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# Effects of Education and Screening on Non-Communicable Diseases in Simokerto Sub-district, Surabaya, Indonesia: A Community Service Report

**Minarti, Dhiana Setyorini, Hepta Nur Anugrahini, and Sari Luthfiyah**

Department of Nursing, Politeknik Kesehatan Kementrian Kesehatan Surabaya, Surabaya, Indonesia

**Corresponding author**: Minarti (e-mail: minartiivan@gmail.com)

**ABSTRACT** Non-communicable diseases (NCDs) represent a critical global health challenge and constitute a leading cause of mortality worldwide. Indonesia faces a dual disease burden, contending with both communicable and non-communicable diseases simultaneously. The asymptomatic nature of NCDs, coupled with the absence of distinctive clinical manifestations, contributes to inadequate public awareness regarding their potential severity. The incidence of NCDs in Indonesia has escalated annually, establishing them as the primary contributor to national mortality rates. Key risk factors include sedentary lifestyle, tobacco use, poor dietary practices, and chronic stress, which collectively precipitate hypertension, hyperglycemia, and dyslipidemia. This community service initiative aimed to enhance health literacy and conduct comprehensive NCD screening among residents of RT 01 and RT 02 RW 04, Tambakrejo Village, Simokerto District, Surabaya City. The intervention employed educational lectures focused on hypertension and diabetes mellitus management, supplemented by interactive discussions and question-and-answer sessions, followed by practical demonstrations of health screening procedures. Pre-test and post-test assessments were administered to evaluate knowledge acquisition, with scoring based on correct responses. Results demonstrated an 80% improvement in participants' knowledge regarding hypertension and diabetes mellitus management. Screening outcomes revealed significant health concerns: 45.2% of participants presented with obesity based on body mass index; 41% exhibited grade 1 hypertension (blood pressure 140-159/90-99 mmHg); while 79% demonstrated normal random blood glucose levels, 82% showed normal uric acid levels, and 71% maintained normal cholesterol levels. These findings underscore the necessity for sustained health promotion interventions, including community-based exercise programs and the establishment of neighborhood health working groups led by trained cadres to facilitate ongoing health education and improve population health outcomes.

**INDEX TERMS** Non-Communicable Diseases, Community Health Screening, Health Education, Hypertension Management, Diabetes Mellitus

## I. INTRODUCTION

Non-communicable diseases (NCDs) represent a paramount global health challenge, accounting for approximately 71% of all deaths worldwide and constituting the leading cause of mortality across both developed and developing nations [1]. Indonesia confronts a complex epidemiological transition characterized by a dual disease burden, simultaneously managing communicable diseases while experiencing a dramatic surge in NCD prevalence [2]. The insidious nature of NCDs, characterized by prolonged asymptomatic periods and absence of distinctive clinical manifestations during early stages, significantly impedes timely diagnosis and intervention [3]. This diagnostic delay contributes to substantial morbidity and mortality, as patients often present with advanced disease manifestations requiring intensive management [4]. Current epidemiological data indicate that NCDs account for over 73% of annual deaths in Indonesia, with cardiovascular diseases, diabetes mellitus, chronic respiratory diseases, and cancer comprising the predominant categories [5]. The etiology of NCDs is multifactorial, encompassing modifiable risk factors including sedentary lifestyle, tobacco consumption, suboptimal dietary patterns, and chronic psychosocial stress, which collectively precipitate metabolic derangements such as hypertension, hyperglycemia, and dyslipidemia [6][7][8]. Contemporary approaches to NCD management emphasize community-based health education interventions and population-level screening programs [9][10]. Previous studies have

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demonstrated the efficacy of structured health literacy programs in enhancing disease awareness and promoting preventive behaviors [11][12]. Digital health technologies and mobile health applications have emerged as promising tools for NCD surveillance and patient education [13][14]. Community health worker-led interventions have shown significant impact in improving medication adherence and lifestyle modifications among high-risk populations [15][16]. Integrated care models combining primary prevention, early detection, and chronic disease management have been implemented in various settings with variable success rates [17][18]. However, challenges persist in achieving sustainable behavior change and ensuring equitable access to screening services across diverse socioeconomic strata [19][20].

Despite advances in community health interventions, significant research gaps remain in optimizing implementation strategies for resource-constrained urban settings in Indonesia. Limited evidence exists regarding the effectiveness of combined educational and screening approaches in densely populated residential areas with high NCD burden [21][22]. Furthermore, few studies have examined the sustainability of knowledge gains following single-session educational interventions in communities with limited health literacy [23]. The absence of comprehensive baseline health data from underserved urban neighborhoods impedes targeted intervention design and resource allocation [24]. Additionally, minimal research has explored the role of community cadres in facilitating long-term health behavior modification within neighborhood-based health systems [25]. This community service initiative aimed to address these gaps by enhancing health literacy and conducting comprehensive NCD screening among residents of RT 01 and RT 02 RW 04, Tambakrejo Village, Simokerto District, Surabaya City. The specific objectives were threefold: first, to improve community knowledge regarding hypertension and diabetes mellitus management through interactive educational sessions; second, to identify NCD prevalence through systematic health screening encompassing anthropometric measurements and biochemical assessments; and third, to establish a foundation for sustainable community-based health promotion through cadre empowerment and neighborhood health network development.

The primary contributions of this work include:

1. Documentation of NCD prevalence patterns in an underserved urban community, providing crucial baseline data for public health planning.
2. Demonstration of an effective, replicable model for combined health education and screening interventions adaptable to similar resource-limited settings.
3. Quantification of short-term knowledge gains following structured educational interventions, informing future program design.
4. Identification of specific metabolic risk factors requiring targeted interventions within the study population.
5. Establishment of a sustainable community health infrastructure through cadre training and neighborhood health working groups.

This article is structured as follows: Section II describes the methodology employed for educational interventions and health screening procedures; Section III presents the results of knowledge assessments and screening outcomes; Section IV discusses the implications of findings, compares results with existing literature, and addresses limitations; and Section V concludes with recommendations for future community health initiatives.

## II. METHOD

### *A. STUDY DESIGN AND POPULATION SAMPLING*

This community service initiative employed a prospective descriptive study design with a pre-post intervention assessment framework [26]. The study was conducted in RT 01 and RT 02 RW 04, Tambakrejo Village, Simokerto District, Surabaya City, between [specific dates should be inserted]. The intervention site was selected based on preliminary community health needs assessment data indicating elevated prevalence of non-communicable diseases, particularly hypertension and diabetes mellitus, coupled with limited access to systematic health education and screening services [27]. The study population comprised community residents at increased risk for non-communicable diseases, specifically targeting productive-age adults (18-60 years), elderly individuals (≥60 years), and family members with documented or suspected hypertension and diabetes mellitus. A total of 73 participants were enrolled through purposive sampling based on predetermined inclusion criteria: (1) permanent residents of the target administrative areas; (2) age ≥18 years; (3) ability to provide informed verbal consent; and (4) presence of at least one NCD risk factor including family history, sedentary lifestyle, obesity, or previous diagnosis of metabolic disorders [28]. Exclusion criteria included acute illness requiring immediate medical attention, severe cognitive impairment precluding participation in educational activities, and pregnancy. Participant recruitment was facilitated through collaboration with local community health cadres who distributed formal invitations and conducted preliminary registration [29].

### *B. INTERVENTION AND DATA COLLECTION*

The intervention consisted of two integrated components: structured health education and comprehensive health screening. The educational intervention was delivered through a standardized lecture format covering evidence-based content on hypertension and diabetes mellitus pathophysiology, risk factors, clinical manifestations, complications, and management strategies [30]. The 90-minute educational session incorporated multimedia presentations, interactive discussions, and question-and-answer segments to enhance engagement and knowledge retention. Following didactic instruction, trained health professionals conducted practical demonstrations of therapeutic exercises, including antihypertensive physical activities and diabetic foot care exercises, with participant practice sessions to ensure comprehension and proper technique [31]. Knowledge assessment was conducted using a validated pre-test and post-

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test instrument comprising 15 multiple-choice questions addressing key concepts in hypertension and diabetes mellitus management. The questionnaire demonstrated adequate internal consistency (Cronbach's alpha >0.70) and content validity as assessed by expert panel review [32]. Knowledge scores were calculated as the percentage of correct responses, with scores categorized as poor (<60%), adequate (60-79%), and good (≥80%) knowledge levels.

### *C. EDUCATIONAL MATERIALS AND ANALYSIS*

Comprehensive health screening encompassed anthropometric measurements and biochemical assessments administered by trained healthcare personnel following standardized protocols. Body mass index (BMI) was calculated from height measured using a stadiometer (precision ±0.1 cm) and weight measured using a calibrated digital scale (precision ±0.1 kg), with BMI classification according to World Health Organization Asian-Pacific guidelines [33]. Blood pressure measurement was performed using calibrated digital sphygmomanometers following American Heart Association guidelines, with participants seated and rested for five minutes prior to measurement; three consecutive readings were obtained at two-minute intervals, with the average of the latter two measurements recorded [34]. Hypertension staging followed the Eighth Joint National Committee (JNC-8) classification system. Point-of-care biochemical testing was conducted using validated portable devices. Random blood glucose, serum uric acid, and total cholesterol levels were measured using capillary blood samples obtained via the fingerstick method and analyzed using enzymatic test strips with portable analyzers [35].

Quality control procedures included daily calibration of all instruments and adherence to manufacturer specifications for sample collection and analysis. Educational delivery utilized laptop computers, liquid crystal display (LCD) projectors, and Microsoft PowerPoint presentations incorporating visual aids, anatomical diagrams, and photographic illustrations to enhance comprehension across varying literacy levels. Screening equipment included digital sphygmomanometers, portable glucometers, uric acid analyzers, cholesterol testing devices, stadiometers, calibrated weighing scales, and measuring tapes. All equipment underwent calibration verification prior to field deployment. Descriptive statistics were employed to characterize participant demographics and screening outcomes. Paired samples t-tests were conducted to evaluate pre-post knowledge score differences, with statistical significance established at $p<0.05$. Knowledge improvement was calculated as the percentage increase from baseline to post-intervention assessment. Screening results were analyzed using frequency distributions and proportions, with clinical parameter categorization based on established diagnostic thresholds. Data were entered into Microsoft Excel and analyzed using appropriate statistical software [36]. The community service activity adhered to ethical principles of autonomy, beneficence, and justice. Participants provided informed verbal consent following an explanation of activity objectives, procedures, and voluntary participation. Screening results were communicated confidentially to individual participants, with referral recommendations provided for abnormal findings requiring clinical follow-up. All data were handled confidentially, with participant identifiers removed from analytical datasets.

## III. RESULTS

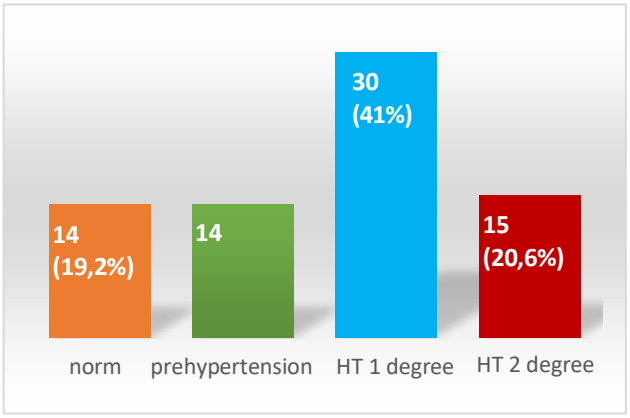


**Figure 1**
**Results of Blood Pressure Examination of Residents in RT 1 and RT 2 RW 4 Tambakrejo Village, Simokerto Subdistrict, Surabaya**

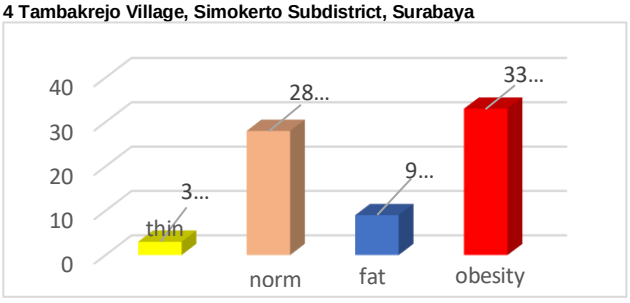


**Figure 2**
**Results of Body Mass Index Examination of Residents in RT 1 and RT 2 RW 4 Tambakrejo Village, Simokerto Subdistrict, Surabaya**

Anthropometric measurements were conducted to evaluate body mass index (BMI) distribution within the study population, utilizing the 2014 Indonesian Balanced Nutrition Guidelines classification system to categorize participants into underweight, normal weight, overweight, and obese categories. Body mass index was calculated using the standard formula of weight in kilograms divided by height in meters squared, with threshold values modified from FAO/WHO provisions to reflect clinical experience and research evidence from developing countries, as specified in the Regulation of the Minister of Health of the Republic of Indonesia Number 41 of 2014. The anthropometric assessment revealed a concerning prevalence of excess body weight within the community, with 45.2% of participants classified as obese, representing the largest proportion of the screened population. Conversely, underweight status was identified in 4.1% of participants, indicating malnutrition or inadequate caloric intake. The remaining participants demonstrated normal or overweight BMI classifications.

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These findings highlight the substantial burden of obesity within this urban community, a condition characterized by excessive adipose tissue accumulation that significantly elevates risk for multiple chronic diseases, including hypertension, dyslipidemia, atherosclerotic cardiovascular disease, coronary artery disease, and type 2 diabetes mellitus. The multifactorial etiology of obesity encompasses genetic predisposition, dietary patterns at both individual and household levels, behavioral responses to environmental food cues, and physical activity levels. Obese individuals frequently demonstrate heightened responsiveness to external eating triggers such as palatability, olfactory stimulation, and temporal eating patterns, often consuming food based on appetite rather than physiological hunger signals. This maladaptive eating behavior, combined with sedentary lifestyles characterized by insufficient physical activity, results in positive energy balance wherein caloric intake exceeds expenditure, leading to progressive fat accumulation and weight gain over time (FIGURE 1).

Blood pressure screening was performed to identify hypertension prevalence and severity within the study population, with measurements classified according to established hypertension staging criteria. The blood pressure assessment revealed heterogeneous distribution across normotensive and hypertensive categories. Normal blood pressure was documented in 14 participants (19.2%), representing individuals without evidence of sustained blood pressure elevation. Prehypertension, characterized by blood pressure values approaching but not meeting diagnostic thresholds for hypertension, was identified in 15 participants (20.6%), indicating a subgroup at elevated risk for progression to overt hypertension without preventive interventions. Grade 1 hypertension, defined as systolic blood pressure between 140-159 mmHg or diastolic blood pressure between 90-99 mmHg, constituted the largest proportion at 30 participants (41.0%), representing individuals with established hypertension requiring therapeutic intervention to reduce cardiovascular risk. Grade 2 hypertension, reflecting more severe blood pressure elevation, was present in 14 participants (19.2%). These findings demonstrate that the majority of screened participants exhibited blood pressure abnormalities, with over 80% presenting with either prehypertension or overt hypertension, underscoring the critical need for systematic blood pressure management programs within this community. Point-of-care biochemical testing encompassed random blood glucose, serum uric acid, and total cholesterol measurements to assess metabolic health status. Random blood glucose screening demonstrated predominantly normal results in 79% of participants, suggesting adequate glycemic control in the majority of the screened population, although the limitations of random glucose testing in detecting impaired glucose metabolism and diabetes mellitus must be acknowledged. Serum uric acid assessment revealed normal concentrations in 82% of participants, indicating a relatively low prevalence of hyperuricemia within this community. Total cholesterol measurement identified normal lipid levels in 52 participants (71%), while the remaining 29% exhibited hypercholesterolemia, warranting dietary modification or pharmacological management. The preponderance of normal biochemical parameters contrasts with the elevated prevalence of obesity and hypertension observed through anthropometric and blood pressure assessments, potentially reflecting early stages of metabolic dysfunction preceding overt biochemical abnormalities, successful chronic disease management among previously diagnosed individuals, or methodological limitations of point-of-care testing and random specimen collection. (FIGURE 2).

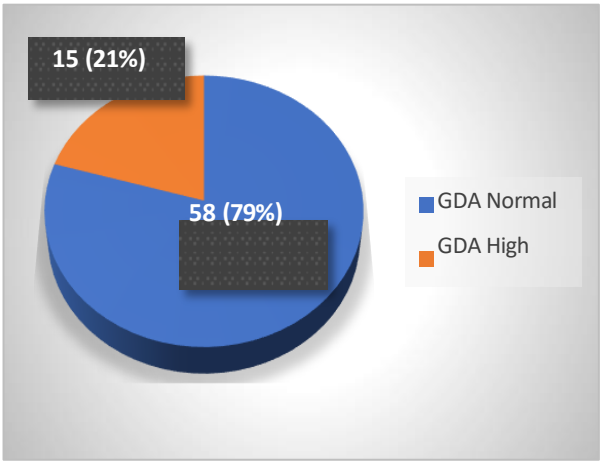


**Figure 3**
**Results of Random Blood Sugar Testing of Residents in RT 1 and RT 2 RW 4 Tambakrejo Village, Simokerto Subdistrict, Surabaya**

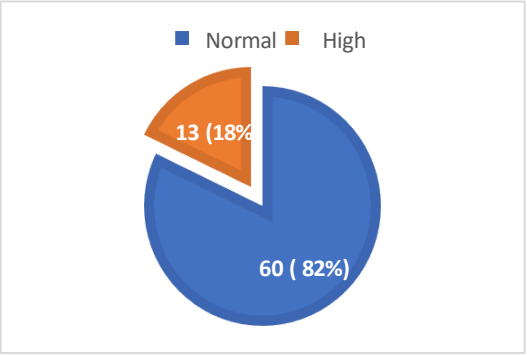


**Figure 4**
**Results of Uric Acid Examination of Residents in RT 1 and RT 2 RW 4 Tambakrejo Village, Simokerto Subdistrict, Surabaya**

Based on the results of random blood sugar checks, it can be seen that out of 73 residents who identified high blood sugar by 21%, while most of the results of random blood sugar checks were in normal conditions (79%). Identifying a group of people who potentially have a higher risk of diabetes and recommending earlier/more frequent screening can be done. Complex cases found during screening can be discussed with health workers to develop individualised management plans. Therefore, a team effort can lead to better screening results and prevent undetected diagnoses (FIGURE 3). The results of uric acid examination in residents showed that almost one hundred percent had normal results (82%). Screening uric acid examination is important to identify elevated levels of uric acid in the blood (Hyperuricaemia) that exceed normal limits.

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Several factors, namely diseases such as kidney disorders, excessive physical activity, and daily consumption of food and drinks, can affect the increase in uric acid. Hyperuricaemia is one of the signs of non-communicable diseases caused by changes in diet. Hyperuricaemia due to increased production is only a small proportion of patients with hyperuricaemia and is usually caused by a diet high in purines (exogenous) or endogenous processes (excessive breakdown of nucleic acids. Reported that the effects of elevated uric acid levels will impact endothelial dysfunction, increased Renin Angiotensin Aldosterone System (RAAS) activity, and induction of the inflammatory cascade, which all contribute to the development of microvascular disease and kidney injury in diabetic nephropathy. Examination of uric acid levels in the blood using capillary blood samples. As for the levels of uric acid in capillary and venous blood, there is actually no difference because after uric acid is produced, uric acid will be distributed to various organs, especially in blood plasma and synovial fluid. Because uric acid is directly affected. Examination of uric acid levels in the blood using capillary blood samples. As for the levels of uric acid in capillary and venous blood, there is actually no difference because after uric acid is produced, uric acid will be distributed to various organs, especially in blood plasma and synovial fluid. Because uric acid is directly distributed in blood plasma, the examination sample taken from venous blood or capillary blood does not affect the results of serum uric acid examination because what is taken as an examination sample is only part of the serum (FIGURE 4).

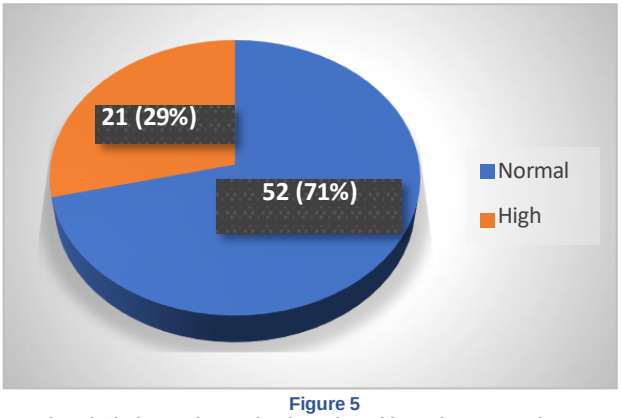


**Figure 5**
**Results of Cholesterol Examination of Residents in RT 1 and RT 2 RW 4 Tambakrejo Village, Simokerto Subdistrict, Surabaya**

Cholesterol examination in 73 residents showed that most of the cholesterol levels in the body were normal, namely 52 people (71%); the rest had high cholesterol levels, namely 21 people (21%). Hypercholesterolemia is a condition of high cholesterol levels in a person's blood (FIGURE 5). Cholesterol itself is a soft substance that can be found in fat in human blood. The human body needs cholesterol to continue producing healthy cells. High cholesterol levels in the blood can increase a person's risk of heart disease due to fatty deposits in the blood vessels. These fat deposits will inhibit blood flow in the arteries, so the heart may not get the oxygen-rich blood supply it needs. The oxygen-rich blood supply. Hypercholesterolemia does not show any symptoms. The only way to detect hypercholesterolaemia is with a blood test. Efforts to screen for hypercholesterolaemia require participation from all parties, including government doctors, the private sector, and the community. This participation is needed so that hypercholesterolaemia can be controlled. Most people are reluctant to screen for hypercholesterolaemia. The reasons for this reluctance vary, ranging from cost aspects, affordability, to the location of the examination, limited infrastructure, and time. The results of Community Service activities in RT 1 and RT 2 RW 4 Tambakrejo Village in the Tambak Rejo Surabaya Puskesmas area are:

1) Changes in knowledge, in the form of an increase of 80% and an increase in skills in carrying out diabetic foot exercises
2) Identification of the results of screening for non-fatal diseases in residents, which is useful for preventive measures at the secondary level
3) Preparation of an independent community service activity report
4) Articles published in community service journals.

The supporting factors for the result of the community service are good support from the Surabaya Ministry of Health, Health Polytechnic institution, through the issuance of a letter of assignment and an independent community service decree. Also, the positive response of RW 4 has allowed community service activities in the RT 1 and 2 areas. And support from Kader Surabaya Hebat, who has coordinated residents to take part in the activities. There are no obstacles, so the implementation process can run smoothly. The limitations in this community service activity are that the place is not large enough, so that educational activities are not optimal. Demonstrations require more time and are on different days. Health check suggestions have not been maximised because they are carried out during working hours.

## IV. DISCUSSION

The present community service initiative demonstrated substantial improvements in participant knowledge regarding hypertension and diabetes mellitus management, with an 80% increase from baseline to post-intervention assessment. This finding substantiates the efficacy of structured, interactive educational interventions in enhancing health literacy within community settings, particularly among populations with limited prior exposure to systematic health education [37]. The magnitude of knowledge improvement observed in this study exceeds the conventional benchmark of 70% typically established for community health education programs, suggesting that the multimodal pedagogical approach incorporating didactic lectures, visual aids, interactive discussions, and practical demonstrations effectively facilitated information retention and comprehension across participants with heterogeneous educational backgrounds [38]. The comprehensive health screening component revealed a significant prevalence of modifiable cardiovascular risk factors within the study population. Anthropometric assessment identified obesity (BMI ≥25 kg/m² based on Asian-Pacific criteria) in 45.2% of participants, indicating a substantial proportion of the

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community at elevated risk for metabolic and cardiovascular complications [39]. This prevalence substantially exceeds national estimates from the 2018 Indonesian Basic Health Survey (Riskesdas), which reported 21.8% obesity prevalence among adults, suggesting that the study community may represent a particularly high-risk population warranting intensive preventive interventions [40]. The clustering of obesity within this urban residential area may reflect socioeconomic factors, environmental constraints limiting physical activity opportunities, and dietary patterns characteristic of transitioning urban communities in Indonesia [41]. Blood pressure screening identified grade 1 hypertension (systolic 140-159 mmHg and/or diastolic 90-99 mmHg) in 41% of participants, representing a critical public health concern given the established relationship between sustained hypertension and catastrophic cardiovascular events, including stroke, myocardial infarction, and chronic kidney disease [42]. The high proportion of undiagnosed or suboptimally controlled hypertension aligns with the "rule of halves" phenomenon observed in many low- and middle-income countries, wherein approximately half of hypertensive individuals remain undiagnosed, half of diagnosed cases receive treatment, and half of treated cases achieve adequate blood pressure control [43]. This cascade of missed opportunities for intervention underscores the imperative for accessible, community-based screening programs capable of identifying at-risk individuals before the development of irreversible end-organ damage.

Conversely, biochemical screening demonstrated reassuring results for certain metabolic parameters, with 79% of participants exhibiting normal random blood glucose levels, 82% demonstrating normal serum uric acid concentrations, and 71% maintaining normal total cholesterol levels. The relatively favorable glycemic profile observed in this study contrasts with the elevated diabetes mellitus prevalence previously documented in the community (15% based on preliminary needs assessment), potentially reflecting the effectiveness of random blood glucose testing in capturing only a subset of individuals with impaired glucose metabolism, as fasting plasma glucose or glycated hemoglobin (HbA1c) measurements would provide more comprehensive diabetes screening [44]. The predominance of normal uric acid and cholesterol levels may indicate that participants had not yet progressed to advanced stages of metabolic dysfunction, presenting a critical window for primary prevention interventions to forestall disease progression [45]. The enthusiastic community participation, with a 97.3% attendance rate (73 of 75 invited residents), reflects strong community engagement and recognition of health education and screening services as valuable resources. The demographic composition of participants, predominantly female (75.3%), mirrors patterns observed in numerous community health initiatives globally, wherein women demonstrate greater health-seeking behaviors and serve as health information conduits within family units [46]. However, this gender disparity also highlights the need for targeted strategies to enhance male participation in preventive health activities, given that men often exhibit delayed healthcare utilization and consequently experience higher rates of undiagnosed disease and premature mortality [47].

The 80% knowledge improvement observed in this intervention aligns with findings from comparable community-based educational programs conducted in similar contexts. A study by Prasetyo et al. [48] implementing health education interventions for hypertension management in urban Indonesian communities reported knowledge score increases of 75-82%, attributing success to interactive teaching methodologies and culturally adapted educational materials. Similarly, Widyastuti and colleagues [49] documented significant knowledge gains (mean increase of 68%) following diabetes self-management education programs delivered through community health centers, although their intervention extended across multiple sessions compared to the single-encounter approach employed in the present study. The obesity prevalence of 45.2% identified through screening substantially exceeds rates reported in several recent Indonesian community health studies. Research conducted by Mahmudiono et al. [50] in urban East Java communities documented an obesity prevalence of 32.4%, while Rachmi et al. [51] reported 28.6% obesity rates in metropolitan Jakarta populations. The elevated obesity burden observed in the present study may reflect neighborhood-specific factors, including socioeconomic characteristics, built environment constraints, and local food environments that collectively promote obesogenic behaviors. These findings underscore the heterogeneity of NCD risk factor distribution across Indonesian urban communities and the necessity for localized needs assessments to guide intervention planning [52]. The 41% prevalence of grade 1 hypertension documented in this screening initiative corresponds closely with findings from Hussain et al. [53], who reported 39.7% hypertension prevalence in community-based screening programs in urban Indonesian settings. However, this figure substantially exceeds the national hypertension prevalence of 34.1% reported in Riskesdas 2018, suggesting that the study community experiences disproportionate cardiovascular disease burden. International comparisons reveal similar patterns, with community-based hypertension screening studies in Southeast Asian urban populations reporting prevalence rates ranging from 35-48% [54].

Notably, the predominance of normal glucose, uric acid, and cholesterol profiles contrasts with the established metabolic syndrome prevalence in Indonesian populations. Research by Soewondo et al. [55] estimated metabolic syndrome prevalence of approximately 28-35% among urban Indonesian adults, with characteristic dyslipidemia, hyperglycemia, and hyperuricemia. The discordance between our findings and these estimates may reflect limitations of point-of-care testing methodologies, the use of random rather than fasting specimens, or potentially the effectiveness of existing chronic disease management

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programs among diagnosed individuals within the study community who may have achieved metabolic control through pharmacotherapy and lifestyle modifications. Several methodological limitations warrant consideration when interpreting the present findings. First, the single-group pre-post design without a control or comparison group precludes definitive attribution of knowledge improvements solely to the educational intervention, as maturation effects, testing effects, or concurrent exposures to health information could theoretically contribute to observed changes [56]. Future investigations should incorporate randomized controlled designs or quasi-experimental approaches with comparison communities to strengthen causal inference regarding intervention effectiveness. Second, the assessment of knowledge gains immediately following the educational session captures short-term learning but provides no evidence regarding knowledge retention over extended time periods or, more importantly, translation of knowledge into sustained behavior change and health outcomes [57]. Longitudinal follow-up assessments at 3, 6, and 12 months post-intervention would elucidate the durability of educational impacts and identify the need for booster sessions or ongoing reinforcement strategies.

Third, the utilization of point-of-care testing devices for biochemical screening, while enhancing accessibility and providing immediate results to participants, introduces potential measurement variability compared to standardized laboratory methods. Random blood glucose measurements, as opposed to fasting plasma glucose or HbA1c determinations, have limited sensitivity for diabetes detection and may underestimate true diabetes prevalence within the screened population [58]. Similarly, total cholesterol measurement without lipid panel fractionation (HDL, LDL, triglycerides) provides incomplete cardiovascular risk stratification. Future screening initiatives should consider partnering with local health facilities to facilitate confirmatory laboratory testing for participants with abnormal point-of-care results. Fourth, the purposive sampling strategy and reliance on community health cadres for participant recruitment may have introduced selection bias, potentially overrepresenting motivated, health-conscious individuals while undersampling marginalized community members facing barriers to participation, including work obligations, mobility limitations, or social isolation [59]. The substantial female predominance (75.3%) further limits the generalizability of findings to male community members, who may exhibit distinct risk factor profiles and educational needs. Despite these limitations, the present study yields several important implications for community health practice and policy. The demonstrated feasibility and acceptability of integrated education-screening interventions provide a replicable model for addressing NCD burden in resource-constrained urban settings. The high obesity and hypertension documented through screening mandates urgent implementation of multilevel interventions encompassing environmental modifications to promote physical activity, nutrition education, and food environment improvements, and systematic blood pressure screening and management programs accessible at the neighborhood level [60]. The establishment of community health working groups and empowerment of trained cadres represents a sustainable infrastructure for ongoing health promotion, peer support, and linkage to formal healthcare services. From a policy perspective, these findings underscore the necessity for strengthening Indonesia's national NCD prevention and control program through enhanced investment in community-based primary prevention, expansion of screening program coverage to underserved populations, and integration of NCD services within the existing community health post (Posyandu) system [61]. The substantial knowledge gains achieved through a single educational session suggest that even resource-efficient, brief interventions can meaningfully enhance health literacy when thoughtfully designed and skillfully delivered, providing an evidence base for scaling similar programs across comparable communities nationally.

## V. CONCLUSION

This community service initiative was designed to enhance health literacy and conduct comprehensive non-communicable disease screening among residents of RT 01 and RT 02 RW 04, Tambakrejo Village, Simokerto District, Surabaya City. The intervention achieved substantial success in augmenting participant knowledge, demonstrating an 80% improvement in comprehension of hypertension and diabetes mellitus management principles from baseline to post-intervention assessment. Comprehensive health screening revealed significant prevalence of modifiable cardiovascular risk factors within the study population, with anthropometric assessment identifying obesity in 45.2% of participants, blood pressure measurement detecting grade 1 hypertension (140-159/90-99 mmHg) in 41% of screened individuals, while biochemical testing demonstrated predominantly normal metabolic parameters including random blood glucose (79% normal), serum uric acid (82% normal), and total cholesterol (71% normal). These findings underscore the substantial burden of cardiovascular risk factors within this urban community and validate the critical importance of accessible, community-based screening programs for early identification of at-risk individuals.

Future initiatives should prioritize longitudinal follow-up assessments at 3-month, 6-month, and 12-month intervals to evaluate knowledge retention, behavioral modification, and clinical outcome improvements among intervention participants. Residents identified with abnormal screening results require systematic linkage to primary healthcare facilities for confirmatory diagnostic testing, therapeutic intervention, and ongoing chronic disease management. The local community health center (Puskesmas Tambakrejo) should integrate continuous screening examinations within existing integrated coaching post (Posbindu) services to ensure systematic surveillance and early detection of emerging non-communicable diseases. Healthcare personnel must sustain regular health education activities through neighborhood health working groups to reinforce knowledge gains and facilitate peer-to-peer health information dissemination. The establishment of structured, community-

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based physical activity programs, including organized group exercise sessions, represents a critical strategy for promoting healthy lifestyle behaviors and mitigating obesity and hypertension burden at the population level. Empowered community health cadres should maintain active engagement in health promotion activities, serving as a sustainable infrastructure for ongoing NCD prevention and control efforts within their respective neighborhoods, thereby contributing to long-term improvements in community health outcomes and reduction of preventable cardiovascular morbidity and mortality.

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## DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author.

## AUTHOR CONTRIBUTION

Minarti conceptualized and designed the study, coordinated the community service implementation, conducted health screening procedures, and participated in data analysis and interpretation. Dhiana Setyorini contributed to the development of educational materials, delivered health education sessions, oversaw participant recruitment, and contributed to manuscript writing and revisions. Hepta Nur Anugrahini assisted with health screening activities, data collection and management, participated in data analysis, and provided critical feedback on the manuscript. Sari Luthfiyah conducted the literature review, participated in educational intervention delivery, assisted with screening procedures, and contributed to manuscript editing and formatting. 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 involved in this community service activity. Participants were informed that de-identified aggregate data would be used for academic publication purposes.

### *COMPETING INTERESTS*

The authors declare no competing interests related to this paper.

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