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MEDTRONIC LABS

BRIDGING THE GAP:

DIGITAL-ENABLED 360° APPROACH TO NCD CARE IN BANGLADESH

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Executive Summary

Non-communicable diseases (NCDs), particularly hypertension and diabetes, pose significant health challenges in Bangladesh. This white paper reviews the implementation and outcomes of a community-based, digitally enabled screening, linkage-to-care and long-term management model piloted in 5 sub-districts (Upazilas) in Bangladesh. Leveraging the SPICE digital platform and community health workers (Shasthya Kormi), the initiative screened 143,527 individuals (1/3 of the target catchment population), identifying a high burden of undiagnosed or uncontrolled hypertension (21%) and diabetes (22%). Of the 48,470 individuals referred, one-third enrolled in care. More than 9,000 (19%) individuals of those referred were flagged as high-risk. Follow-up rates at 6 and 12 months were 34% for hypertension and 25% for diabetes. Control rates among those who followed up increased from 31% at baseline to 72% at 12 months for hypertension and 23% at baseline to 47% at 12 months for diabetes. The SPICE digital platform enabled risk stratification and real-time referral, follow-up and outcomes tracking, demonstrating the feasibility and impact of digital community-based care in resource-limited settings. However, the pilot also exposed critical health system barriers, particularly inconsistent medication availability, weak behavioral interventions and fragmented public-private coordination, that must be addressed for sustainable scale-up. Advocacy efforts driven by these insights have catalysed national and subnational alignment towards a "Community-First" NCD prevention and control approach, with digital innovation and policy reforms at the forefront of scale-up planning.

Introduction

Non-communicable diseases (NCDs) such as hypertension and diabetes are emerging as the biggest health challenge of our time, contributing to 75% of global mortality.[1]

Bangladesh faces a significant burden of NCDs, accounting for 63% of all deaths.[2]

Traditional facility-based screening approaches have proven insufficient, with less than half of people living with hypertension and diabetes diagnosed,[3] particularly in rural areas where 68% of the population resides.[4]

The high undiagnosed population, coupled with low control rates for hypertension (20%) and diabetes (~6%)[3] portends a major crisis for cardiovascular complications, which would impose catastrophic costs on families and overwhelm tertiary care facilities.

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This white paper reviews the operational feasibility and public health outcomes of a digital-enabled, community-based and decentralized comprehensive hypertension and diabetes care model designed to address these challenges. The findings offer both encouraging evidence of what is possible and sobering insights into the health system barriers that must be overcome to achieve sustainable impact at scale.

THE 360° CARE MODEL

Program scope

The pilot program was designed as a tech-enabled, community-first model that integrated awareness creation, screening & referral, treatment, and follow-up, digitally connecting patients across the continuum of care. The pilot was implemented in five Upazilas (sub-districts): Araihazar, Bandar, Rupganj, and Sonargaon in Narayanganj district, and Nilphamari Sadar in Nilphamari district.

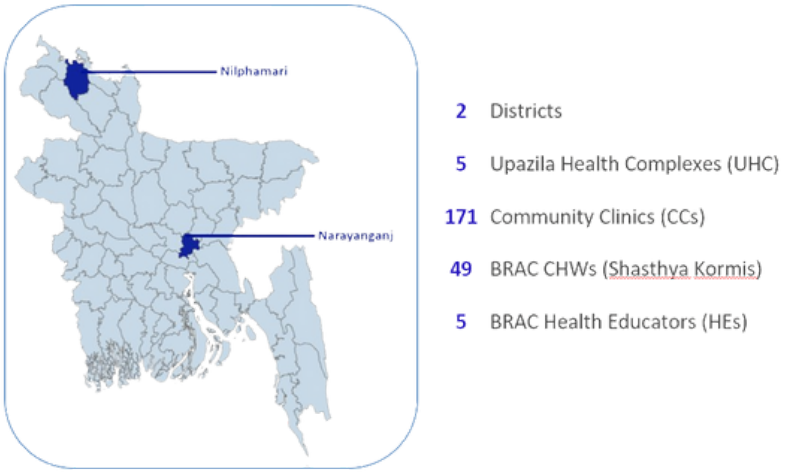

Figure 1: Pilot scope

Care model

Community-based screening: Trained Shastha Kormi (SKs) conducted household-level awareness and NCD screenings. This involved real-time capture of individual demographics, blood pressure (BP), and blood glucose (BG) readings, along with initial risk factor assessments. Household screenings were complemented with screening at Community Clinics (CC) by Community Health Care Providers (CHCPs), ensuring multiple touch points for community engagement

Referral and enrollment: When elevated readings were detected, the SPICE platform automatically triggered differentiated referral pathways based on severity. Individuals with moderately elevated values (BP 140-179/90-109mmHg, fasting blood glucose 7-15mmol/L or random blood glucose 11.1-15mmol/L) were referred to CC for initial assessment before potential escalation to Upazila Health Complexes (UHCs), while those with dangerously high readings received immediate referral to UHCs. This risk stratification ensured efficient use of limited resources while prioritizing those in greatest need. Existing patients in pilot UHCs were also enrolled during their routine clinics. Enrolled patients received monthly medical reviews until they achieved control status. Further, they received ongoing counseling from health educators.

Decentralized patient management: Rather than requiring all patients to return monthly to overcrowded UHCs, the system identified stable, controlled patients who could receive routine monitoring and medication refills at Community Clinics, with quarterly reviews at UHCs. This decentralized approach not only reduced the burden on UHCs but also made care more accessible and sustainable for patients managing lifelong conditions.

Program monitoring: Throughout this continuum, the SPICE platform served as the digital thread connecting all elements: tracking referrals, monitoring follow-up, flagging high risk patients needing additional support, and generating real-time analytics for program improvement. Integration with the national DHIS2 system ensured that this wealth of data contributed to broader health system planning and accountability.

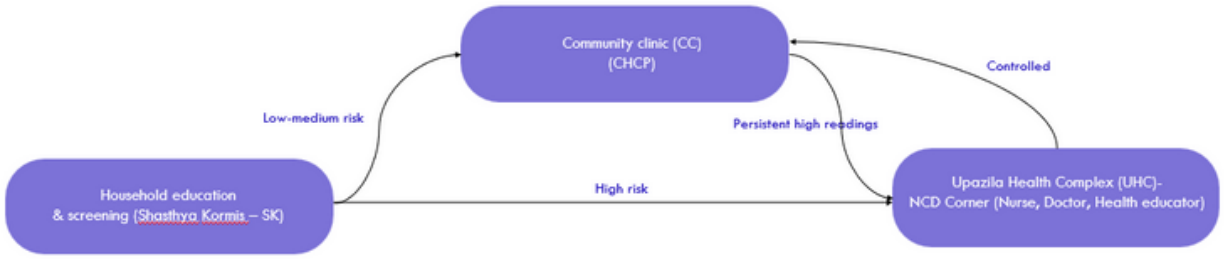

Figure 2: The 360° Care Model

KEY FINDINGS FROM THE PILOT

Overall, the pilot demonstrated improved access to care and outcomes through tech-enabled 360° patient management. Figure 3 below shows a summary of the pilot's key findings.

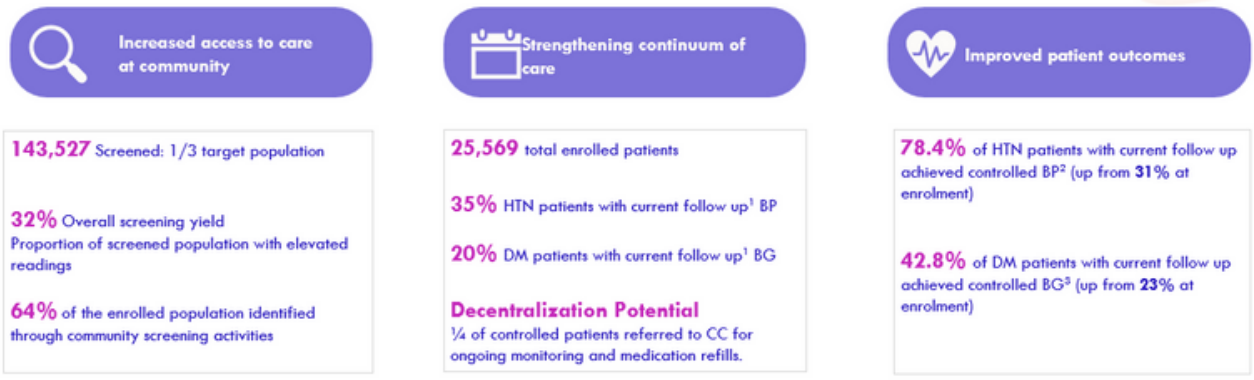

Figure 3: Summary of key pilot findings

[1] Current follow-up is defined as documented blood pressure/blood glucose in the preceding 90 days
[2] Controlled BP: <140mmHg SBP and < 90mmHg DBP (Bangladesh National Guideline for Hypertension)
[3] Controlled BG: HBA1C <7% or FPG < 7mmol/L or RPG < 10mmol/L (Bangladesh National Guidelines for Diabetes Mellitus)

Population level screening coverage & disease burden

The screening initiative reached 143,527 individuals over the 2-year implementation period, representing 29% of the target population across the five Upazilas. The demographic profile of those screened; 87% aged ≥40 years, with a female-to-male ratio of 72:28 reflected both the program's appropriate targeting of at-risk groups and the operational reality of conducting household visits du ringworking hours when men were often absent.

The proportion of elevated blood pressure (BP) and blood glucose (BG) among the screened population was 21% and 22%, respectively. These rates are similar with (hypertension; 17%male/23%female) or exceed (diabetes; 15% male/17%female) national averages reported in the Bangladesh Demographic and Health Survey 2022 (BDHS 2022). More striking were the inter-Upazila variations revealed through granular community-level data analysis. Bandar and Sonargaon emerged as particular hotspots, with elevated BP rates of 33% and 24% respectively, and elevated BG rates of 29% in both Upazilas. In contrast, Araihazar showed a 17% rate of elevated BP, while Nilphamari Sadar demonstrated lower rates for both conditions (20% elevated BP; 16% elevated BG). While the higher rates of elevated BG might be partly explained by bias induced by the voluntary, paid screening approach, reasons for the inter-Upazila variations need to be further investigated to design patient centric regional interventions.

Perhaps most alarming was the identification of 9,238 individuals (1/5 of those with elevated readings) with critical values requiring urgent medical attention. This included 4,102 people with Grade 3 hypertension (BP ≥180/110 mmHg) and 5,359 with severe hyperglycemia (glucose levels >18 mmol/L). These individuals were walking time bombs, at immediate risk of stroke, heart attack, or diabetic crisis, yet had been living in the community without intervention. This further reinforces the critical and life-saving role of community-based screening outreach.

Linkage to care and enrollment

Of the total 48,470 individuals referred, 16,329 (34%) were successfully enrolled at Upazila Health Complexes (UHCs). Even among the high-risk cohort (n=9,238), linkage was 36% (n=3,321). Bandar stood out with a 54% linkage rate, likely benefiting from its proximity to Dhaka and better transportation infrastructure, while other Upazilas saw rates ranging from 27% to 39%.

Among those enrolled from screening (n=16,329), 38% of them were newly diagnosed, while 62% were previously diagnosed with elevated readings, underscoring the critical role of community-based screening outreach in identifying undiagnosed and uncontrolled patients.

In addition to the 16,329 individuals enrolled from screening, an additional 9,240 patients were directly enrolled at UHC during their routine clinical appointments, bringing the total enrolled patient population to 25,569. It is worth noting that 64% of the total enrolled patient population came in through community-based screening outreach, underscoring its critical role in providing an entry point into care.

Among the total enrolled patient population, close to 1/3 (29%) had comorbid hypertension and diabetes, representing a high-risk group for medication adherence issues & elevated cardiovascular risk. At scale, this would lead to an overwhelming public health and economic burden on the health sector

Follow up care and clinical outcomes

12-month cohort follow up analysis

Among patients who had been enrolled for >12 months, 1/3 had documented follow up at 6 & 12 months, notably lower (25%) for diabetes (Figure 4).

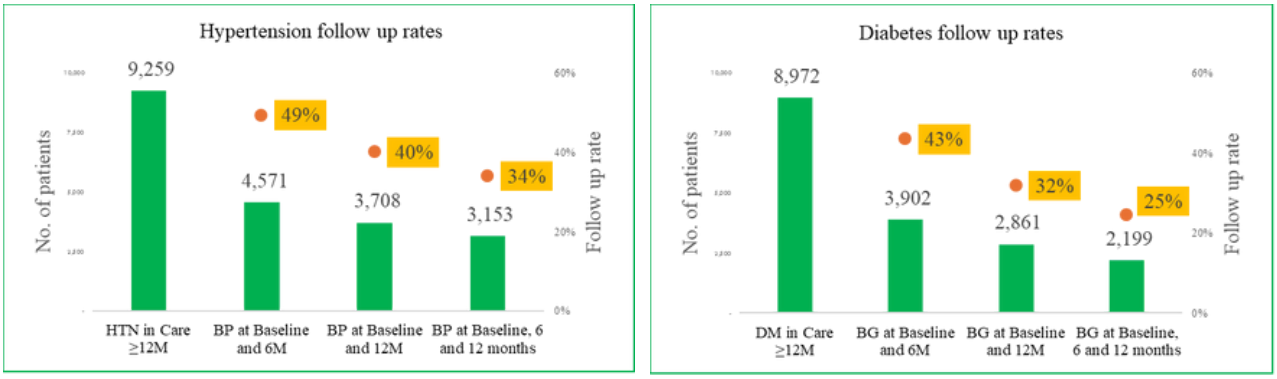

Figure 4: Six- and twelve-month follow-up rates

Decentralized care

Among controlled/stable patients on medications available at CC (n=1,526), 26% (403) were referred to CC for routine monitoring and medication refill within the 1st year of initial roll-out, demonstrating the feasibility of the model despite the significant change in established clinical pathways.

12-month cohort control analysis

Among patients with hypertension with 6 and 12-month BP data, control improved from 31% to 72%, with 60% of patients achieving clinically significant reductions in their systolic BP (>10mmHg).[5] While the proportion of diabetic patients with controlled BG doubled over 12 months, more than half still remained uncontrolled (Figure 6). Diabetes control might be lower compared to hypertension due to more frequent stock outs of medications, inconsistent availability of glucose testing supplies and weak lifestyle interventions, as informed by anecdotal implementation insights.

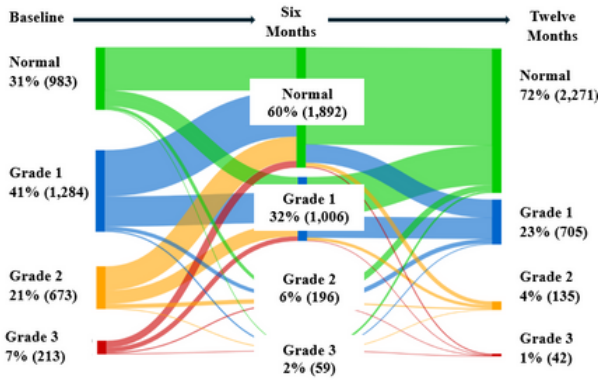

Figure 5: Changes in hypertension severity

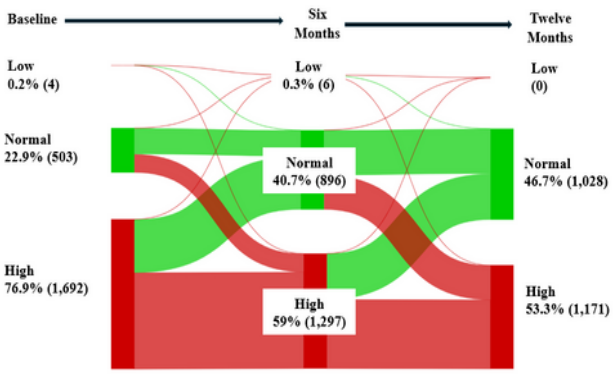

Figure 6: Changes in glycaemic status

Discussion and Implications

This pilot reinforces a growing body of evidence that community-based, digitally supported interventions can successfully uncover and address the substantial hidden burden of hypertension and diabetes in resource-limited settings. The use of a 360-degree, tech-enabled decentralized approach demonstrated both operational feasibility and clinical utility in achieving significant reach, early identification of high-risk individuals and improved outcomes.

The screening coverage of nearly a third of the target population and the identification of hotspot regions with elevated prevalence are particularly noteworthy, aligning with global findings that door-to-door and community-based opportunistic awareness raising and screening can detect a large proportion of previously undiagnosed and/or uncontrolled NCDs.[6] While the 1-in-3 linkage rate to public sector care is similar to many real-world programs which report similar conversion rates from screening to treatment initiation (22-56%) in LMICs,[8-13] these findings demonstrate that screening alone is insufficient without robust linkage-to-care mechanisms, including private sector coordination to capture the broader picture of care pathways. Moreover, the identification of patients with crisis-level blood pressure and/or hyperglycemia emphasizes the need for triage capacity and more immediate referral mechanisms. High rates of such severe cases (over 9,000, 19% of those referred) reinforce the need for primary care strengthening through digital and community models to include emergency response protocols.

Anecdotal implementation insights revealed several potential explanations for the observed follow-up rates. Inconsistent availability of medications and distance to public facilities were the most cited reasons, which informed patient preference for more convenient private providers. Other factors included patients 'feeling well' and seeing no need to continue attending appointments, or limited awareness about the life-long nature of their condition. This significant drop-off in follow-up rates underscores a persistent challenge noted across many real-world programs: the difficulty of maintaining long-term engagement without system-level changes in medication availability, private sector coordination, and patient-centric incentives.[7,14-16]

The observed low rates of diabetes control call for intensification of behavioral and lifestyle interventions. These interventions can also be leveraged for overall disease prevention, especially among at risk and high-risk groups such as those with prediabetes, prehypertension (‘high normal BP’) and overweight/ obesity.

From pilot to policy advocacy: catalyzing system-level change

The pilot's insights have sparked momentum at national and subnational policy advocacy forums, solidifying support for a "Community-First" approach as a cornerstone of sustainable NCD management. Emphasis is now placed on embedding digital innovation and decentralized care models within national health frameworks, backed by clear operational protocols and sustainable financing.

At the subnational level, district and Upazila coordination forums have become vital in driving localized improvements, focusing on strategic enhancements such as refined medication forecasting, optimized deployment of health educators, data-driven decision-making, and leveraging existing community structures such as Community Groups (CGs) and Health Groups (CHGs) to foster sustained behavioural change and enhance local ownership.

Going forward, this systemic shift from fragmented to coordinated care across the entire continuum will be measured not just by inputs but by outcomes: Improved population health, enhanced health system efficiency, and reduced patient and health system costs.

Finally, the implications for scale-up include not only replicating this model across districts, but refining it through systematic research and innovation. This pilot validates the community-based digital model as a promising front door to NCD care, while highlighting opportunities for addressing systemic barriers crucial for scaling and sustaining impact.

Conclusion

The 360-degree initiative demonstrates the operational feasibility and clinical utility of digitally supported community-based interventions, significantly improving disease detection and clinical outcomes, despite persistent health system challenges. Long-term success at scale depends on overcoming identified gaps in continuity of care, private sector integration, medication availability and behavioral/lifestyle interventions. The time is now to translate pilot insights into sustained, national and subnational-level action for a healthier, more resilient Bangladesh.

References

1. World Health Organization. Noncommunicable diseases fact sheet [Internet]. 2024 [cited 2025 Jul 12]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

2. World Health Organization. Noncommunicable diseases: Progress monitor 2025 [Internet]. 2025 [cited 2025 Jul 12]. Available from: https://knowledge-action-portal.com/en/content/noncommunicable-diseases-progress-monitor-2025

3. Bangladesh Demographic and Health Survey 2022 Final Report. 2024 [cited 2025 Jul 12]; Available from: www.niport.gov.bd

4. Bangladesh Bureau of Statistics. Bangladesh Population and Housing Census 2022. 2023 Nov;

5. Ettehad D, Emdin CA, Kiran A, Anderson SG, Callender T, Emberson J, et al. Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. www.thelancet.com [Internet]. 2016 [cited 2024 May 6];387. Available from: http://dx.doi.org/10.1016/

6. Beaney T, Kerr GK, Kiru G, McArdle H, Schlaich M, Schutte AE, et al. May Measurement Month 2022: results from the global blood pressure screening campaign. BMJ Glob Health [Internet]. 2024 Dec 2 [cited 2025 Jul 13];9(12):16557. Available from: https://gh.bmj.com/content/9/12/e016557

7. Mbau L, Harrison R, Kizito W, Timire C, Namusonge T, Muhula S, et al. Case identification, retention and blood pressure control in Kenya. Public Health Action [Internet]. 2022 Jul 27 [cited 2025 Jul 13];12(2):58. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC9176190/

8. McGuire H, Van TB, Thi Thu H Le, Nguyen Thanh H, Murray M, Shellaby J, et al. Improving hypertension awareness and management in Vietnam through a community-based model. Sci Rep [Internet]. 2022 Dec 1 [cited 2025 Jul 13];12(1). Available from: https://pubmed.ncbi.nlm.nih.gov/36400798/

9. Madela S, James S, Sewpaul R, Madela S, Reddy P. Early detection, care and control of hypertension and diabetes in South Africa: A community-based approach. Afr J Prim Health Care Fam Med [Internet]. 2020 Mar 1 [cited 2025 Jul 13];12(1):1–9. Available from: https://pubmed.ncbi.nlm.nih.gov/32129650/

References

10. Vedanthan R, Kamano JH, DeLong AK, Naanyu V, Binanay CA, Bloomfield GS, et al. Community Health Workers Improve Linkage to Hypertension Care in Western Kenya. J Am Coll Cardiol [Internet]. 2019 Oct 15 [cited 2025 Jul 13];74(15):1897–906. Available from: https://www.sciencedirect.com/science/article/pii/S0735109719361911

11. Pastakia SD, Ali SM, Kamano JH, Akwanalo CO, Ndege SK, Buckwalter VL, et al. Screening for diabetes and hypertension in a rural low income setting in western Kenya utilizing home-based and community-based strategies. Global Health [Internet]. 2013 May 16 [cited 2025 Jul 13];9(1). Available from: https://pubmed.ncbi.nlm.nih.gov/23680083/

12. Basu P, Mahajan M, Patira N, Prasad S, Mogri S, Muwonge R, et al. A pilot study to evaluate home-based screening for the common non-communicable diseases by a dedicated cadre of community health workers in a rural setting in India. BMC Public Health [Internet]. 2019 Jan 3 [cited 2025 Jul 13];19(1):1–12. Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-018-6350-4

13. Larsson L, Chingono RMS, Calderwood CJ, Nzvere FP, Marambire ET, Kavenga F, et al. Barriers to and facilitators of linkage to care following hypertension and diabetes screening among health workers in Zimbabwe: A mixed method study. PLOS Global Public Health [Internet]. 2025 Apr 1 [cited 2025 Jul 13];5(4). Available from: https://pubmed.ncbi.nlm.nih.gov/40300032/

14. Garrib A, Njim T, Adeyemi O, Moyo F, Halloran N, Luo H, et al. Retention in care for type 2 diabetes management in Sub-Saharan Africa: A systematic review. Tropical Medicine and International Health [Internet]. 2023 Apr 1 [cited 2025 Jul 13];28(4):248–61. Available from: https://pubmed.ncbi.nlm.nih.gov/36749181/

15. India Hypertension Control Initiative – a patient-centred approach to control hypertension at the Primary care level [Internet]. [cited 2025 Jul 13]. Available from: https://www.who.int/about/accountability/results/who-results-report-2020-mtr/country-story/2022/india-hypertension-control-initiative---a-patient-centred-approach-to-control-hypertension-at-the-primary-care-level

16. Kaur P, Kunwar A, Sharma M, Mitra J, Das C, Swasticharan L, et al. India Hypertension Control Initiative—Hypertension treatment and blood pressure control in a cohort in 24 sentinel site clinics. J Clin Hypertens. 2021 Apr 1;23(4):720–9. https://onlinelibrary.wiley.com/doi/10.1111/jch.14141

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