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SOCIAL DETERMINANTS OF HEALTH IN ADULTS WITH HYPERTENSION AND TYPE 2 DIABETES

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ABSTRACT

Background: Social and material circumstances influence the feasibility of long-term treatment for hypertension and type 2 diabetes. Understanding these circumstances is particularly relevant when patients must manage both conditions.

Objective: To examine how social determinants relate to cardiometabolic outcomes and critically consider responses at clinical, community and policy levels.

Approach: This narrative review uses the World Health Organization conceptual framework and the five Healthy People 2030 domains. Targeted source verification and supplementary web searches identified illustrative observational studies, intervention trials and framework documents. Evidence was synthesized thematically; no systematic search, formal risk-of-bias assessment or meta-analysis was undertaken.

Synthesis: Economic insecurity, difficulties obtaining care, limited access to understandable health information and adverse neighborhood conditions can interfere with treatment. Observational associations should not be interpreted as proof that a particular social exposure causes a specific complication. Trials support selected community-based hypertension interventions, whereas food-support programs have produced differing effects on dietary and glycemic outcomes. Evidence from populations with either condition cannot automatically be generalized to patients with both.

Conclusion: Socially responsive care should connect assessment of patient priorities with affordable treatment, accessible communication and services that can address identified needs. Implementation should evaluate clinical outcomes alongside patient burden, referral completion and equity. Stronger evidence is needed on sustained benefits and on interventions designed specifically for coexisting hypertension and type 2 diabetes.

KEYWORDS: *social determinants of health; hypertension; type 2 diabetes mellitus; health equity; primary care; medication adherence.*

INTRODUCTION

Hypertension and type 2 diabetes mellitus require sustained treatment, monitoring and opportunities for self-management. A prescription alone cannot ensure that a patient can obtain medicines, attend appointments or follow dietary advice. The social determinants of health therefore belong within the clinical assessment of treatment barriers. The diabetes literature links socioeconomic circumstances and social environments with disease risk and outcomes, while a systematic review of hypertension studies identifies associations involving education, insurance, income and neighborhood conditions [1,2].

This review examines social determinants relevant to adults with hypertension or type 2 diabetes, with particular attention to implications for people managing both. Its purpose is to connect evidence about social disadvantage to practical decisions in care, while distinguishing associations, possible mechanisms and tested interventions. The coexistence of two conditions is not, by itself, sufficient evidence of a syndemic; that term would require a more explicit account of interacting diseases and adverse social contexts.

Review approach and conceptual framework

This is a focused narrative review. The review was developed from an initial thematic draft and its references. On 26 October 2026, targeted web searches and direct checks of PubMed, PubMed Central, publisher pages and official organizational sources were used to verify references and identify illustrative studies. Search phrases combined social determinants, hypertension or type 2 diabetes with housing instability, food insecurity, health literacy, neighborhood conditions, discrimination, particulate pollution and community interventions. Sources were selected for relevance to the themes and for identifiable study designs and outcomes. Accessible abstracts or full texts were used; full-text assessment was not available for every source.

The review does not claim exhaustive coverage. There was no prospectively registered protocol, database-wide reproducible search, independent duplicate screening or formal quality scoring. Findings are discussed according to study design, population, outcome and interpretive limitations. Intervention examples were chosen to include both favorable and null findings. Recommendations extending beyond the tested interventions are presented as proposed practice or research priorities.

The World Health Organization framework distinguishes the social and political processes that distribute resources from the material, psychosocial and health-system pathways through which disadvantage affects health [3]. Healthy People 2030 organizes determinants into economic stability, education access and quality, healthcare access and quality, neighborhood and built environment, and social and community context [4]. These domains overlap: housing costs may compete with food

expenditure, while employment conditions can constrain access to care. Individual social needs are manifestations of this wider context, not interchangeable measures of structural disadvantage.

Economic stability and housing

Financial constraints can interrupt medicine acquisition and follow-up, making treatment plans difficult to sustain [1]. An assessment should therefore consider the complete cost of care, including monitoring supplies, travel and time away from work. Employment status alone is an inadequate indicator of security: an employed person may still lack predictable income or flexibility to attend appointments. For clinical decision-making, asking about actual affordability is more informative than assuming that insurance or employment removes financial barriers.

Housing instability adds difficulties with continuity of care and safe storage of medicines. A 2025 longitudinal study examined its association with subsequent type 2 diabetes outcomes using health-system data [5]. Such evidence strengthens the rationale for considering housing in care planning, but observational adjustment cannot exclude all differences between people with and without housing instability. It should not be used to assert that unstable housing inevitably produces hyperglycemic emergencies or a particular form of organ damage.

Medication-storage advice also requires precision. Insulin storage limits depend on the product, container and whether it is in use. Manufacturer information allows specified periods at controlled room temperature for several products, with different limits across formulations [6]. The relevant concern is whether a patient can meet the instructions for their prescribed product, including protection from heat and freezing. Lack of a refrigerator should prompt an individualized storage plan rather than an assumption that insulin treatment is impossible.

Education and health literacy

Educational attainment and health literacy should be assessed as related but distinct concepts. In a cross-sectional study of adults with type 2 diabetes, Schillinger and colleagues examined relationships between functional health literacy and diabetes outcomes [7]. The design can identify associations but cannot establish whether limited literacy preceded poorer outcomes or isolate the effect of a communication intervention. Formal education should not be treated as a reliable substitute for directly checking understanding.

A practical response is to review whether the patient can explain the treatment plan in their own words and demonstrate use of monitoring or administration devices. Instructions should use the patient's preferred language, familiar units and a manageable number of actions. Dietary discussions can begin with available foods and usual meals. These are proposed adaptations to the demands of care; their value should be assessed through understanding, treatment errors and patient experience, rather than assumed from the distribution of educational leaflets.

Healthcare access and quality

The hypertension evidence associates insurance coverage and other access-related conditions with outcomes, but much of the reviewed literature comes from the United States [2]. Insurance arrangements differ internationally, so coverage cannot serve as a universal measure of access. Local assessment should distinguish availability, affordability, travel requirements and continuity. A service may be nominally available yet remain unusable because its opening hours or refill arrangements conflict with a patient's circumstances.

For patients receiving care from several professionals, a proposed priority is one reconciled medicine list and a clearly identified contact for follow-up. Teams can ask why an appointment or refill was missed before interpreting it as unwillingness to engage. Telephone or digital follow-up may be useful options, but the patient's access to a device, privacy and confidence using the service should be checked. These implementation choices require evaluation in the population where they are introduced.

Neighborhood conditions and food security

Food insecurity concerns the ability to obtain sufficient food, whereas geographic food access concerns proximity to outlets. The two should not be treated as equivalent. In a longitudinal study of 391 adults with diabetes, food insecurity was associated with an adjusted HbA1c difference of 0.6 percentage points (95% confidence interval [CI], 0.4 to 0.8); the study's geographic measure of low food access was not significantly associated with HbA1c [8]. The findings support asking about household resources rather than inferring food security from a neighborhood map.

Neighborhood influences are difficult to isolate because people are not randomly distributed across places. The Moving to Opportunity social experiment provides a stronger design for examining some of these effects. Offering women with children in high-poverty public housing an opportunity to move to lower-poverty areas was associated with lower subsequent prevalence of extreme obesity and elevated HbA1c [9]. This was not a trial of treatment for established hypertension and diabetes, and its effects cannot identify which neighborhood feature was responsible.

Environmental exposure extends the discussion beyond personal behavior. A cohort study involving 12,064 adults in Delhi and Chennai linked higher fine particulate matter exposure with glycemic markers and incident type 2 diabetes [10]. Its observational design leaves uncertainty about causality, exposure measurement and residual confounding. The study concerns disease development as well as biomarkers; it does not establish that pollution reduction alone improves control in people with both diseases. Nevertheless, it supports including environmental conditions in research on cardiometabolic inequity.

Social context and possible pathways

Support from family or community members may assist with appointments and daily treatment, but the person receiving care should decide whom to involve. The diabetes literature also considers social cohesion and social support as relevant determinants [1]. Living alone should not automatically be equated with loneliness, and having relatives nearby does not establish that useful or acceptable support is available.

Discrimination is another exposure that needs careful definition. The Multi-Ethnic Study of Atherosclerosis examined perceived everyday and lifetime discrimination in relation to incident hypertension [11]. Different measures capture different experiences; a self-reported exposure does not represent the whole of structural racism. Findings should be interpreted within their population and measurement context, without treating racial or ethnic categories as biological explanations for social inequalities.

Several pathways may operate together: difficulty obtaining treatment, constrained food choices, disruption of daily routines and sustained psychosocial stress. Biological stress pathways are plausible components of this account, but the selected clinical studies do not establish a single mechanism linking every social exposure to blood pressure or glucose. This review therefore avoids assigning a specific complication to each determinant. For practice, a more useful question is which barrier can be addressed safely and acceptably for the individual patient.

Interventions and the strength of evidence

Community-based hypertension trials illustrate the potential of linking outreach to treatment delivery. In the COBRA-BPS cluster-randomized trial, 2,645 adults in rural Bangladesh, Pakistan and Sri Lanka received usual care or a package involving community health-worker home visits, physician training and care coordination. The intervention produced a 5.2 mm Hg greater reduction in systolic blood pressure at 24 months (95% CI, 3.2 to 7.1) [12]. Because the intervention had several components, its effect cannot be attributed to home visits alone. It was also not restricted to people with diabetes.

A US cluster-randomized trial in Black-owned barbershops coupled trusted community engagement with pharmacist-led medication management under collaborative practice agreements [13]. The intervention improved blood-pressure outcomes compared with an active control approach. Its lesson is that outreach may be more effective when connected to the capacity to adjust treatment. Transfer to another healthcare system would require consideration of prescribing authority, monitoring, staffing and financing; the result does not establish the effectiveness of pharmacist counseling alone.

Food-support trials show why improvements in intermediate outcomes should not be equated with improved glycemic control. A randomized crossover trial in 44 adults with diabetes and food insecurity found that medically tailored meal delivery improved dietary quality and reduced self-

reported hypoglycemia during meal provision [14]. The small sample and short intervention periods limit conclusions about durable clinical effects.

In contrast, a larger randomized trial of an intensive food-as-medicine program found no significant between-group improvement in HbA1c at six months, despite increased engagement with preventive care. The adjusted difference was −0.10 percentage points (95% CI, −0.46 to 0.25) [15]. These studies tested different programs and outcomes. Together, they argue for evaluating the intended benefit explicitly and using a comparator rather than attributing all before-and-after improvement to the intervention. Table 1 summarizes selected intervention evidence.

Implications for clinical practice and policy

This synthesis suggests a practical sequence for care: identify a concern the patient wants help with, assess its consequences for treatment, agree on a feasible response and check whether that response occurred. Screening should be voluntary and linked to available support. Recording a need without a response plan should not be counted as successful intervention. Confidentiality and clear explanation of who can access the information are essential features of the proposed process.

For pharmacy practice, this could include identifying unaffordable prescriptions, discussing suitable lower-cost options with prescribers, simplifying refill arrangements where appropriate and checking understanding of administration and monitoring. Referral pathways should name the responsible team member and record whether the patient received the service. Clinical safety remains central: improving access must be accompanied by appropriate review of treatment effects and adverse events.

At service level, proposed evaluation measures include blood pressure, HbA1c when clinically indicated, treatment interruptions, completed referrals, patient-reported burden and differences in access across social groups. These outcomes answer different questions. A program might improve food security without changing HbA1c, or improve average blood pressure while failing to reach the most disadvantaged patients. Reporting both clinical and social outcomes would make these distinctions visible.

Policy responses should address the distribution of resources as well as immediate patient needs, consistent with the WHO framework [3]. Affordable longitudinal care, reliable medicine supply, housing security and accessible transport are relevant areas for local policy assessment. This review does not establish the comparative effectiveness or cost-effectiveness of these reforms. Medical–legal partnerships may be considered where legal barriers are identified, but the selected evidence does not justify claiming a proven cardiometabolic benefit from that model.

Limitations and research priorities

This narrative review is vulnerable to selection and publication bias because it uses targeted retrieval rather than a comprehensive search. It did not formally assess risk of bias, certainty of evidence or unpublished studies. Some sources were accessible only as abstracts or publisher summaries. The

discussion emphasizes selected English-language evidence, and several studies were conducted in US populations. Applicability to other settings, including India, requires attention to local financing, service availability and social conditions.

A further limitation is the distinction between disease onset, control and complications. These outcomes cannot be combined into one measure of social impact. Evidence concerning either hypertension or diabetes is informative but does not establish effects in patients with both. Future studies should enroll this population explicitly, report baseline social needs and assess sustained clinical outcomes alongside treatment burden and patient priorities. Pragmatic controlled evaluations should distinguish the contribution of referral, material assistance and treatment management, and document who is not reached by the intervention.

Table 1 Selected interventions and limits of Interpretation.

Study	Design and population	Finding	Interpretive limit
Jafar et al [12]	Cluster trial; 2,645 adults with hypertension in rural South Asia	Greater systolic blood-pressure reduction at 24 months	Combined intervention; not specific to coexisting diabetes
Victor et al [13]	Cluster trial; Black male barbershop patrons with uncontrolled hypertension	Improved blood pressure with pharmacist-led treatment and community engagement	Specialized staffing and collaborative prescribing; context-specific
Berkowitz et al [14]	Crossover trial; 44 adults with diabetes and food insecurity	Improved diet quality and less self-reported hypoglycemia during meal delivery	Small, short-term trial; durable glycemic benefit not established
Doyle et al [15]	Randomized trial; adults with diabetes and food insecurity	No significant HbA1c advantage at six months; greater preventive-care engagement	Findings apply to this program and comparator

Selected examples, not an exhaustive evidence inventory. HbA1c, glycated hemoglobin. Narrative interpretation; no formal certainty grading was performed.

CONCLUSION

Socially responsive cardiometabolic care should connect identified needs to feasible treatment and support. Selected community hypertension interventions demonstrate benefit, but food-support trials show that improved engagement does not necessarily improve glycemic control. Programs require evaluation of clinical outcomes, patient burden and equity, especially among people with coexisting hypertension and type 2 diabetes.

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