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The Vital Role of Blood Pressure and Glucose Screening Integrated with Vision and Dental Prosthetic Education for the Elderly

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Abstract

General Background: Older populations face concurrent risks from noncommunicable diseases, visual deterioration, and oral functional decline that can compromise independence and quality of life. **Specific Background:** Community-level programs in suburban areas frequently separate metabolic examinations from education concerning ocular health and dental prosthetics. **Knowledge Gap:** Integrated initiatives combining early cardiometabolic detection with vision and oral-function education remain limited among older residents of Sedati, Sidoarjo. **Aims:** This community service program conducted random blood glucose and arterial blood pressure examinations alongside interactive education concerning cataract, glaucoma, ocular care, dentures, mastication, and oral maintenance. **Results:** The program involved 100 participants at Al Amin Mosque on 25 January 2026. Reported measurements showed that 15% had normal blood pressure, 52% were prehypertensive, 29% were hypertensive, and 4% experienced hypertensive crisis. Glucose findings classified 49% as normal, 27% as prediabetic, 15% as indicating diabetes, and 9% as hypoglycemic. Educational sessions addressed preventable visual complications and the functional role of dental prostheses in mastication, speech, nutrition, and wellbeing. **Novelty:** The initiative integrates cardiometabolic assessment with ophthalmic and prosthodontic education in one multidisciplinary community model. **Implications:** Regular follow-up, lifestyle counseling, referral pathways, and collaboration between academic institutions and local health centers are required to support preventive geriatric care and functional independence.

Highlights:

- ♦ Only 15% of participants had readings below 120/80 mmHg.
- ♦ Forty-two percent showed prediabetic or diabetic values, while 9% were hypoglycemic.
- ♦ Eye and denture education addressed functional independence, nutrition, and preventable complications.

Keywords: Geriatric Health, Hypertension Detection, Diabetes Risk, Ocular Health Education, Dental Prosthetics

Introduction

The aging population in Indonesia, particularly in suburban regions such as Sedati, Sidoarjo, presents a complex public health challenge marked by the rising prevalence of non-communicable diseases (NCDs) alongside sensory and oral impairments. As life expectancy increases, older adults become increasingly susceptible to chronic conditions such as hypertension and diabetes mellitus, both of which are often described as “silent killers” because they commonly remain undiagnosed until severe complications arise. At a physiological level, the aging process itself is accompanied by progressive molecular and cellular changes that heighten susceptibility to chronic conditions such as hypertension and diabetes, reinforcing the need for early, community-level detection rather than reliance on symptom-driven diagnosis [1]. Nearly half of all individuals with hypertension are unaware of their condition, and unawareness itself has been identified as a persistent public health problem that continues to hinder timely treatment and blood pressure control [2]. Because hypertension progresses silently, routine self-screening from an early age has been advocated as a simple yet effective measure to combat this silent killer before irreversible organ damage occurs [3]. Community-based screening has been shown to complement formal health services by increasing detection rates, particularly among populations with limited routine access to care [4]. Similar findings have been reported in Indonesian community service programs, where hypertension and diabetes screening among productive-age and elderly populations revealed a substantial proportion of previously undetected cases [5]. Establishing an accessible, localized baseline for metabolic health, as undertaken in this initiative, is therefore a critical first step toward more targeted and culturally relevant interventions for the people of Sidoarjo.

Beyond metabolic disease, the decline of sensory and physiological function—particularly vision and oral health—further complicates quality of life in old age. Visual impairment, commonly caused by cataract, glaucoma, or age-related macular degeneration, is a well-established and independent risk factor for falls among older adults, with impaired depth perception and postural instability substantially increasing fall incidence [6]. Cataract in particular has been associated not only with fall risk but also with frailty, depression, and cognitive decline, underscoring that its impact extends well beyond visual acuity alone [7]. In parallel, the loss of natural teeth without adequate prosthetic replacement compromises masticatory function and dietary variety, predisposing elderly individuals to malnutrition and diminished psychosocial wellbeing [8]. Health education in geriatric care must therefore be holistic; treating chronic metabolic disease alone, without addressing sensory and functional deficits that hinder daily activities, is insufficient. In Sedati specifically, structured educational programs focusing on eye health maintenance and denture (gigi tiruan) care have been largely absent, making an integrated model of screening and education a synergistic and timely approach. Rather than focusing solely on longevity, this model supports “successful aging,” in which older adults retain functional independence and quality of life through informed health behavior and timely medical intervention—an approach increasingly emphasized in the public health literature on healthy aging [9].

Effective community engagement of this kind requires a multidisciplinary approach involving academic institutions, local health authorities, and community members themselves. Family- and community health worker-based monitoring models implemented during and after the COVID-19 pandemic in Indonesia have demonstrated that structured, cadre-supported surveillance can sustain elderly health monitoring even when access to formal facilities is constrained [10]. Likewise, posyandu lansia-based programs that combine physical activity, health literacy, and routine screening have shown measurable benefit in identifying elevated blood pressure and blood glucose among participants [11]. The Faculty of Medicine and Dentistry (FKKG) of Universitas Muhammadiyah Sidoarjo plays a pivotal role in this ecosystem by translating clinical knowledge into actionable community programs. Sidoarjo, with its diverse demographic profile, provides an ideal setting for implementing this comprehensive model of geriatric care. By focusing on Sedati, this initiative aims to build a replicable framework for community-based geriatric care that prioritizes early detection, health literacy, and functional independence, while documenting evidence-based insight into the health status of the local elderly population.

Methods

This community service initiative was carried out through two categories of activity conducted simultaneously on Sunday, 25 January 2026, from 08:00 to 12:00 Western Indonesia Time (WIB). The program was centered at the Al Amin Mosque, Muhammadiyah District Branch (PCM) of Sedati, located at Jl. Sedati Agung III RT 04 RW 01, Sedati, Sidoarjo.

The first activity comprised interactive dialogue and health education sessions covering two core themes: (1) “Maintaining Ocular Health in the Elderly,” presented by dr. Rifat Nurfahri, Sp.M., M.Ked.Klin, and (2) “Dental Prosthetics for the Geriatric Population,” delivered by Reza Nur Alfansyah, A.Md.Batra, drg.

The second activity involved random blood glucose (RBG) and arterial blood pressure screening for a cohort of 100 elderly participants. Documentation of screening shown in Figure 1. Blood pressure was measured using a calibrated GEA BP-M300 digital sphygmomanometer, while blood glucose was assessed using the EasyTouch GCU point-of-care monitoring system. All clinical examinations were performed by experienced medical personnel to ensure data accuracy and participant safety. Screening results were classified according to standard clinical cut-off values for blood pressure and random blood glucose, and descriptive statistics were used to summarize the distribution of findings.



Figure 1. Blood pressure and blood glucose level screening process

Results and Discussion

The analysis of health screening data in Sedati reveals a concerning prevalence of hypertension among elderly participants. Based on the blood pressure data, only 15% (9 individuals) of the screened population maintained normal blood pressure below 120/80 mmHg. Conversely, 52% (30 individuals) were categorized as pre-hypertensive, 29% (17 individuals) had reached the hypertension stage, and 4% (2 individuals) were in hypertensive crisis. Diagram shown in Figure 2. These findings echo national and international patterns in which unawareness of hypertension remains a major obstacle to blood pressure control among older adults [2], and are consistent with community screening reports from other posyandu lansia in East Java, where a substantial share of elderly participants were found to have elevated blood pressure at first screening [11]. The high proportion of pre-hypertension identified in Sedati indicates a critical window for lifestyle intervention before progression to sustained hypertension. Community-based screening of this kind has been shown to complement, rather than compete with, formal health-care services by reaching populations who might not otherwise seek routine blood pressure checks [4]. This underscores the necessity for routine monitoring in Sedati, as many participants were previously unaware of their elevated status. Hypertension education in this setting should emphasize salt reduction and physical activity to mitigate the risk of stroke and heart failure, which remain prevalent complications in this demographic.

Regarding metabolic health, blood glucose screening provided a snapshot of diabetes risk within the community. The data indicate that 49% (33 individuals) of the elderly had normal glucose levels (70–140 mg/dL), a positive indicator of metabolic health for nearly half of the group. However, 27% (18 individuals) fell into the pre-diabetes category (140–199 mg/dL), and 15% (10 individuals) showed indications of diabetes with glucose levels exceeding 200 mg/dL. Additionally, 9% (6 individuals) were found to be hypoglycemic, presenting an immediate risk of weakness or fainting. This finding is clinically significant, as hypoglycemic events among older adults with type 2 diabetes have been associated with a markedly higher risk of subsequent hospital admission and emergency department visits, particularly among those with comorbid liver disease or dyslipidemia [12]. Diagram shown in figure 3. This bimodal distribution of risk—ranging from hypoglycemia to diabetes—mirrors findings from other Indonesian posyandu lansia screening programs, which similarly report a considerable proportion of elderly participants with abnormal glucose or lipid profiles alongside a smaller but clinically important group at risk of hypoglycemia [13], [14]. Elderly patients with type 2 diabetes also carry a disproportionately high burden of comorbidities, which further complicates glycemic management and increases the importance of early, community-level detection [15]. These results suggest that nutritional education in Sedati must be nuanced, addressing both overconsumption of sugar and the dangers of inadequate caloric intake. Pre-diabetic individuals represent a priority group for intensive counseling to prevent progression to type 2 diabetes through dietary modification and regular screening.

Blood Glucose Level Distribution in the Elderly

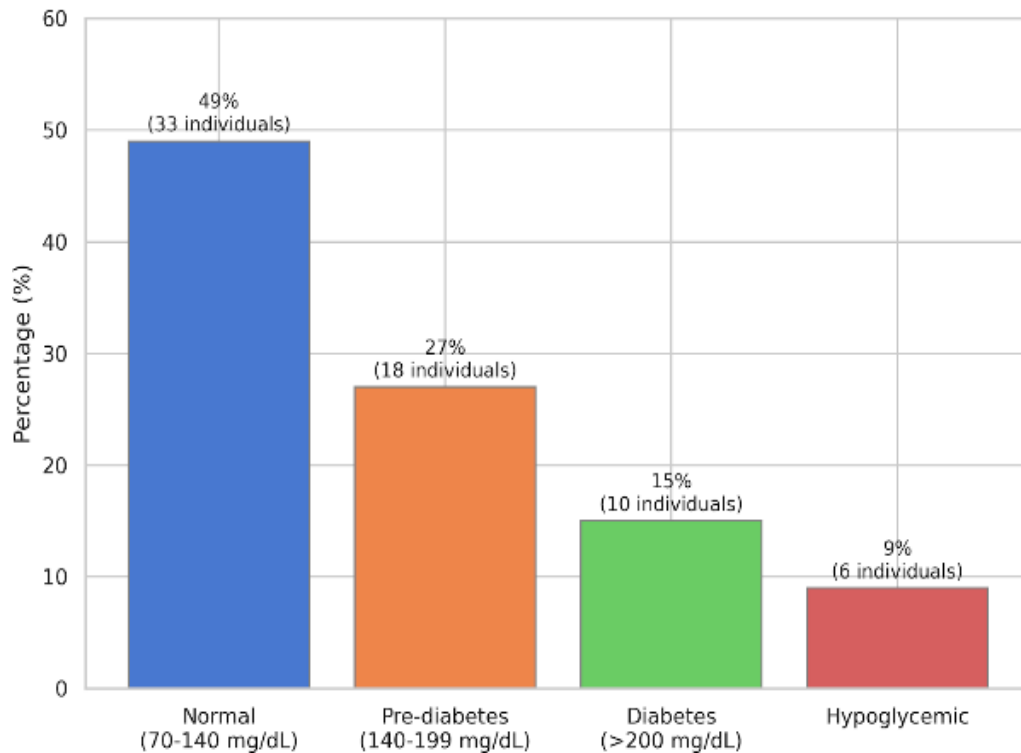


Figure 2. Blood pressure distributin in the population

Blood Pressure Distribution in the Population

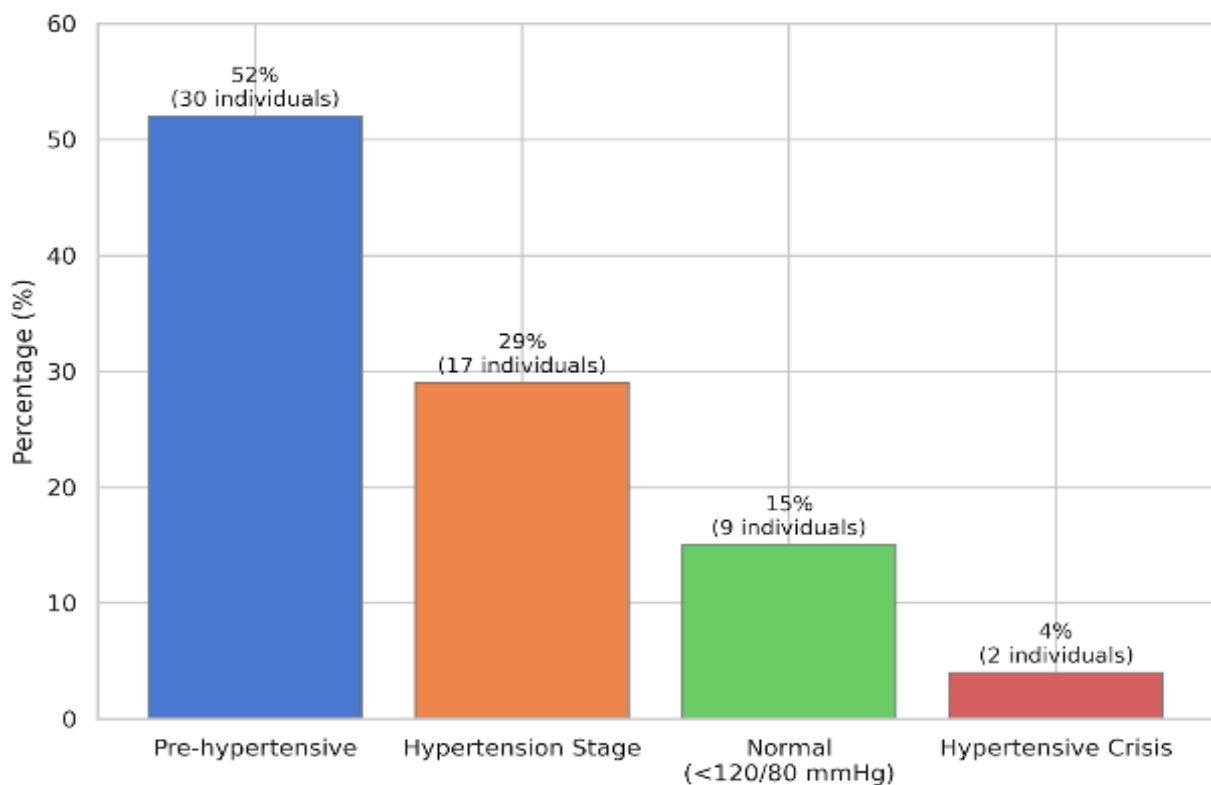


Figure 3. Blood glucose level distribution in the population

Vision health education was a cornerstone of this program, focusing on the prevention of blindness and the management of common age-related eye conditions. The material presented by dr. Rifat Nurfahri, Sp.M., emphasized the importance of

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regular eye check-ups to detect conditions such as cataract and glaucoma. Participants were educated on the symptoms of vision decline and on proactive steps to maintain ocular health, including proper lighting and avoiding self-medication with traditional eye drops. This emphasis is well supported by clinical evidence: visual impairment is an independent and modifiable risk factor for falls in older adults, and predictive models built from ophthalmic risk factors have been proposed to identify elderly patients at greatest risk [6]. Cataract in particular has been linked not only to fall risk but also to broader geriatric outcomes such as frailty, depression, and cognitive decline, reinforcing that timely detection and management can have effects reaching well beyond visual acuity alone [7]. The enthusiasm of the Sedati participants during the eye health session highlighted a significant demand for ophthalmological information. By integrating this component into the general screening, the program addressed a frequently overlooked aspect of geriatric care, helping to preserve the mobility and environmental engagement of elderly participants.

The dental health segment focused specifically on the importance of dentures for improving quality of life among the elderly. Educational sessions delivered by the Faculty of Dental Medicine, Universitas Muhammadiyah Sidoarjo, highlighted that dentures are not merely aesthetic devices but are essential for proper mastication, speech, and the prevention of further alveolar bone loss. Longitudinal evidence indicates that tooth loss without adequate prosthetic replacement is associated with reduced dietary variety and adverse nutritional and psychosocial outcomes among elderly patients [8], while more recent systematic review evidence confirms that prosthodontic rehabilitation consistently improves masticatory function and oral health-related quality of life, with nutritional benefits strengthened further when denture provision is paired with dietary counseling [16]. By providing education on denture types and the maintenance required to prevent oral infection, the program empowered participants to seek professional dental care. This is particularly relevant in suburban areas such as Sedati, where many elderly individuals rely on ill-fitting traditional prosthetics or remain edentulous altogether. Promoting professional denture services aligns with the broader goal of enhancing nutritional status and psychological wellbeing through restored oral function.

Synthesizing these findings, the community service program in Sedati demonstrates that the health needs of the elderly are multidimensional and require an integrated response. The high rates of pre-hypertension and pre-diabetes, coupled with the functional needs for vision and dental care, suggest that health services must move beyond episodic care toward a continuous health promotion model consistent with contemporary public health approaches to healthy aging [9]. This is consistent with evidence that structured, family- and cadre-supported monitoring models can sustain elderly health surveillance at the community level even under resource constraints [10]. Local health centers (Puskesmas) should consider adopting this integrated screening approach to broaden the reach of preventive services, while community leaders and family members play a vital role in supporting adherence to the health recommendations provided during these sessions. This program has not only identified individuals at risk but has also built a foundation of health literacy essential for long-term health management, providing a strong argument for the expansion of similar academic-led community health programs across Sidoarjo Regency.

Conclusion

The integrated health screening and education program in Sedati, Sidoarjo, successfully identified significant health risks among the elderly, particularly concerning hypertension and diabetes. Over 80% of participants fell outside the normal range for blood pressure, while more than 40% showed signs of pre-diabetes, diabetes, or hypoglycemia. These findings highlight the urgent need for regular, community-based monitoring and early intervention strategies to prevent the onset of severe complications, and are consistent with broader evidence that community-based screening improves detection among populations with otherwise limited access to routine care [2], [4]. By bringing these services directly to the community, the program helped bridge the gap in healthcare accessibility, providing the elderly with essential knowledge about their metabolic health status and actionable steps for lifestyle improvement.

Furthermore, the educational sessions on vision and dental health addressed critical yet often neglected aspects of geriatric wellbeing. The emphasis on maintaining eye health and on the functional necessity of dentures provided a holistic perspective on aging, consistent with evidence linking both visual impairment and edentulism to reduced functional independence and quality of life [6], [8]. In conclusion, this multidisciplinary approach—combining medical screening with targeted education—serves as an effective and replicable model for geriatric public health intervention. To ensure sustainability, it is recommended that local health authorities collaborate with academic institutions such as FKKG Universitas Muhammadiyah Sidoarjo to provide continuous health education and follow-up care, ultimately fostering a healthier and more resilient elderly population in the Sidoarjo region.

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