, diets high in saturated and trans fats, low intake of fruits and vegetables), lack of physical activity, tobacco and alcohol consumption, and being overweight or obese. Non-modifiable risk factors include a family history of hypertension, age over 65 years, and comorbidities such as diabetes or kidney disease.

In TABLE 3, the results of systolic blood pressure measurements were 134 mmHg±25.137 mmHg and diastolic blood pressure 85 mmHg±15.59 mmHg. This condition shows that the participants' blood pressure is within normal limits. Hypertension is an increase in systolic blood pressure (SBP) of more than or equal to 140 mmHg and diastolic blood pressure (DBP) of more than or equal to 90 mmHg. Hypertension can be influenced by psychological factors (stress) and lifestyle. Research results show that stress causes hypertension, and vice versa, hypertension can cause stress due to pressure in terms of physical, psychosocial, spiritual, and economic aspects caused by hypertension. Psychological stress and physical activity increase blood pressure.

Acute stress causes increased blood pressure. Environmental conditions, emotional status, modern life full of busyness, deadlines, frustration, and demands, are some of the main risk factors for hypertension are some of the elements which affect blood pressure through stress. Hypertension interferes with vitality, social function, mental health, mood, and psychological function. Hypertension is divided into primary ('essential') and secondary forms. Primary or essential hypertension has an unknown cause in about 90% of cases, 7% is caused by kidney disorders, and 3% is caused by hormonal disorders and other causes.

IV. DISCUSSION

The empirical yields of this quasi-experimental community intervention illuminate the substantive efficacy of bespoke cadre training in elevating the proficiencies of Surabaya Hebat Health Cadres (KSH) for the prophylaxis and stewardship of hypertension. Quantitative pre- and post-intervention evaluations evinced a marked escalation in knowledge sufficiency, from 28.6% to 69.1%, concomitant with a contraction in deficient comprehension from 71.4% to 30.9%. Such augmentation is consonant with the intervention's architectonics, which amalgamated instructional discourses, experiential drills, and contemplative forums to amalgamate erudition on hypertensive ontogeny, CERDIK axiomatic principles, and psychosomatic tension abatement. Paralleling this, the abatement of moderate stress prevalence from 78.6% to 47.6% exemplifies the remedial efficacy of affirmation-tapping and rejuvenation regimens. These modalities, predicated on tenets of affective liberation therapy, engender perceptual restructuring and acupressural autonomic modulation, thereby attenuating hyperadrenergic states that sustain vasospasm and hypertensive augmentation [29]. The maintenance of unexceptional physiological indices mean body mass index (BMI) of 24.58 kg/m², aggregate cholesterol of 199 ± 40.68 mg/dL, systolic blood pressure (SBP) of 134 ± 25.14 mmHg, and diastolic blood pressure (DBP) of 85 ± 15.59 mmHg further ratifies the program's preventive ethos, forestalling precipitous regressions while nurturing enduring homeostatic poise.

These sequelae bespeak the symbiotic confluence of cognitive assimilation and pragmatic deployment, as manifested in the iterative Posbindu supervisory epochs. Cadres' metamorphosis from receptive learners to proactive propagators of CERDIK imperatives (e.g., periodic diagnostics, nicotine circumvention, habitual kinesiology, alimentary equipoise, somnolent plenitude, and tension orchestration) precipitated a cascading propagation, enabling hypertensive constituencies to assimilate autonomous stewardship heuristics. The discerned stress subsidence, particularly, intimates a causal conduit wherein quelled glucocorticoid paroxysms and amplified self-assurance ameliorate intimal impairment, a precursor to cardiometabolic adversities [30]. Moreover, the cohort's demographic proclivity toward midlife matrons (mean age 48 years, 97.6% female) suggests gender-inflected susceptibility, plausibly ascribable to ingrained nurturant imperatives that heighten psychosocial encumbrances yet galvanize collective salubrity advocacy [31]. In aggregate, these exegeses position the intervention as a robust edifice for attitudinal transfiguration, whereby cadre-orchestrated proliferation converts arcane salubrity dogmas into operable praxis, thereby blunting hypertension's clandestine progression in metropolitan Indonesian demesnes.

The discerned ameliorations in cognitive and tensional metrics herein resonate with contemporary scrutinies of community health worker (CHW)-orchestrated architectures for non-communicable disease (NCD) stewardship in low- and middle-income countries (LMICs). Akin to the quasi-experimental inquest by Ogunleye et al. in Nigerian urban settings, which chronicled a 12% augmentation in hypertension diagnostic uptake and a 0.11 standard deviation abatement in SBP through CHW-mediated community outposts, our 40.5% cognitive uplift attests to analogous extensibility in layperson-centric milieus [32]. This consonance accentuates the pervasiveness of delegation paradigms, wherein nonprofessional intermediaries span

e-ISSN: 2827-8747 p-ISSN: 2829-3029
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clinician-patient interstices to universalize NCD oversight [33]. Notably, the tensional mitigation parallels the systematic appraisal by Aggarwal et al. on relaxation stratagems, which imputed transient SBP diminutions of 5.8–8.4 mmHg to contemplative disciplines and neurofeedback mechanisms recapitulated in our affirmation-tapping instantiation, albeit with a locale-embedded nuance [29]. Within an LMIC lens, Gaziano et al.'s evaluation of mHealth-augmented CHW engagements corroborated BP mitigations averaging 4–9 mmHg systolic, crediting potency to behavioral inculcation; our unvarying post-hoc physiological norms, contrasted against antecedent steadiness, imply a prophylactic rather than restorative impetus, differentiating it from medicament-centric supplements [34].

Inversely, discrepancies arise apropos interventional chronology and psychosomatic amalgamation. Whereas Adegboye et al.'s qualitative synthesis of CHW delegation in Nigerian primary care evinced ambivalent durability (stewardship ratios <25% beyond nine months), our quarterly oversight forestalled erosion, engendering sustained tensional stewardship accruals [33]. This divergence may derive from our indigenized CERDIK imbuement, which surpasses anodyne lifestyle adjurations by positing tension as a sui generis bastion of a deficit in Lee et al.'s meta-analysis of behavioral interventions in hypertension, where emphases on pharmacosurveillance eclipsed psychosocial buttressing, yielding tepid DBP contractions devoid of tensional quanta [30]. Furthermore, our cadre-focalized archetype diverges from digital hybrids in Kangovi et al.'s JGIM appraisal, which mobilized CHW-augmented telecoaching for 14% hypertension stewardship increments but exacted cybernetic requisites inimical to bandwidth-impoverished Surabaya enclaves [35]. These antitheses elucidate situational exigencies: our tactile, frugal modality harnessing duplicated codices and in-situ valuations bestows duplicability in connectivity-starved LMICs, albeit forfeiting cybernetic extensibility [36]. In recapitulation, while concordances validate CHW feasibility for NCD palliation, our syncretic tension-CERDIK axis tenders a refined paradigm, traversing evidentiary chasms in psychosomatic hypertensive predicates.

Despite the intervention's ostensible wholesomeness, intrinsic frailties attenuate exegetical breadth. Principally, the quasi-experimental antecedent-posterior configuration, devoid of a coterminous comparator assemblage, begets causal ascription equivocation; unmonitored covariates such as climatological BP undulations or ancillary promulgatory exertions may engorge potency ascriptions [37]. The opportunistic accrual of 42 KSH, notwithstanding its expediency for cadre pervasion, constrains extrapolative warrant, with demographic uniformity (predominantly matrilineal, secondary-educated) perchance biasing yields toward sex-skewed fortitude contours and obviating inferences to patrilineal or senescent cohorts [38]. Chronometric concision embracing four months preempts perdurability probes; ephemeral cognitive surges may dissipate absent elongated buttressing, as adumbrated by meta-analytic attestations of 15–25% reversion in CHW schemas post-nine months [39]. Metrological apparatuses, albeit corroborated (e.g., PSS-10 Cronbach's α=0.82), hinged on auto-declarations prone to approbation distortions, and physiological amassments, though triplicately normed, absented adjudicative centralization, soliciting inter-appraiser divergence [35]. Morally, the pro bono ethos forestalled duress yet perchance induced elective partiality toward innately zealous cadres, underportraying refractory echelons.

These imperfections notwithstanding, the corollaries for application and erudition are momentous. For legislators, the archetype ratifies cadre capacitation as a financially effective rampart against hypertension's socioeconomic depredations in LMICs, where medicament stewardship alone founders amid 65% noncompliance [34]. Assimilation into sovereign NCD schemata, e.g., enriching Indonesia's Posbindu with compulsory tensional codices, might catalyze cadre credentialing, nurturing a tenacious lay lattice for comprehensive salubrity envelopment [32]. Therapeutically, the tension-BP symbiosis portends ancillary functions for affirmation-tapping in stratified stewardship, plausibly forestalling 8–12% of cerebrovascular incursions via primordial prophylaxis [29]. Eruditely, mandates summon protracted RCTs counterpoising amalgamated modalities against pharmaco-attitudinal dyads, partitioning tensional intermediaries via expectorant glucocorticoid surrogates or chronometry [30]. In gerontological adjuncts, resonant with St. Yosef Hospice affinities, cadre empowerment might alleviate polydrug encumbrances, augmenting elder verve amid demographic involution [38]. In limine, this pursuit augurs a paradigmatic transposition: from retortive mitigation to preemptive communal instrumentality, wherein invigorated vigils convert hypertension's tacit pandemic into a conquerable societal chronicle.

V. CONCLUSION

This community service endeavor, instantiated under the Partner Village Development Program, sought to fortify the preventive and managerial capacities of residents in Surabaya's Kapasan and Tambakrejo sub-districts against hypertension by cultivating CERDIK behavioral adherence encompassing routine health screenings, tobacco avoidance, consistent physical exertion, equilibrated nutrition, sufficient repose, and judicious stress modulation whilst concurrently augmenting psychological stress governance among Surabaya Hebat Health Cadres (KSH) to amplify their facilitative efficacy in guiding hypertensive constituencies. Empirical scrutiny through a quasi-experimental pre-post paradigm unveiled salient advancements: knowledge sufficiency among the 42 participating KSH escalated from 28.6% to 69.1%, with the incidence of inadequate comprehension contracting from 71.4% to 30.9%, reflective of the intervention's pedagogical amalgamation of didactic expositions, simulacra, and dialogic reflections on hypertensive pathogenesis, CERDIK axioms, and affirmation-tapping modalities. Concomitantly, moderate stress prevalence abated from 78.6% to 47.6%, underscoring the autonomic recalibrative prowess of these psychosomatic

e-ISSN: 2827-8747 p-ISSN: 2829-3029
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stratagems in quelling sympathetic overdrive and glucocorticoid effusions that perpetuate vascular duress. Physiological equilibria remained unperturbed, with mean body mass index registering at 24.58 kg/m², total cholesterol at 199 ± 40.68 mg/dL, systolic blood pressure at 134 ± 25.14 mmHg, and diastolic blood pressure at 85 ± 15.59 mmHg, thereby affirming the program's prophylactic salience in averting derangements whilst nurturing homeostatic resilience amid urban epidemiological exigencies. These quanta not only evince a 40.5% net uplift in cadre competencies but also portend a cascading dissemination, wherein empowered KSH transmute esoteric salubrity precepts into communal praxis, potentially attenuating hypertension's socioeconomic depredations in low- and middle-income contexts. Nonetheless, prospective trajectories necessitate protracted longitudinal inquiries to assay perdurability, incorporating randomized controlled trials juxtaposing hybrid CERDIK-stress paradigms against pharmaco-behavioral adjuncts, disaggregating mediators via salivary cortisol assays or actigraphic chronometry, and extending geriatric foci to hospice milieus like St. Yosef Nursing Home for polydrug mitigation amid demographic senescence. Furthermore, assimilation into Indonesia's national NCD architectures via Posbindu credentialing and digital augmentation could catalyze scalable task-sharing, fostering equitable stewardship and primordial prophylaxis to forestall 10–15% of cerebrovascular incursions, thereby transmuting hypertension's tacit scourge into a surmountable societal imperative.

ACKNOWLEDGEMENTS

We extend our profound gratitude to the Polytechnic of the Ministry of Health, Surabaya, for institutional support and resources under the Partner Village Development Program. Sincere appreciation is due to the Tambakrejo Health Center leadership, Surabaya Hebat Health Cadres (KSH), and community stakeholders in Kapasan and Tambakrejo sub-districts for their invaluable collaboration and participation. Special thanks to the facilitators and elderly caregivers at St. Yosef Nursing Home for enriching the training sessions. This initiative would not have succeeded without the unwavering commitment of all involved, advancing hypertension prevention in our community.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Joko Suwito conceptualized the study, developed the methodology, supervised the implementation, and acquired funding. Adin Muafiro conducted the investigation, curated data, administered the project, wrote the original draft, and managed correspondence. Kiaonarni provided resources, validated the findings, and contributed to data collection during training sessions. Sri Hidayati performed formal analysis, visualized the results, reviewed and edited the manuscript, and handled revisions. All authors contributed to the focus group discussions, mentoring phases, and interpretation of outcomes. All authors have read and agreed to the published version of the manuscript.

CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants

COMPETING INTERESTS

The authors declare no competing interests.

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