# Multimodal strategies for improving health literacy in chronic kidney disease

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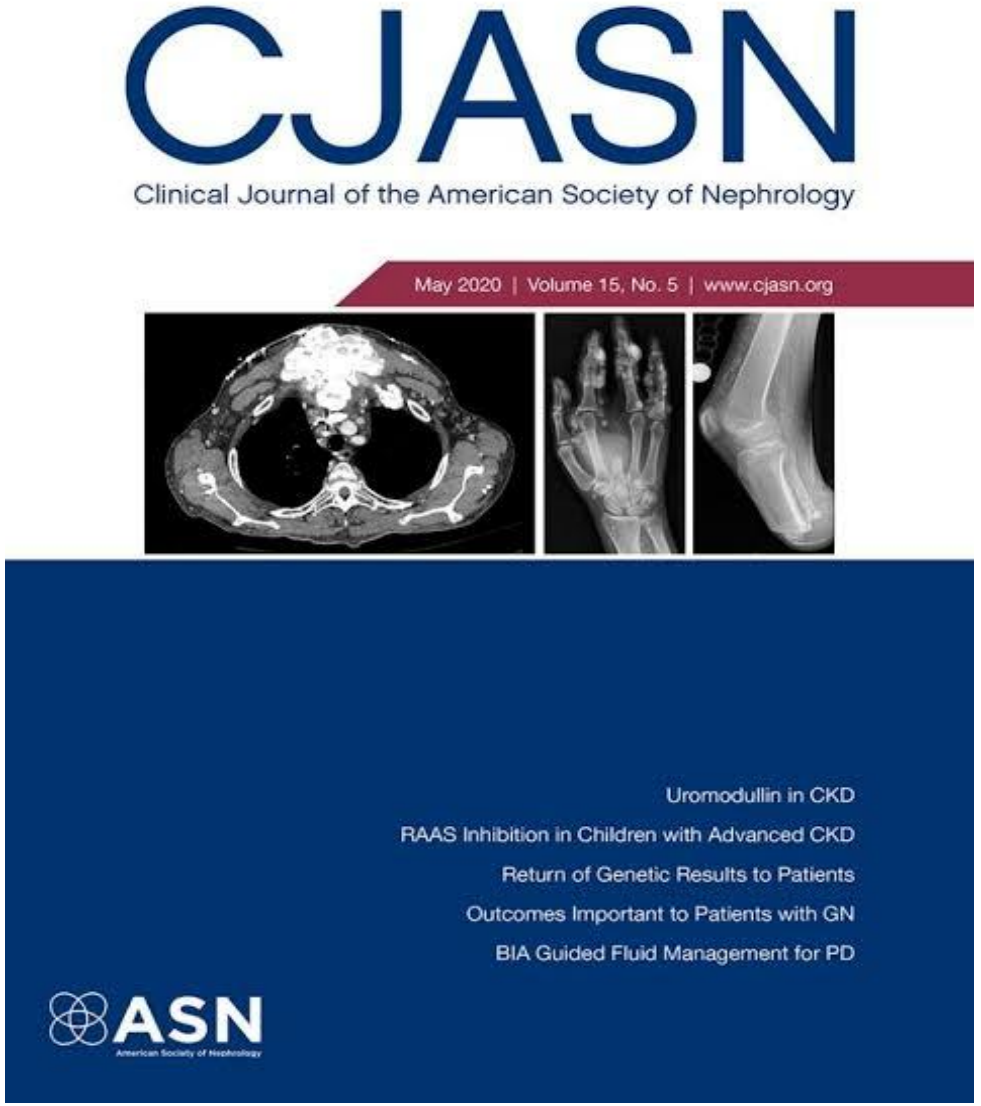
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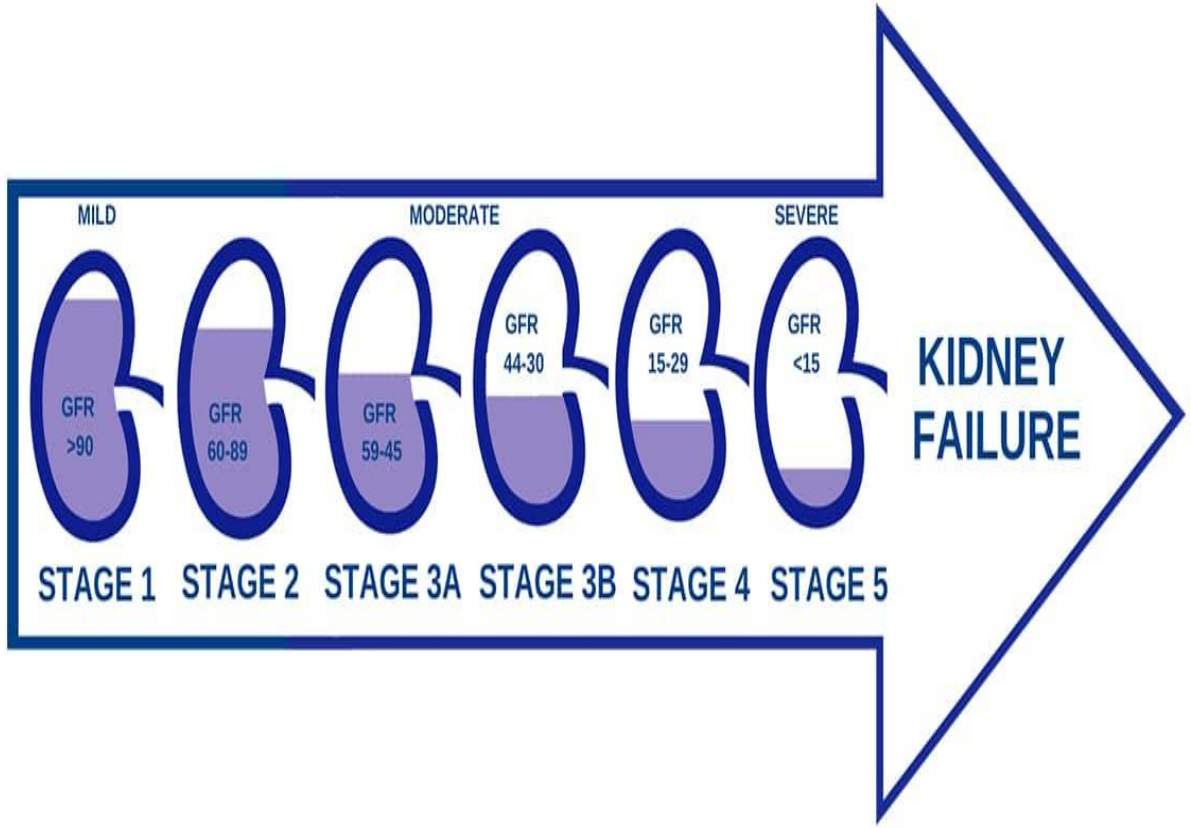
Bonner, A; **Smith, GD**; Ha Dinh, TT; Jagodage, H (2026) Multimodal Strategies for Improving Health Literacy in Adults with CKD, *Clinical Journal of the American Society of Nephrology.*
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# Chronic Kidney Disease: Background






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# Chronic Kidney Disease: Background

- In CKD, adults have to deal with multiple medications, complex treatment regimens, lifestyle modifications, as well as dealing with numerous health-related clinical appointments.
- Requires health literacy (HL) skills to access and utilize health information (Dinh et al., 2022).
- If information is not accessible, patients may struggle to engage fully in care.
- Health literacy is can therefore be both a patient and system issue.

Dinh HTT, Nguyen NT, Bonner A (2022) Healthcare systems and professionals are key to improving health literacy in chronic kidney disease. *J Ren Care*;48(1):4-13.

# More than 1 in 2 adults can't:

## Use a BMI graph to find their healthy weight




## Understand a vaccination chart

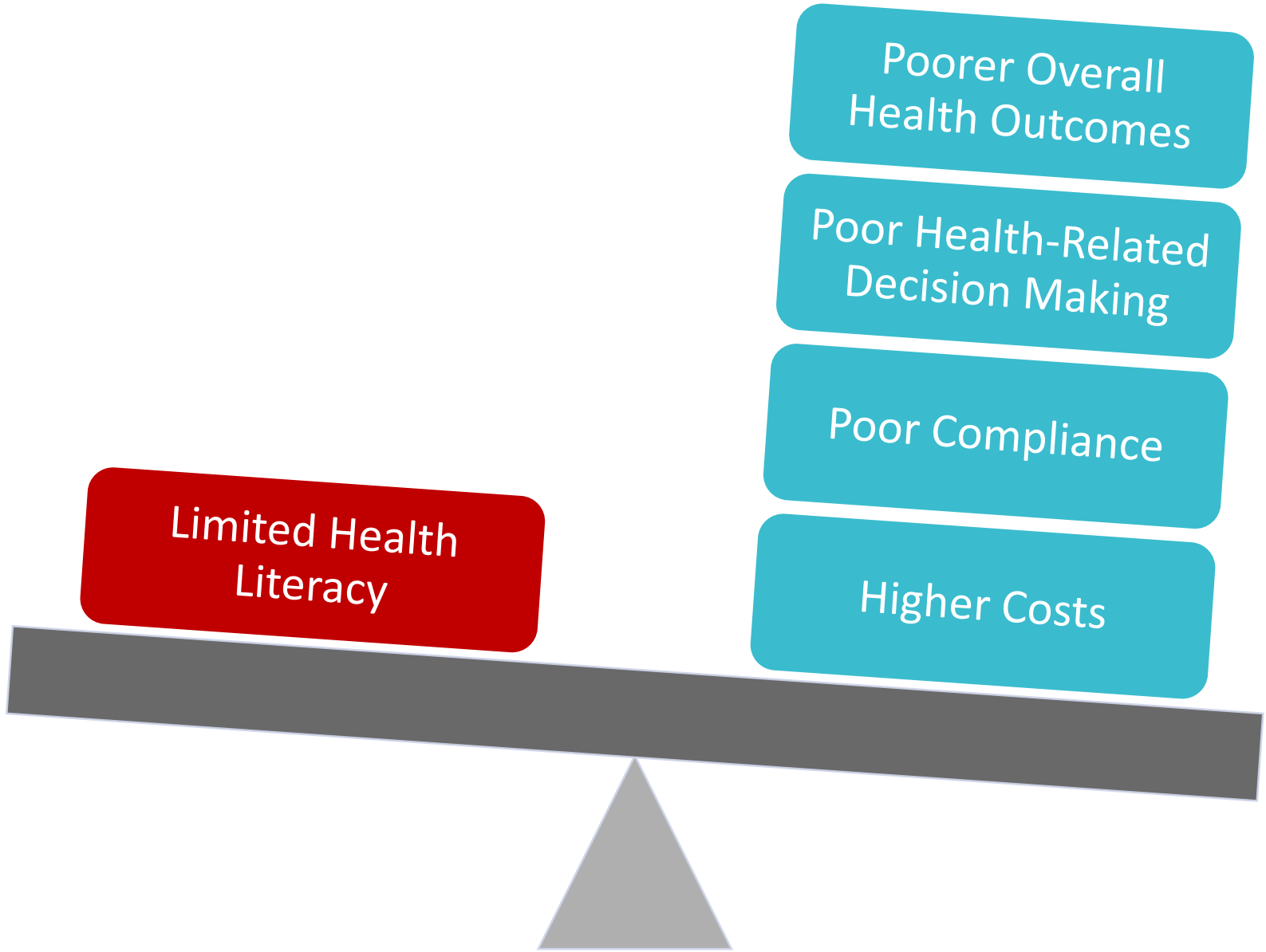



## Read a drug label




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# Why do we care about health literacy?



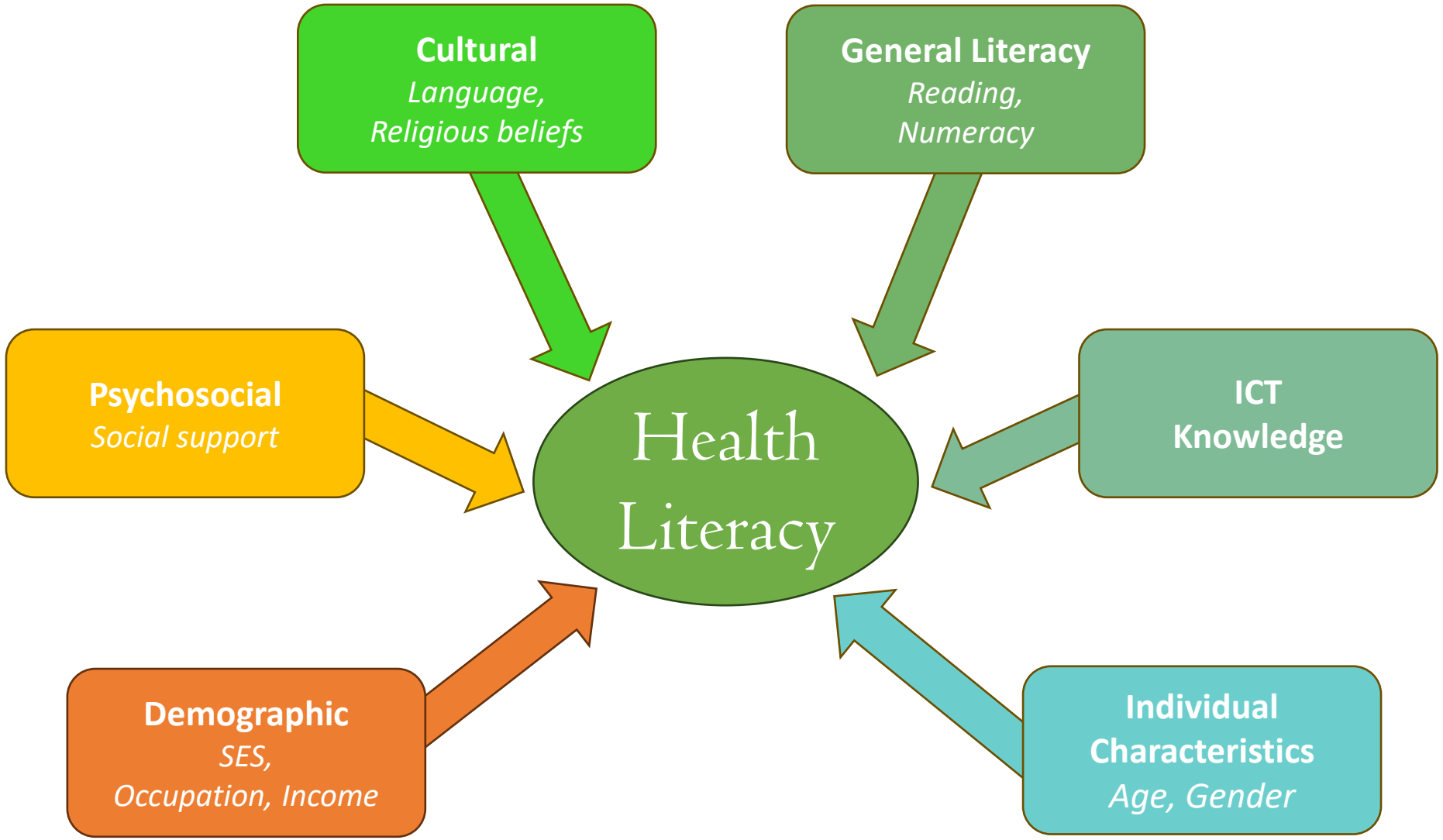

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# Low health literacy in CKD

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- Reduced adherence to medication and dietary restrictions
- Suboptimal self-monitoring of blood pressure and fluid balance
- Lower self-efficacy and motivation for disease management
- Increased hospitalisation, faster eGFR decline, & excess mortality
- Lower transplant referral and renal replacement therapy uptake

# Definition of Health Literacy




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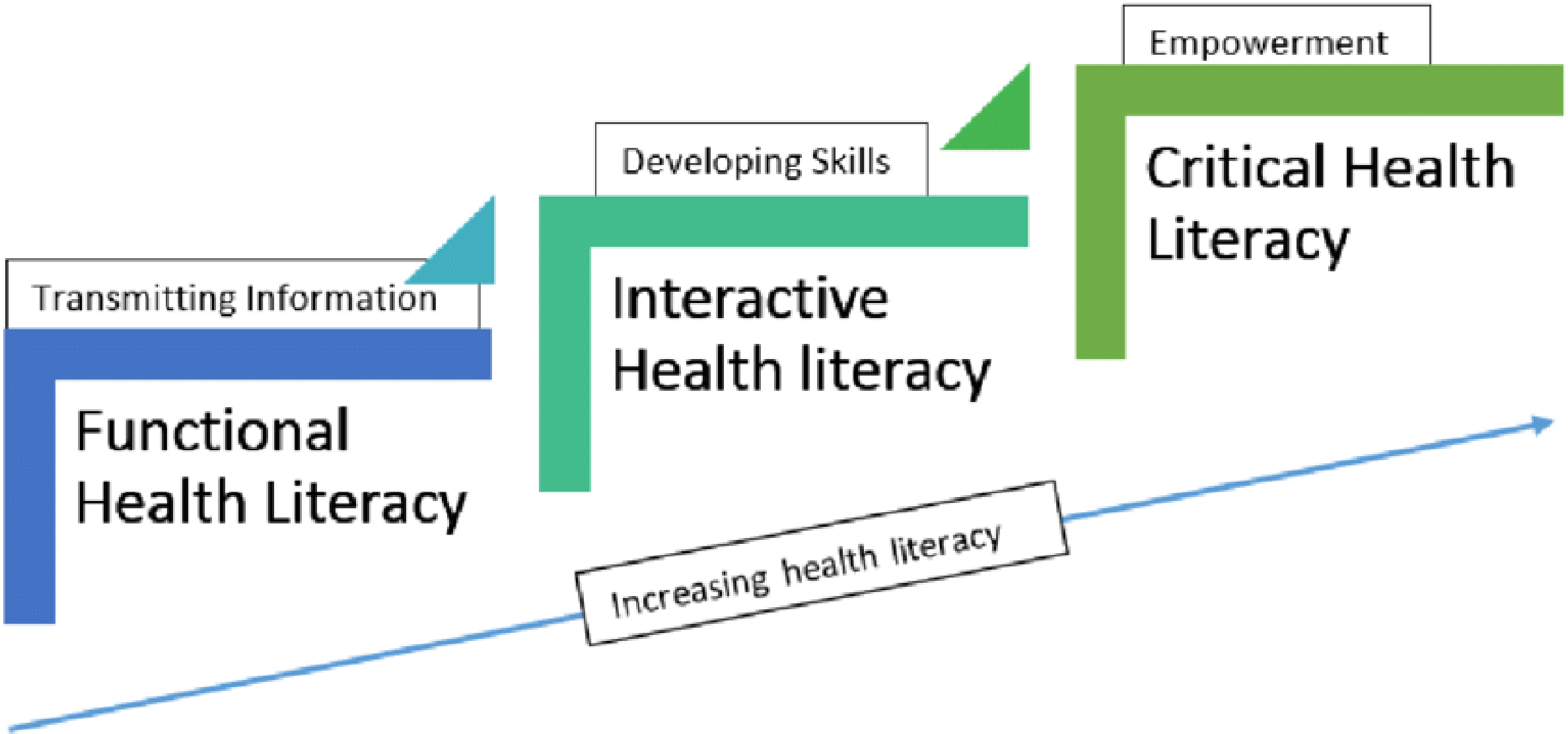
# Health literacy… a multi-demensional concept

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- « *A person's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course*»

WHO. Health literacy. The solid facts. Health, 2016.


Empowerment
Critical Health Literacy
Developing Skills
Interactive Health literacy
Transmitting Information
Functional Health Literacy
Increasing health literacy

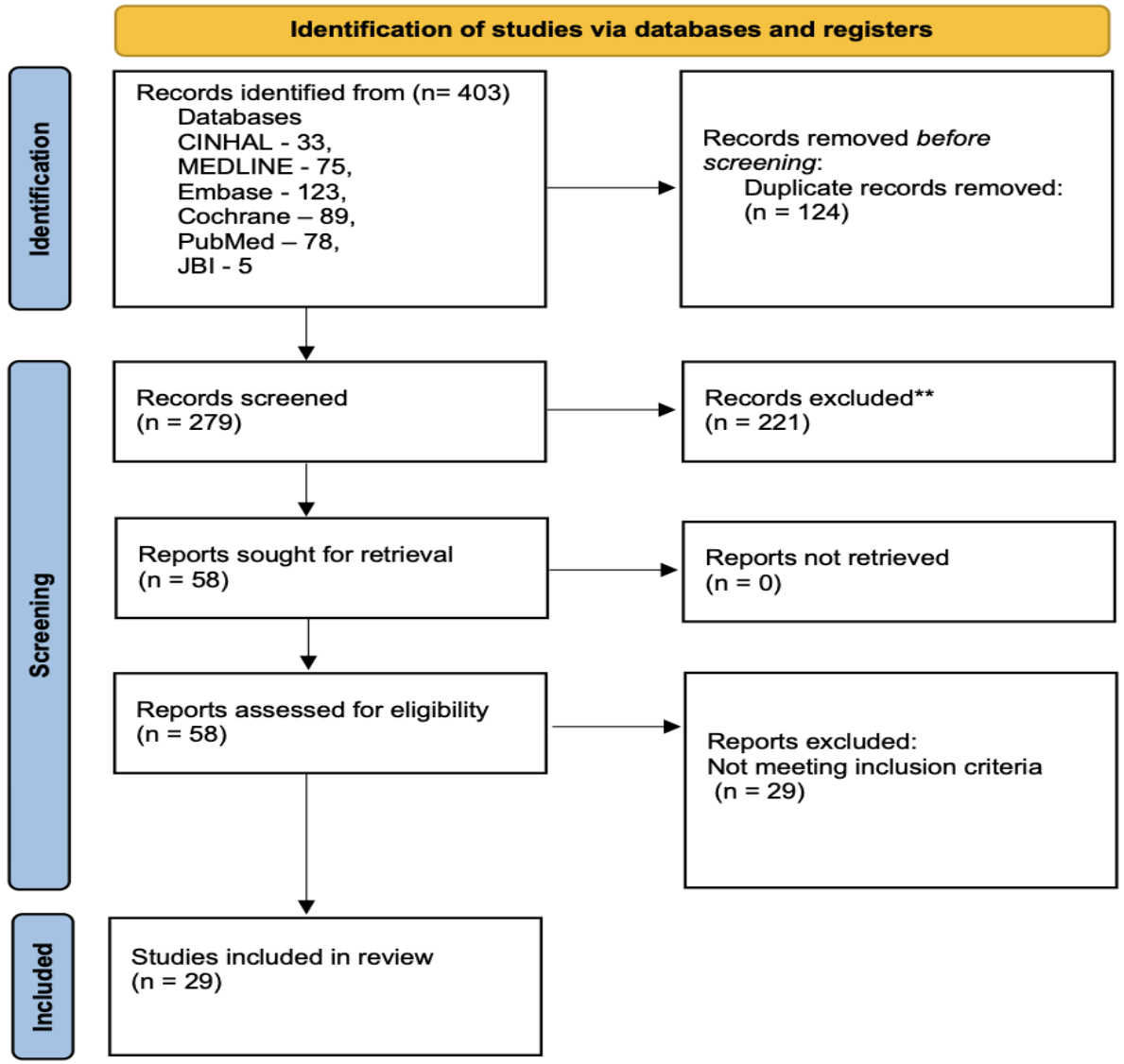
# Study design: Scoping type review

Patient-Concept-Context framework informed the search strategy

1. What do recent studies show about health literacy in adults with CKD?
2. What factors influence health literacy?
3. What interventions have been studied?
4. Where are the major evidence gaps?

- All study designs were eligible.
- Included adults with CKD across all grades, treatment modalities, and settings.
- Six databases searched for English-language studies from January 2021 to March 2025.

# PRISMA 2020 flow diagram




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*From:* Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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## Determinants of health literacy

### Psychosocial and community factors

- Social support
- Community engagement
- Psychological distress

### Health-related factors

- Comorbidities
- Perceived health status
- Duration of CKD

### Sociodemographic factors

- Demographic characteristics (age, gender, education, employment, marital status)
- Ethnicity
- Cultural background
- Language proficiency



## Interventions to increase health literacy abilities

### Multimodal strategies for health literacy development

- Patient education materials
- Communication strategies (e.g., teach-back, health counselling and motivational interviewing)
- Technology resources (e.g., web-based portals, mobile apps, social networks, multimedia resources)
- Health coaching
- Aids to enhance patient engagement in healthcare consultation
- Interactive case-based skill building
- Community engagement
- Health literacy training for healthcare providers

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# Multimodal Health Literacy Strategies: Overview

*Bonner et al. (CJN 2026) — scoping review, January 2021 to March 2025*

### Educational Interventions

Most common modality; aimed at eGFR, BP, IDWG and patient-reported outcomes
Pictorial image education (Iran RCT): outperformed teach-back for nutritional knowledge in low-HL patients
Caution: pictorial methods less suitable for vision-impaired CKD patients

### Teach-Back Method

Meta-analysis: improved self-management, self-efficacy, and knowledge (6 RCTs, n=520)
Suitable for ALL literacy levels — shifts onus from patient to clinician
Recommended universally for kidney care teams (JORC 2023)

### Co-Design / Co-Creation

Co-designed interventions proven effective for comprehensibility and patient satisfaction (Boonstra; de Winter)
Only two interventions specifically targeted patients with LOW HL — a critical evidence gap
Dual-targeting (patients + HCPs) is now the recommended design standard

### Digital Self-Management

"My Kidneys & Me" (MK&M): co-developed, interactive digital CKD programme
Uses behaviour change techniques and health trackers (JMIR 2022)
Accessible and culturally adaptable across literacy levels

### Cultural & Language Adaptation

Culturally safe, person-centred care imperative for ethnic minorities
Cultural Health Liaison Officers: effective across 6 countries (CKJ 2023)
Co-design with community: authentic, locally relevant resources

### Visual & Audiovisual Tools

Infographics, animated kidney videos, simplified plain-language materials
Reduce reading burden; effective across literacy levels
NKF Animated CKD Heat Maps and CMP guides (NKF 2023)

*Sources: Bonner et al. CJN 2026 (doi:10.2215/CJN.0000001028) | de Winter et al. J Nephrol 2024 | Nixon et al. JMIR 2022 | Kanagaratnam et al. CKJ 2023 | NKF 2023*

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# Intervention Design Gaps: Evidence

*Bonner et al. (CJN 2026) — scoping review, January 2021 to March 2025*

### Only Two Interventions Targeted Low-HL Patients Specifically

Boonstra et al. (Netherlands): logic model of change for CKD patients and HCPs identified via All Aspects of Health Literacy Scale

Iranian RCT: older adults with low HL (HELIA tool) randomised to pictorial image, teach-back, or usual care — both educational arms improved nutritional knowledge; pictorial outperformed teach-back

Critical missed opportunity to build an evidence base for most vulnerable CKD group

### Recruitment Skewed to Late-Stage CKD & KRT

Most studies recruited participants in CKD G4 or receiving kidney replacement therapy (KRT)

Represents a lost opportunity to support patients earlier and slow CKD progression through supportive health literacy interventions

Early-stage CKD (G1–G3) populations remain almost entirely absent from HL intervention trials

### Geography & HCP Discipline Gaps

Most studies conducted in high- and middle-income countries — despite greatest need to slow CKD progression existing in low-income countries

Interventions delivered primarily by researchers or kidney care nurses — insufficient involvement of physicians, dietitians, pharmacists, and other disciplines

Only a few studies attempted to improve HL capacities of kidney HCPs directly

### Conceptual & Measurement Inconsistency

Few studies provided a conceptual definition of health literacy — concept used inconsistently across the literature

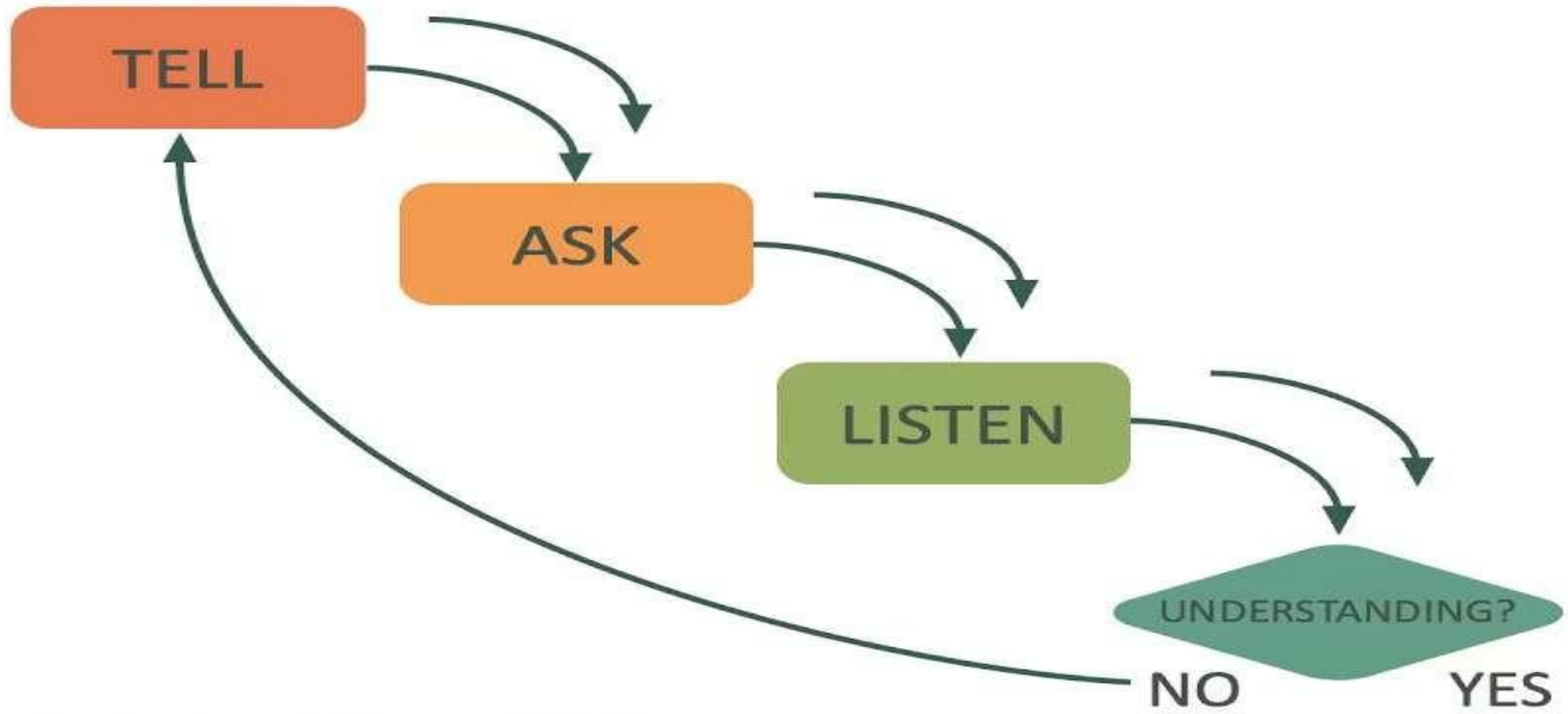
Most used multidimensional HL tools but reported total scores only, obscuring which HL construct (functional, interactive, critical) was being targeted or improved

Two studies assessed functional HL only — ignoring interactive and critical domains essential for CKD self-management

*Source: Bonner A, Smith G, Dinh TTH, Jagodage H et al. — CJN 2026 (doi:10.2215/CJN.0000001028) | Boonstra et al. Patient Educ Couns 2021 | Inthaphalan et al. BNJ 2024*

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# Teach-Back




Based on the work of Darren DeWalt, MD

# Digital, eHealth & Emerging Modalities

## "My Kidneys & Me" — Digital CKD Self-Management Programme

Co-developed with non-dialysis CKD patients; built on evidence-based MyDESMOND digital platform (Nixon et al., JMIR 2022)

Components: educational modules, behaviour change tools, health trackers (BP, weight, fluid)

Underpinned by Behaviour Change Wheel, Health Action Process Approach, Social Cognitive Theory

Accessible, tailored, interactive — designed to address variable health literacy needs across all CKD stages

## eHealth Attitudes Among CKD Patients — China 2025 (Wei et al.)

957 patients surveyed in Heilongjiang Province; 70.6% had less than a bachelor's degree

Despite self-management challenges, patients showed strong positive attitudes toward digital tools

eHealth may bridge HL gaps in primary care and remote settings — particularly in resource-limited contexts

Key barriers: financial constraints, poor self-rated health, low educational attainment, and cold-region isolation

## Visual & Multimedia Tools — National Kidney Foundation Toolkit

Animated "Kidney Numbers" videos — simplified eGFR and creatinine explanation for low-literacy patients

CKD Heat Map — visual disease staging at a glance without text-heavy explanations

Infographics: sodium limits, plant-based diets, post-transplant dietary guidance in plain language

Evidence: photograph-based materials and interview-driven co-design most effective for lowest-literacy populations

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*Sources: Nixon et al. JMIR 2022 (doi:10.2196/39657) | Wei et al. FZM 2025 (doi:10.1515/fzm-2025-0002) | NKF Kidney Commute CE 2023*

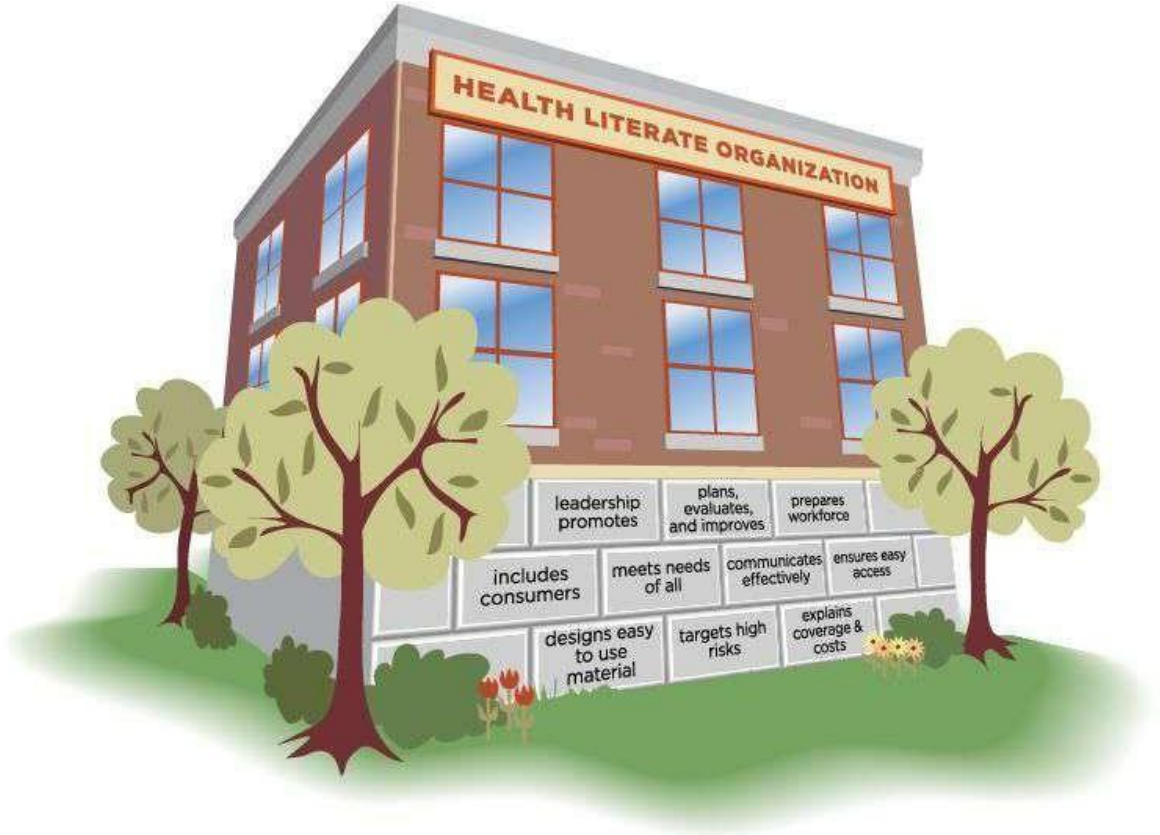
# Summary/Conclusion

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- HL remains poorly integrated into kidney policy, guidelines, and system reform despite its impact on CKD outcomes.
- A multimodal, multi-level approach spanning individual, community, organisational, and policy levels is recommended.
- Targeted interventions are needed for limited-HL and early-stage CKD patients, with psychosocial support alongside education to strengthen engagement and self-management.
- Advancing OHL through co-designed, multidisciplinary research with patients and care teams is essential for culturally relevant, feasible, scalable interventions.

# Increasing Shift to Organizational Health Literacy

**Smith GD**, Lui SF, Kalantar-Zadeh K, Bonner A (2024) The Shift from Individual to Organizational Health Literacy: Implications for Kidney Healthcare Leaders and Clinicians. *Nephron.* 2024;148(5):349-356.




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Thank you

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