

Integrated Primary Health Care Strategies for Hypertension and Type 2 Diabetes Management: Analysis of Three-Month Morbidity Data Surveillance from an Indonesian Primary Health Center

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Abstract. Non-communicable diseases, particularly hypertension and type 2 diabetes mellitus, continue to impose a substantial burden on primary health care systems. Routine morbidity surveillance at primary health centers provides valuable epidemiological information, but it is often used mainly for administrative reporting rather than integrated service planning. This study aimed to analyze three-month morbidity surveillance data and explore its implications for integrated hypertension and type 2 diabetes management in primary health care. A retrospective descriptive epidemiological design was used based on secondary routine outpatient morbidity data from Puskesmas Purwosari, Kudus, Indonesia, from March to May 2026. Diagnoses were classified using ICD-10, and data were analyzed using frequencies, percentages, monthly trend analysis, and an integrative public health interpretation. Hypertension accounted for 111 cases in March, 72 in April, and 87 in May, while type 2 diabetes mellitus accounted for 70, 85, and 73 cases, respectively. Across the observation period, hypertension contributed 270 cases and type 2 diabetes mellitus 228 cases among the selected chronic disease burden. These patterns indicate a persistent need for continuous, multidisciplinary, and community-based chronic disease management. Routine morbidity surveillance can support early detection, risk stratification, health promotion, Posbindu PTM strengthening, Prolanis optimization, self-management, family-centered care, digital follow-up, and local policy planning. The study concludes that routine health service data can be transformed into practical evidence for integrated chronic disease management in Indonesian primary health care.

Keywords: routine morbidity surveillance; hypertension; type 2 diabetes mellitus; integrated care; primary health care

INTRODUCTION

Non-communicable diseases (NCDs) have become one of the most important public health challenges worldwide. The global pattern of disease has shifted from predominantly infectious diseases to chronic conditions requiring long-term prevention, treatment, monitoring, and health system adaptation. According to the World Health Organization, NCDs, including cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases, account for approximately 74% of all deaths globally, with the greatest burden occurring in low- and middle-income countries (World Health Organization [WHO], 2025). The Global Burden of Disease Study has also demonstrated that NCDs contribute substantially to premature mortality, disability-adjusted life years, and long-term health-care costs, reflecting the increasing complexity of population health needs (Hay et al., 2025; Li et al., 2025).

The global NCD burden is driven by multiple interconnected determinants, including population ageing, urbanization, unhealthy diets, physical inactivity, tobacco use, obesity, and metabolic risk factors. Among these metabolic risks, raised blood pressure and elevated blood glucose are particularly important because they directly contribute to cardiovascular disease, stroke, kidney disease, and premature death. The WHO Global Action Plan for the Prevention and Control of NCDs emphasizes the need for integrated, people-centred, and primary health care-based strategies to reduce premature mortality from NCDs and achieve Sustainable Development Goal target 3.4 (WHO, 2023a). This approach requires health systems to move beyond episodic treatment and toward continuous care, early detection, risk factor control, patient education, community engagement, and long-term monitoring.

Hypertension is widely recognized as the leading modifiable cardiovascular risk factor. It is often asymptomatic, yet it substantially increases the risk of stroke, ischemic heart disease, heart failure, chronic kidney disease, and premature mortality. The NCD Risk Factor Collaboration reported

that the number of adults aged 30-79 years with hypertension doubled from 1990 to 2019, reaching more than one billion people worldwide, while treatment and control rates remained insufficient in many settings (NCD Risk Factor Collaboration, 2021). WHO's first global report on hypertension further highlighted that most people with hypertension are not adequately treated and that scaling up effective hypertension control could prevent millions of deaths between 2023 and 2050 (WHO, 2023b; Kario et al., 2024).

Type 2 diabetes mellitus (T2DM) is another major chronic condition that increasingly burdens primary health care systems. Diabetes is associated with macrovascular and microvascular complications, including cardiovascular disease, kidney failure, neuropathy, retinopathy, and lower-limb complications. The Global Burden of Disease 2021 Diabetes Collaborators estimated that 529 million people were living with diabetes globally in 2021, with projections indicating a substantial increase by 2050 (GBD 2021 Diabetes Collaborators, 2023). More recent global analyses also indicate that diabetes prevalence and treatment gaps remain major concerns, particularly in low- and middle-income countries (NCD Risk Factor Collaboration, 2024). T2DM is closely linked with hypertension, obesity, dyslipidemia, and sedentary lifestyles, creating patterns of multimorbidity that require integrated rather than disease-specific management.

Indonesia is undergoing a significant epidemiological transition (Budiaty, et.al,2026). While communicable diseases remain relevant, NCDs such as hypertension and diabetes are increasingly prominent in national and local morbidity patterns. The Indonesian Health Survey 2023 reported that hypertension and diabetes remain major public health concerns and require stronger prevention and control strategies (Ministry of Health of Indonesia, 2024). Recent analyses of Indonesian data indicate that hypertension prevalence remains high, while diagnosis, treatment, and control rates are still suboptimal (Muharram et al., 2025). Diabetes also continues to increase, partly due to demographic change, urban lifestyles, dietary transition, obesity, and limited early detection.

Primary health care has a strategic role in responding to chronic diseases. The WHO and UNICEF Operational Framework for Primary Health Care describes PHC as a whole-of-society approach that integrates primary care, essential public health functions, multisectoral action, and community empowerment (WHO & UNICEF, 2020). In Indonesia, Puskesmas are expected to provide promotive, preventive, curative, rehabilitative, and community-oriented services. This position makes Puskesmas highly relevant for hypertension and T2DM management because most patients require continuous care rather than one-time clinical encounters.

Integrated care is increasingly emphasized as a response to fragmented chronic disease services. WHO's Package of Essential Noncommunicable Disease Interventions for Primary Health Care provides practical guidance for managing hypertension, diabetes, cardiovascular risk, chronic respiratory disease, and other NCDs in resource-limited settings (WHO, 2020). Similarly, the HEARTS technical package promotes standardized hypertension management through healthy lifestyle counselling, evidence-based treatment protocols, access to essential medicines and technologies, cardiovascular risk-based management, team-based care, and systems for monitoring (WHO, 2019; Campbell et al., 2022; Brettler et al., 2022).

In Indonesia, integrated chronic disease management is supported through several programs, including Posbindu PTM and Prolanis. Posbindu PTM is a community-based initiative for early detection and monitoring of NCD risk factors, while Prolanis is a chronic disease management program implemented through primary care facilities and supported by the national health insurance system. Studies have shown that Posbindu PTM has potential as a community empowerment platform for early detection of NCDs, but its implementation still faces challenges such as limited resources, community participation, cadres' capacity, access barriers, and inconsistent reporting (Siswati et al., 2022; Widyaningsih et al., 2022). Meanwhile, Prolanis has been associated with improvements in chronic disease monitoring, although its impact varies across settings and may be affected by service disruption, patient adherence, and health system constraints (Alkaff et al., 2021; Salamah et al., 2023). Despite the availability of routine surveillance data, there remains a gap in how such data are translated into integrated primary health care strategies. Many studies on hypertension and diabetes focus on prevalence, individual risk factors, clinical outcomes, or medication adherence. Fewer studies examine how routinely collected morbidity data from Puskesmas can be used as practical evidence for local chronic disease planning. The novelty of this study lies in positioning routine morbidity surveillance not merely as an administrative reporting activity but as a foundation for integrated chronic disease

management. Therefore, this study aimed to analyze three-month routine morbidity data from Puskesmas Purwosari, Kudus, Indonesia, and to explore its implications for integrated primary health care strategies in hypertension and type 2 diabetes management.

METHODS

This study used a retrospective descriptive epidemiological design based on secondary routine morbidity surveillance data collected over a three-month period. The data were obtained from outpatient morbidity reports at Puskesmas Purwosari, Kudus, Indonesia, from March to May 2026. The descriptive epidemiological design was selected because the study aimed to describe disease patterns, monthly trends, and the relative burden of hypertension and type 2 diabetes mellitus within a primary health care setting rather than to test causal relationships.

The main data source was routine outpatient morbidity surveillance recorded by the health center. The unit of analysis was aggregated monthly disease counts. Diagnoses were classified using the International Classification of Diseases, Tenth Revision (ICD-10), with hypertension coded as I10 and type 2 diabetes mellitus coded as E11. Variables analyzed in this study included disease category, ICD-10 code, monthly number of cases, total cases during the three-month period, and proportional distribution among the selected chronic disease burden. Sex-disaggregated and complete top-ten morbidity data should be incorporated in the final statistical table when the complete dataset is available.

Data were analyzed descriptively using frequency, percentage, and simple monthly trend analysis. The percentage contribution of each condition was calculated by dividing the number of cases for each disease by the total selected chronic disease cases during the study period. Monthly trend analysis was used to identify changes in the number of hypertension and T2DM cases between March, April, and May 2026. No inferential statistical testing was conducted because the study used aggregated routine surveillance data and was designed to generate service-planning evidence rather than estimate causal associations.

An integrative public health approach was used to interpret the findings. The analytical framework followed five stages: health service data, disease pattern identification, integrated chronic disease management, community intervention, and policy recommendation. This framework enabled the study to link morbidity patterns with practical implications for multidisciplinary care, health promotion, Posbindu PTM strengthening, Prolanis optimization, self-management support, family-centered care, digital follow-up, community empowerment, and evidence-based primary health care planning.

The study used secondary aggregated data without individual identifiers. Therefore, no personal clinical information was reported. The analysis was conducted for public health planning and scientific dissemination purposes while maintaining confidentiality of routine health service records. Analytical framework: Health Service Data -> Disease Pattern -> Integrated Chronic Disease Management -> Community Intervention -> Policy Recommendation.

RESULTS AND DISCUSSION

Table 1. Monthly distribution of hypertension and type 2 diabetes mellitus cases, March-May 2026.

Disease	ICD-10	March	April	May	Total	Percentage
Hypertension	I10	111	72	87	270	54.2%
Type 2 diabetes mellitus	E11	70	85	73	228	45.8%
Total selected chronic disease cases	-	181	157	160	498	100.0%

Routine outpatient morbidity surveillance at Puskesmas Purwosari showed that hypertension and type 2 diabetes mellitus were persistent chronic disease burdens during the observation period. Hypertension accounted for 111 cases in March, decreased to 72 cases in April, and increased again to

87 cases in May. Type 2 diabetes mellitus showed a different monthly pattern, with 70 cases in March, 85 cases in April, and 73 cases in May. Across the three-month period, hypertension contributed 270 cases, while T2DM contributed 228 cases. Among the selected chronic disease burden, hypertension represented 54.2% and T2DM 45.8%.

These findings indicate that hypertension and T2DM were not isolated monthly events but recurring conditions requiring continuous management. The pattern is consistent with the nature of chronic diseases, which require repeated contact with primary health care services for monitoring, medication, counselling, risk factor control, and complication prevention. Although the three-month observation period does not allow long-term seasonal interpretation, the persistence of both conditions suggests that chronic disease management should be treated as a core service priority at the Puskesmas level.

Figure 1. Monthly trend of hypertension and type 2 diabetes mellitus cases, March-May 2026.

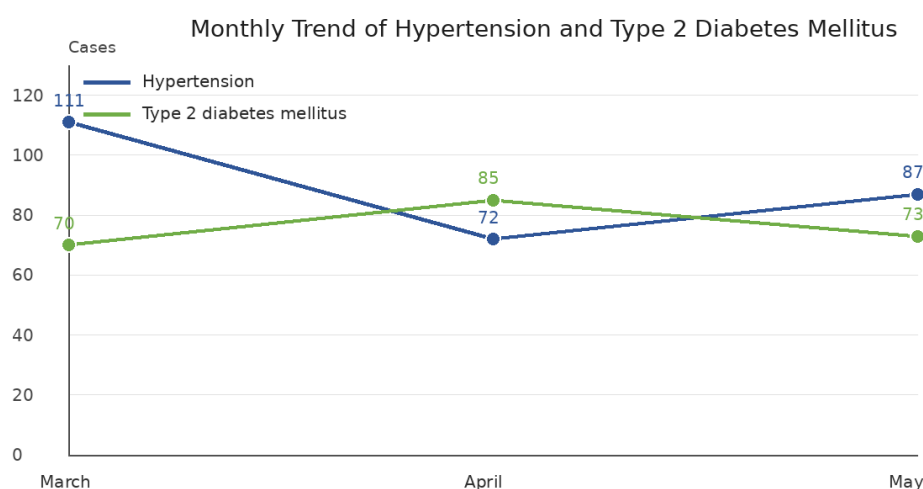
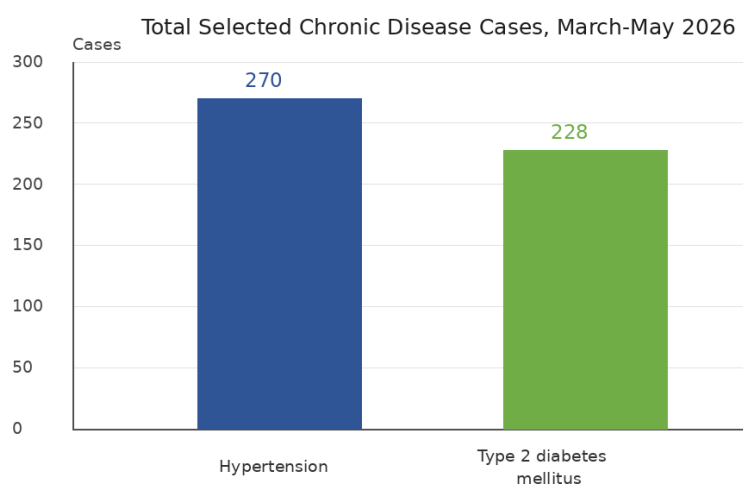


Figure 2. Total selected chronic disease burden during March-May 2026.



From the perspective of WHO integrated care, the management of hypertension and diabetes should involve coordinated promotive, preventive, curative, and rehabilitative services. Patients should not only receive clinical examination and medication but also counselling, risk assessment, laboratory monitoring, referral support, and follow-up. This is particularly relevant for multimorbidity because hypertension and diabetes often coexist and increase cardiovascular, renal, neurological, and metabolic complications. Therefore, routine morbidity findings should be translated into a coordinated service package rather than interpreted as a simple ranking of diseases.

The findings also align with the Chronic Care Model, which emphasizes productive interaction between informed patients and prepared health care teams. In this model, chronic disease outcomes improve when health systems support self-management, clinical decision-making, delivery system design, community resources, and health information systems. Routine morbidity surveillance directly contributes to the health information system component. When analyzed properly, monthly morbidity data can help Puskesmas identify priority diseases, target high-risk groups, plan education activities, monitor program performance, and evaluate whether chronic disease interventions are reaching patients consistently.

The results have important implications for integrated community health. Hypertension and diabetes are strongly influenced by behavioural and social determinants, including diet, physical activity, smoking, obesity, stress, medication adherence, and family support. Therefore, Puskesmas-based management should be linked with community-based activities. Posbindu PTM can function as an early detection and monitoring platform for blood pressure, blood glucose, body mass index, abdominal circumference, smoking behaviour, and physical activity. Strengthening Posbindu PTM would allow chronic disease control to move closer to the community, especially for individuals who rarely visit health facilities.

Health promotion should become a central strategy. The high burden of hypertension and diabetes suggests the need for continuous education on low-salt diet, reduced sugar intake, balanced nutrition, regular physical activity, weight control, smoking cessation, stress management, and routine health checks. Health promotion should not be limited to general counselling but should be tailored to local morbidity patterns. For example, if hypertension remains the leading diagnosis, community education should prioritize blood pressure awareness, home blood pressure monitoring, dietary salt reduction, and adherence to antihypertensive therapy. The findings also support optimization of Prolanis BPJS as a structured chronic disease management program. Prolanis can strengthen continuity of care for patients with hypertension and diabetes through regular medical consultation, medication monitoring, laboratory checks, group education, physical activity sessions, reminders, and follow-up. However, Prolanis should not operate separately from Posbindu PTM. A more integrated model is needed, where Posbindu PTM supports community screening and early detection, while Prolanis supports long-term management for diagnosed patients. This connection would reduce fragmentation between community-based prevention and facility-based chronic disease care.

Self-management and family-centered care are essential in chronic disease management. Patients with hypertension and diabetes make daily decisions that affect disease control, including diet, medication use, physical activity, and health service utilization. Family members influence food choices, health-seeking behaviour, medication adherence, physical activity, and emotional support. Puskesmas can involve families during counselling sessions, Prolanis activities, home visits, and community education. By positioning patients and families as active partners, chronic disease management becomes more sustainable and culturally appropriate.

Digital health may further strengthen integrated chronic disease management. Simple tools such as WhatsApp reminders, digital education materials, electronic morbidity dashboards, and monthly monitoring forms can support patient follow-up and program planning. For Puskesmas, digital dashboards based on routine morbidity data can help visualize monthly trends, identify increasing disease patterns, and guide decision-making. Digital health does not need to be complex; low-cost communication tools can improve continuity, reminders, and health promotion if used systematically.

Community empowerment is also essential. Chronic disease prevention will be more effective when community leaders, cadres, families, and patients are involved. Cadres can support screening, health education, follow-up reminders, and referral encouragement (Budiati, R.E., et al, 2025). Community-based interventions may include regular Posbindu PTM sessions, healthy cooking demonstrations, walking groups, anti-smoking campaigns, and blood pressure screening during village activities. These interventions can translate morbidity data into practical action.

This study has several limitations. First, the data were obtained from routine outpatient morbidity reports, which may reflect health service utilization rather than true community prevalence. Second, the observation period was limited to three months, so longer-term trends could not be assessed. Third, individual-level clinical data, such as blood pressure control, blood glucose levels, medication adherence, complications, comorbidities, and sex distribution, were not available in the revised dataset. Despite these limitations, the study provides practical evidence that routine morbidity data can support

evidence-based planning for chronic disease control at the primary health care level.

Table 2. Implications of routine morbidity findings for integrated primary health care strategies. Program

component	Strategic implication for hypertension and T2DM management
WHO integrated care	Coordinate promotive, preventive, curative, rehabilitative, and referral services around patient needs.
Chronic Care Model	Use morbidity surveillance as a health information system for priority setting, follow-up, and quality improvement.
Posbindu PTM	Strengthen community screening, risk factor monitoring, cadre capacity, and referral linkage to Puskesmas.
Prolanis BPJS	Optimize structured follow-up, medication adherence, laboratory monitoring, group education, and physical activity.
Self-management and family-centered care	Involve patients and families in diet, medication use, physical activity, home monitoring, and routine control.
Digital health and policy planning	Develop simple digital reminders and morbidity dashboards to support follow-up and local decision-making

CONCLUSION

Routine morbidity surveillance at Puskesmas Purwosari, Kudus, showed that hypertension and type 2 diabetes mellitus were persistent chronic disease burdens during March-May 2026. Hypertension contributed 270 cases and T2DM contributed 228 cases among the selected chronic disease burden. These findings demonstrate that routine health service data can be transformed into practical epidemiological evidence for integrated chronic disease management. Strengthening primary health care strategies should include multidisciplinary care, health promotion, lifestyle modification, Posbindu PTM strengthening, Prolanis BPJS optimization, self-management support, family-centered care, digital follow-up, and community empowerment. Routine morbidity surveillance should therefore be used not only for administrative reporting but also for evidence-based planning and local policy recommendation in Indonesian primary health care.

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