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BRIDGING THE KNOWLEDGE GAP: A CONCEPT PAPER ON HEALTH LITERACY INTERVENTIONS AND ARDIOVASCULAR DISEASE KNOWLEDGE AMONG ADULTS

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ABSTRACT

Background: Cardiovascular disease (CVD) continues to exact an enormous toll on global adult health, yet a substantial proportion of at-risk individuals lack the foundational knowledge needed to identify warning signs, understand risk factors, or navigate preventive care pathways. Health literacy—the capacity to access, comprehend, and apply health information—is a pivotal determinant of CVD-related knowledge and, by extension, of health-seeking behaviour and clinical outcomes. Despite growing evidence that health literacy interventions (HLIs) can meaningfully improve CVD knowledge, the field lacks a consolidated conceptual analysis of how such interventions work, for whom, and under what conditions.

Purpose of Paper: This concept paper reviews the conceptual and empirical foundations of HLIs targeting CVD knowledge among adults. It proposes a theoretically grounded framework for designing, delivering, and evaluating such interventions; examines the evidence regarding specific intervention characteristics associated with superior outcomes; and identifies structural and equity considerations that must inform programme development.

Key Arguments: Effective HLIs are not merely educational events—they are theoretically anchored, contextually sensitive communication systems designed to match information to the literacy capacities, cultural contexts, and motivational states of adult learners. Multicomponent designs employing teach-back pedagogy, plain-language materials, community-embedded delivery, and digital reinforcement consistently produce the most durable CVD knowledge gains. Equity-oriented adaptation is non-negotiable for reaching populations who bear the heaviest cardiovascular burden.

KEYWORDS: health literacy, cardiovascular disease, concept paper, knowledge gap, adult learning, intervention design, teach-back, plain language, community health worker, health equity

INTRODUCTION

A curious paradox defines cardiovascular health in the modern era. On one side stands an unprecedented accumulation of scientific knowledge about how CVD develops, how it can be prevented, and how it can be treated. On the other stands a persistent, widespread gap between what clinicians and researchers know and what ordinary adults understand about their own cardiac health. This gap is not merely academic—it kills people. Adults who cannot recognise the symptoms of a heart attack wait too long to call for help. Adults who do not understand what high blood pressure means for their long-term health decline to take prescribed medications. Adults who have never been told about the connection between physical inactivity and coronary artery disease continue to live sedentarily, confident in their apparent wellness.

This concept paper is concerned with one of the most tractable mechanisms for closing this gap: deliberate, well-designed health literacy intervention. Health literacy, broadly understood as the ability to find, understand, evaluate, and use health information to guide decisions, is among the most powerful known predictors of health knowledge, self-management capability, and ultimately health outcomes. Individuals with limited health literacy are more likely to misunderstand diagnoses, misuse medications, avoid preventive screening, and present to emergency services later in the course of acute cardiac events. They are less likely to complete cardiac rehabilitation, less likely to modify risk behaviours following a CVD diagnosis, and more likely to be hospitalised repeatedly for conditions that could have been managed in primary care.

The adult population is the central focus of this analysis for reasons both epidemiological and pedagogical. Most CVD morbidity and mortality occurs in adults aged 40 and above, but risk accumulation begins earlier and the window for effective knowledge-driven behaviour change is widest in young and middle adulthood. Adults are not blank slates—they bring existing beliefs, life experiences, and established habits to any educational encounter. Interventions that fail to account for these realities will fail to produce lasting knowledge change regardless of how scientifically accurate their content may be. Adult learning principles, health literacy science, and cardiovascular epidemiology must therefore be synthesised into intervention designs that are simultaneously evidence-informed and human-centred.

This paper reviews the conceptual underpinnings of health literacy as it applies to CVD; examines the structural features of interventions that have demonstrated effectiveness in improving CVD knowledge; presents a typological overview of existing approaches; proposes a working conceptual framework for future intervention design; and argues for equity-centred implementation as a non-negotiable dimension of any serious national or institutional response to the CVD knowledge deficit.

THEORETICAL FOUNDATIONS:HEALTHLITERACY,ADULT LEARNING& CVD

Evolving Conceptions of Health Literacy

Early formulations of health literacy focused narrowly on the ability to read and understand written medical materials—a conception closely aligned with general functional literacy and primarily concerned with patient compliance. This functional framing, while operationally useful for identifying literacy deficits in clinical populations, was insufficiently broad to capture the full range of competencies required for meaningful health engagement in contemporary society.

Nutbeam's influential three-tier model expanded the conceptual terrain substantially. Functional health literacy encompasses the basic reading and writing skills necessary to follow instructions, fill out forms, and interpret written health communications. Communicative, or interactive, health literacy incorporates the ability to extract information from varied sources, adapt it to personal circumstances, and apply it within evolving health contexts. Critical health literacy adds a further dimension: the capacity to critically analyse health information, challenge institutional health messages, and participate as an informed agent in decisions about personal and community health.

For cardiovascular health specifically, these three tiers map meaningfully onto distinct competency domains. Functional literacy enables a patient to read a blood pressure cuff's numerical display and understand what a 'normal' range means. Communicative literacy allows an adult to navigate contradictory dietary advice from different sources and synthesise a coherent understanding of heart-healthy eating. Critical literacy supports an adult in questioning whether a marketed supplement genuinely reduces cardiac risk or challenging a clinical recommendation that may not align with their values and circumstances. HLIs that operate only at the functional tier—providing written materials or verbal instructions without deeper engagement—address only the most superficial layer of the knowledge problem.

Andragogy and the Conditions for Adult Knowledge Acquisition

Malcolm Knowles' andragogical framework, though developed without specific application to health, offers principles directly relevant to CVD education. Adults are self-directed learners who draw on accumulated life experience as a resource for new learning. They are most receptive to knowledge they perceive as immediately relevant to their lives, and they are intrinsically motivated by problems they recognise as personally meaningful. These characteristics have profound implications for how CVD knowledge should be framed and delivered.

An intervention that presents cardiovascular risk factors as abstract statistics is likely to produce passive reception but limited personal engagement. By contrast, one that invites a 55-year-old man with hypertension to reflect on his own blood pressure readings, explore what those numbers mean for his specific health trajectory, and identify one personally realistic action step activates the self-directed, experience-grounded, problem-centred orientation that andragogy describes as the natural learning mode of adults. Health literacy interventions informed by andragogical principles create conditions not merely for knowledge transfer but for knowledge construction—a qualitatively different and more durable cognitive outcome.

The Knowledge-Attitude-Behaviour Pathway in CVD

It is important to locate health literacy interventions accurately within the broader behaviour change literature. Knowledge is a necessary but rarely sufficient condition for health behaviour change. The Knowledge-Attitude-Practice (KAP) model posits that accurate knowledge shapes attitudes toward health-protective behaviours, which in turn influence practice. However, decades of health promotion research have documented the substantial gap between knowledge gain and behaviour change, attributable to attitudinal barriers, social norms, environmental constraints, and competing priorities.

This understanding does not diminish the importance of CVD knowledge interventions—it contextualises them. A person who does not know that physical inactivity is a cardiac risk factor cannot act on that knowledge. A person who knows but does not feel personally susceptible may not act. A person who is both knowledgeable and personally motivated may nonetheless be prevented from acting by structural barriers such as unsafe walking environments, inability to afford nutritious food, or demanding work schedules. HLIs occupy the first essential stage of this pathway; comprehensive CVD prevention requires that subsequent stages—attitude, motivation, enablement, and environmental support—be addressed concurrently through policy and service design.

Typology of Health Literacy Interventions for CVD Knowledge

Health literacy interventions targeting CVD knowledge take diverse forms, reflecting variation in target populations, resource environments, theoretical orientations, and delivery infrastructure. Table 1 below presents a working typology of the principal intervention categories represented in the available literature, along with their defining features, typical settings, and primary CVD knowledge foci.

Table 1. Typology of Health Literacy Interventions Targeting CVD Knowledge in Adults

Intervention Type	Core Features	Typical Setting	CVD Focus
Structured Education Sessions	Interactive lectures, Q&A, case discussions led by clinicians or educators	Primary care, hospital outpatient	Risk factor recognition, symptom awareness
Teach-Back Programmes	Patients restate information in own words; iterative correction of misunderstanding	Inpatient, discharge planning	Medication, warning signs, self-monitoring
Plain-Language Print Materials	Low-reading-level leaflets, pictographs, annotated diagrams	Clinic waiting rooms, pharmacies	Diet, blood pressure, smoking cessation
Community Health Worker (CHW) Led	Peer educators, home visits, culturally concordant delivery	Community centres, homes	Risk factor knowledge, care navigation
Digital &mHealth Platforms	Apps, web portals, SMS reminders, video modules	Mobile/remote, clinic-linked	Symptom literacy, medication adherence
Multicomponent Programmes	Combination of ≥2 above; theory-driven, sustained reinforcement	Multi-setting, integrated care	Broad CVD knowledge + behaviour change

Each category carries distinct strengths and limitations. Structured education sessions delivered by clinical professionals offer content authority and depth, but are constrained by clinician time, institutional settings, and the inherent power asymmetry of the clinical encounter, which can inhibit the participatory engagement necessary for durable adult learning. Printed materials are scalable and low-cost but communicate unidirectionally, cannot respond to individual confusion, and frequently exceed the reading grade level of the populations they are intended to serve.

Community health worker-led programmes overcome several of these limitations through cultural concordance, linguistic accessibility, and community trust, but require sustained investment in recruitment, training, supervision, and quality assurance. Digital platforms offer unprecedented scalability and personalisation potential, but their equitable deployment is constrained by device access, data costs, and digital literacy—particularly among older adults and those in low-resource settings who often represent the highest CVD-risk populations.

Multicomponent interventions that integrate the complementary strengths of several modalities consistently emerge as the most effective approach in the literature, though they are also the most resource-intensive to design and implement. The design challenge lies not in selecting a single 'best' modality but in sequencing and combining approaches in ways that are logistically feasible, theoretically coherent, and adapted to the specific literacy profile and context of the intended population.

Conceptual Frameworks –Effective Intervention Design

The effectiveness of HLIs is substantially shaped by whether they are grounded in an explicit theoretical framework that informs both the content and delivery logic of the intervention. Atheoretical interventions that provide cardiovascular information without attending to the psychological, social, and motivational processes governing how adults receive and act on that information are predictably inconsistent in their outcomes. Table 2 presents the principal theoretical frameworks applied in evidence-based HLIs targeting CVD knowledge, with their key constructs and specific relevance to cardiovascular health education.

Table 2. Theoretical Frameworks Applied in Health Literacy Interventions for CVD Knowledge

Framework / Theory	Key Constructs Applied	Relevance to CVD Health Literacy
Health Belief Model (HBM)	Perceived susceptibility, severity, benefits, barriers, self-efficacy	Grounds knowledge delivery in personal CVD risk perception and motivation to act
Social Cognitive Theory (SCT)	Observational learning, self-efficacy, goal-setting, outcome expectations	Extends CVD knowledge into practical behavioural competence and confidence

Transtheoretical Model (TTM)	Stages of change: pre-contemplation → maintenance	Tailors information intensity and type to readiness for CVD-related behaviour change
Nutbeam's Literacy Model	Functional, communicative, critical health literacy tiers	Provides staged framework for designing progressively complex CVD education
Andragogy (Knowles)	Self-direction, experience-based learning, intrinsic motivation	Informs adult-centred CVD education design that respects learner autonomy

Among these frameworks, the Health Belief Model has achieved the most widespread application in cardiovascular health education, largely because its constructs map directly onto the cognitive processes most proximal to health decision-making. When an adult attending a health education session is helped to personalise their CVD risk—to move from understanding that 'high blood pressure causes heart attacks' in the abstract to understanding that 'my own blood pressure puts me in a high-risk category'—perceived susceptibility and severity are activated in ways that motivate deeper information seeking and behaviour change consideration.

Social Cognitive Theory adds a critical dimension frequently overlooked in information-centred HLIs: self-efficacy, or the belief in one's own capacity to perform a specific health behaviour. Knowledge without self-efficacy produces little action. An adult who learns that regular physical activity reduces cardiac risk by 30% but believes themselves incapable of exercising consistently will not act on that knowledge. SCT-informed HLIs therefore incorporate self-efficacy building through modelling, mastery experiences, and social encouragement alongside direct knowledge provision—a design feature consistently associated with superior CVD knowledge outcomes and greater rates of subsequent behaviour change.

Evidence-Informed Design Principles for CVD Health Literacy

Plain Language and Plain Design

The readability of health education materials is a foundational determinant of comprehension and knowledge retention. Analyses of patient-facing cardiovascular health materials in clinical settings consistently find that these resources are written at reading levels several grades above the average adult literacy level. The plain language movement, which advocates for materials written at or below an eighth-grade reading level, employing short sentences, active voice, concrete rather than abstract language, and avoidance of medical jargon, has produced measurable improvements in CVD knowledge when rigorously applied. Pictographic supplements—visual representations of anatomical concepts, dietary recommendations, medication schedules, and symptom identification—are particularly effective for adults with limited functional literacy.

The Teach-Back Method

Teach-back is among the most robustly evidenced techniques in health literacy practice. Rather than assuming comprehension following information delivery, teach-back requires that clinicians or educators invite patients to explain key concepts in their own words. Where misunderstanding is revealed—and it frequently is, even when patients nod in apparent understanding—information is re-explained using alternative language or visual aids until accurate comprehension is confirmed. Studies examining teach-back implementation in CVD education contexts report post-intervention knowledge scores consistently 18 to 24 percentage points higher than those achieved without teach-back, independent of baseline literacy level.

The mechanism is not simply one of repetition. Teach-back transforms the educational encounter from a passive reception event into an active cognitive exercise requiring retrieval, restatement, and conceptual integration. The act of explaining a concept in one's own words—even imperfectly—substantially enhances encoding and subsequent recall. For CVD concepts such as the relationship between dietary sodium and blood pressure, or the importance of aspirin in the acute management of suspected myocardial infarction, accurate and durable knowledge is potentially life-saving, making teach-back not merely a pedagogical preference but a clinical imperative.

Cultural and Linguistic Tailoring

CVD knowledge deficits are not uniformly distributed across adult populations—they cluster along lines of race, ethnicity, language, educational background, and geographic location. Interventions designed without attention to these dimensions will systematically underserve the populations most in need. Cultural tailoring encompasses far more than translation; it involves understanding how health and illness are conceptualised within a specific cultural community, identifying the health beliefs and explanatory models that may enhance or obstruct reception of biomedical CVD information, selecting community-trusted messengers and settings, and representing the target population's lived experience in educational materials and narratives.

Community health workers have emerged as essential actors in culturally responsive HLI delivery, precisely because they embody the cultural and linguistic concordance that formal healthcare providers frequently cannot offer at scale. Their effectiveness is not incidental to their community embeddedness—it is constitutive of it. Programmes that engage, train, support, and appropriately compensate CHWs as central rather than peripheral members of the CVD health literacy workforce have consistently achieved the broadest reach and some of the largest knowledge effect sizes documented in the literature.

Digital Integration without Digital Exclusion

The rapid proliferation of mobile health applications, web-based educational platforms, and SMS messaging systems has created significant new capacity for CVD health literacy intervention at scale. Well-designed digital HLIs offer personalisation, interactivity, asynchronous access, and the ability to deliver spaced retrieval practice—repeated exposure to key CVD knowledge points over time—that single-session in-person formats cannot match. Several digital interventions targeting CVD knowledge have demonstrated outcomes comparable to face-to-face educational programmes in controlled evaluations.

However, the enthusiastic adoption of digital delivery must be tempered by recognition of the digital divide. Older adults, individuals in rural areas, and those in low-income households—all groups with elevated CVD risk—face the greatest barriers to digital access and digital literacy. A health literacy strategy that relies primarily on digital delivery will replicate and potentially entrench the very knowledge disparities it aims to address. Digital and non-digital modalities must therefore be treated as complementary infrastructure, with non-digital pathways receiving equivalent design investment and institutional commitment.

Equity as a Non-Negotiable Design Dimension

CVD does not afflict all adult populations equally, and neither does health literacy. The populations at greatest absolute risk of cardiovascular morbidity and premature cardiac mortality—those with the lowest incomes, the least formal education, the greatest exposure to environmental and occupational health hazards, and the most tenuous connections to preventive healthcare—are also those most likely to exhibit limited health literacy and the largest CVD knowledge deficits. This co-distribution of risk and knowledge deficit is not coincidental; it reflects the structural determinants of health that shape both cardiovascular vulnerability and educational access across the life course.

Health literacy interventions that are designed for, tested in, and evaluated among predominantly educated, health-engaged, higher-income populations will produce findings of limited generalisability to the populations most in need. Equity-centred HLI design demands active recruitment of low-literacy participants, co-design of materials and programmes with community members rather than merely for them, rigorous subgroup analysis disaggregated by literacy level, educational attainment, income, race, ethnicity, age, and sex, and honest reporting of heterogeneous effects.

The evidence that equity-oriented HLIs can achieve knowledge convergence—bringing the CVD knowledge levels of previously disadvantaged groups up to those of higher-literacy populations—is genuinely encouraging. Several well-designed community-based programmes targeting Black adults, Hispanic adults, and low-income rural populations have achieved post-intervention knowledge gains not merely in absolute terms but in terms of equity gaps narrowed. This is the standard against which CVD health literacy programmes should ultimately be held: not simply average knowledge improvement, but movement toward a world in which an adult's cardiovascular knowledge is not determined by their ZIP code, educational history, or mother tongue.

Proposed Conceptual Framework for HLI Design in CVD Contexts

Drawing on the theoretical foundations, typological analysis, and design principles reviewed in preceding sections, this paper proposes a conceptual framework for health literacy intervention development targeting CVD knowledge in adult populations. The framework comprises five interacting dimensions:

First, Literacy Profiling — before any intervention is designed or delivered, the health literacy characteristics of the target population must be assessed using validated, population-appropriate instruments. This profile should inform every subsequent design decision, from reading level of materials to delivery format to choice of messenger. Treating all adult learners as if they share the same literacy capacities produces intervention designs that serve some while excluding others.

Second, Theoretical Anchoring — every HLI should articulate the theoretical mechanism through which it expects to produce knowledge change and specify how each intervention component activates that mechanism. The choice of framework should be deliberate and justified by the characteristics of the target population and the specific knowledge gaps being addressed. Hybrid frameworks that combine, for example, the motivational constructs of HBM with the self-efficacy architecture of SCT are particularly well-suited to multi-session, behaviour-change-oriented CVD education.

Third, Cultural Co-Production — materials, delivery formats, messenger selection, and programme narratives should be developed in genuine partnership with members of the target community. Co-production is not a consultation process appended to professionally designed programmes; it is the process through which programmes acquire the community legitimacy and contextual accuracy required for effective knowledge transmission across cultural boundaries.

Fourth, Multimodal Reinforcement — knowledge retention requires repeated exposure, retrieval practice, and contextual embedding. Interventions designed around a single session or a single modality will produce knowledge gains that decay rapidly. Effective HLIs embed key CVD knowledge points across multiple exposures, formats, and contexts: a group session reinforced by take-home plain-language materials, followed by digital reminders at two-week intervals, with community follow-up at three months.

Fifth, Outcome Evaluation Beyond Knowledge Scores — while knowledge is the proximate outcome of HLIs, intervention evaluations should also track attitudinal change, self-efficacy, health-seeking behaviour, and where feasible, clinical outcomes such as blood pressure control and medication adherence. Frameworks that treat knowledge score improvement as the terminal outcome miss the larger purpose of HLI: enabling adults to live longer, healthier lives through better-informed engagement with cardiovascular health.

CONCLUSION

The relationship between health literacy and cardiovascular disease knowledge is neither peripheral to public health practice nor difficult to act upon. It is central, consequential, and tractable. Adults across every demographic group can acquire meaningful CVD knowledge when interventions are designed with sufficient care, theoretical grounding, cultural attentiveness, and commitment to the real conditions of their lives. The challenge is not a lack of effective methods—it is the insufficient, uneven, and often inequitable application of methods that are already well-evidenced.

This concept paper has argued that effective HLIs for CVD knowledge are fundamentally pedagogical enterprises rather than mere information delivery mechanisms. They must engage adults as active learners with relevant prior experience and legitimate motivation. They must communicate through plain language, confirmatory dialogue, and culturally resonant imagery. They must be embedded in settings—clinics, pharmacies, community centres, digital platforms—that adults with elevated CVD risk actually use. And they must be evaluated with equity as a central criterion: not merely whether knowledge improves on average, but whether knowledge improves most for those most at risk.

The cost of failing to close the CVD knowledge gap is measured in premature deaths, avoidable hospitalisations, and years of diminished quality of life. The cost of building the health literacy infrastructure to close it—through investment in clinician communication training, community health worker programmes, plain-language materials, culturally responsive digital platforms, and equity-focused evaluation—is modest by comparison. This paper is offered as a contribution to the intellectual and programmatic foundation for that investment.

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