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A Practical Framework for Selecting Health Literacy Measurement Tools in Rural and Agricultural Communities: A Narrative Review

Okta Bela Pangesti[1], TA Larasati[2], Suharmanto[3], Dyah Wulan Sumekar Rengganis Wardani[4], Endang Budiati[5]
[1,2,3,4,5]Master of Public Health, Faculty of Medicine, Lampung University, Indonesia Jl. Prof. Dr. Ir. Sumantri Brojonegoro No. 1, Bandar Lampung, Lampung 35145, Indonesia

ABSTRACT: Health literacy is a key public health competency that enables individuals to access, understand, appraise, and apply health information in daily decision-making. Rural and agricultural communities require particular attention because health information is often delivered in contexts shaped by limited formal education, work-related hazards, restricted access to health services, uneven digital connectivity, and culturally diverse communication practices. Although many studies use well-known health literacy instruments, tool selection is often based on popularity rather than methodological fit for field conditions, respondent literacy level, cultural adaptation, occupational risk exposure, and interviewer burden. This narrative review aims to compare commonly used health literacy measurement tools and to propose a practical framework for selecting instruments for rural and agricultural populations, particularly in low- and middle-income countries. Literature was identified through targeted searches in PubMed/MEDLINE, Google Scholar, ScienceDirect, and official instrument sources, with priority given to validation studies, psychometric papers, reviews, and publications involving rural or agricultural populations. The review discusses multidimensional tools such as the European Health Literacy Survey instruments and the Health Literacy Questionnaire, functional and clinical tools such as TOFHLA, S-TOFHLA, and the Newest Vital Sign, digital tools such as eHEALS, and occupation-specific tools such as the Agricultural Safety and Health Literacy Tool. A purpose-based selection framework is proposed to guide the choice of instruments for community surveys, clinical screening, digital health assessment, agricultural safety, and intervention development. For rural and agricultural settings, the most feasible approach is often a short-validated tool, culturally adapted, administered with interviewer assistance, and supplemented with context-specific items on work-related health risks and access to health information.

KEYWORDS: health literacy, measurement tools, rural health, agricultural workers, questionnaire, narrative review, tool selection framework, low- and middle-income countries

INTRODUCTION

Health literacy is increasingly understood as a public health competency rather than merely an individual reading ability. It includes the capacity to obtain, understand, judge, and use health information for decisions related to healthcare, disease prevention, and health promotion [1]. Measurement is central to this field because health literacy cannot be improved without first understanding which abilities are limited, which contextual barriers are present, and which groups require targeted support.

The choice of measurement tool is especially important in rural and agricultural communities. Farmers and other agricultural workers are exposed to specific health risks, including pesticide exposure, heat stress, injuries, zoonotic infections, musculoskeletal problems, respiratory symptoms, and chronic diseases. In these settings, health information is often practical and technical: warning labels, pesticide instructions, dosage rules, safe storage, use of personal protective equipment, appointment schedules, and explanations from health workers. A tool that works well in a hospital waiting room may not fully capture the health literacy needs of a farmer who must interpret occupational risks in the field. Health literacy instruments differ substantially in their conceptual focus. Some tools assess broad multidimensional competencies, some measure functional reading and numeracy, some screen clinical patients quickly, and others focus on digital or occupational safety contexts. As a result, selecting a tool only because it is popular may produce incomplete findings. A questionnaire that is too long may increase respondent fatigue, whereas a tool that is too narrow may miss important domains such as information appraisal, social support, occupational safety, or navigation of health services.

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Research Gap and Rationale

A key gap in health literacy research is that many studies adopt popular instruments without sufficiently examining whether those instruments match the population, setting, and purpose of measurement. In rural and agricultural communities, the use of a widely known questionnaire does not automatically ensure valid measurement. Respondents may have limited formal education, unfamiliarity with written health forms, limited exposure to packaged food labels or digital health portals, and difficulty interpreting formal medical terminology. These conditions may produce measurement error if the instrument assumes a level of reading, numeracy, or digital familiarity that is not realistic in the target population.

Another gap is the limited attention given to cultural and occupational context. Rural communities may rely on family members, community health cadres, agricultural extension workers, traditional beliefs, informal advice, or local language communication when seeking health information. Agricultural workers also face risks that are not fully represented in generic tools, such as pesticide handling, heat exposure, injury prevention, livestock-related diseases, and the use of personal protective equipment. Therefore, a tool that captures general healthcare literacy may still be incomplete when the research question is related to farming safety or work-related health behavior.

Fieldwork burden is also frequently underestimated. Long questionnaires may be difficult to administer during planting, harvesting, or working hours. Self-administered formats may not be appropriate for respondents with low reading ability, while interviewer-assisted formats require trained enumerators and clear standardization. These methodological challenges indicate the need for a practical tool selection framework that considers conceptual domain, respondent burden, cultural adaptation, feasibility in rural field conditions, agricultural relevance, and the intended use of the findings.

This narrative literature review discusses widely used health literacy measurement tools and proposes a purpose-based framework for selecting instruments for rural and agricultural populations. The review was written as a conceptual manuscript and does not use unpublished primary thesis data, individual respondent data, or local study results. Its aim is to support future research design, instrument selection, and health promotion planning without disclosing primary thesis findings.

METHODS

A narrative literature review design was used because the objective of this paper was not to estimate pooled prevalence, calculate effect size, or perform a formal systematic review, but to synthesize conceptual and methodological considerations for selecting health literacy measurement tools. Narrative review is appropriate when a topic involves heterogeneous instruments, diverse measurement traditions, different populations, and practical decision-making issues that cannot be fully addressed through a single quantitative synthesis [20,21].

Literature was identified through targeted searches in PubMed/MEDLINE, Google Scholar, ScienceDirect, and official instrument or developer sources. Additional references were identified through reference lists of key validation studies and review papers. Search terms were combined using keywords related to the construct, instrument type, and target population. Examples of search strings included: "health literacy" and "measurement tool"; "health literacy questionnaire" and "validation"; "HLS-EU" and "rural"; "health literacy" and "farmers"; "agricultural safety" and "health literacy"; "functional health literacy" and "screening"; and "digital health literacy" and "eHEALS".

The review prioritized peer-reviewed validation studies, psychometric papers, instrument development articles, public health measurement papers, reviews, and studies involving rural, agricultural, occupational, or low-resource populations. Instruments were included when they measured general health literacy, multidimensional health literacy, functional or clinical health literacy, digital health literacy, or agricultural/occupational safety health literacy. Articles that only assessed general health knowledge without an explicit health literacy measurement framework were not prioritized.

Data were synthesized narratively according to instrument purpose, conceptual domain, number of items, administration burden, cultural adaptation needs, rural feasibility, agricultural relevance, and recommended use. Because this review is intended to guide instrument selection rather than rank instruments statistically, no meta-analysis was conducted. The comparison emphasizes practical suitability for field research and health promotion planning in rural and agricultural communities.

Because this paper is a literature-based review and does not involve human participants, biological samples, intervention, or access to identifiable private data, formal ethical approval is generally not required. Nevertheless, ethical principles remain relevant in

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instrument selection because questionnaires should be understandable, culturally appropriate, and respectful of respondents with limited literacy.

RESULTS AND DISCUSSION

Conceptual Approaches in Health Literacy Measurement

Health literacy measurement can be grouped into several broad approaches. The first approach is multidimensional population measurement, represented by the HLS-EU family and the HLQ. These tools aim to capture more than reading ability; they assess how people find, understand, judge, and use health information in everyday life and in relation to healthcare systems. This approach is suitable for public health research because it connects individual competencies with social and environmental determinants.

The second approach is functional health literacy measurement. Instruments such as TOFHLA, S-TOFHLA, REALM, and NVS assess practical reading, numeracy, or comprehension skills. These tools are valuable when the research objective is to screen whether a person can understand common clinical materials, medication instructions, or nutrition labels. However, they may not capture broader public health competencies such as critical appraisal, community participation, or the ability to apply health information in occupational settings.

The third approach is context-specific measurement. Digital health literacy tools, including eHEALS, evaluate perceived ability to find and use electronic health information. Occupational or agricultural tools, such as ASHLT, focus on the safety and health literacy demands of agricultural work. These context-specific tools are increasingly relevant because health information is now delivered through digital platforms and because workers face risks that are not fully represented in generic instruments.

European Health Literacy Survey Instruments

The European Health Literacy Survey Questionnaire (HLS-EU-Q47) is one of the most influential instruments for measuring comprehensive health literacy. It was designed around four information-processing competencies: accessing, understanding, appraising, and applying health information. These competencies are assessed across three health domains: healthcare, disease prevention, and health promotion [1]. This structure produces a broad picture of health literacy as a public health capacity.

The strength of HLS-EU-Q47 lies in its conceptual depth. It is useful when researchers want to describe health literacy comprehensively and compare dimensions across populations. However, the 47-item format may be time-consuming for communities with limited literacy, older respondents, or field conditions in which interviews must be completed quickly. In agricultural communities, long instruments may become difficult to administer during working hours or in outdoor settings.

Shorter versions, including HLS-EU-Q16 and HLS-EU-SQ10, were developed to reduce respondent burden. In Indonesia, HLS-EU-SQ10-IDN was developed as a short-form survey using Indonesian population data [2]. The existence of an Indonesian short-form version is important because language adaptation, cultural relevance, and local validation are essential for valid measurement. For rural and agricultural communities in Indonesia, HLS-EU-SQ10-IDN is attractive because it is short, reflects the HLS-EU conceptual model, and can be administered in community surveys with limited time.

Nevertheless, short forms should be interpreted carefully. A short questionnaire improves feasibility but reduces the level of detail available for analysis. It may be suitable for estimating overall low or adequate health literacy, but it may be less suitable when researchers need to distinguish between specific weaknesses in appraisal, application, healthcare navigation, or disease prevention.

Health Literacy Questionnaire

The Health Literacy Questionnaire (HLQ) was developed to assess health literacy needs across individuals, groups, and organizations. It contains nine conceptually distinct domains and is widely used in surveys and intervention evaluation [3]. The HLQ includes domains related to feeling understood and supported by healthcare providers, having sufficient information, actively managing health, social support, appraisal of information, engagement with health professionals, navigating the healthcare system, finding good health information, and understanding information well enough to act.

The HLQ is particularly useful when the purpose of measurement is not only to classify respondents as having low or high health literacy, but also to identify specific needs that can guide interventions. In a rural community, for example, low scores in the navigation domain may suggest that transportation, referral pathways, or administrative barriers need attention. Low scores in appraisal may suggest the need for education on evaluating information sources, especially when informal advice or social media is widely used.

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However, the HLQ has more items than many short screening tools, and administration requires careful explanation. For agricultural communities with limited formal education, interviewer-assisted administration may be preferable to selfadministered paper forms. The HLQ can provide rich data, but it requires sufficient time, trained data collectors, and a validated language version.

Functional Health Literacy Tools

The Test of Functional Health Literacy in Adults (TOFHLA) is a classic instrument that measures reading comprehension and numerical ability using health-related materials. The original TOFHLA includes a 50-item reading comprehension section and a 17-item numeracy section, and administration may take up to 22 minutes [4]. The Short Test of Functional Health Literacy in Adults (S-TOFHLA) was developed to reduce administration time while maintaining reliability and validity [5].

TOFHLA and S-TOFHLA are useful when the focus is functional ability in clinical contexts, such as understanding medication instructions, appointment slips, or health forms. These skills are relevant to rural populations because many health decisions depend on reading and numeracy. However, these tools may be less suitable for measuring broader public health literacy because they focus mainly on functional comprehension rather than access, appraisal, social interaction, or application in community settings.

The Newest Vital Sign (NVS) is a brief tool based on a nutrition label and six questions. It can be administered quickly and is often used to identify people at risk for low health literacy [6]. The NVS is attractive because it is short, practical, and includes numeracy and document interpretation. In rural settings, however, researchers should consider whether the nutrition-label format is culturally familiar to respondents. If the stimulus material is unfamiliar, low scores may reflect limited exposure to packaged food labels rather than general health literacy alone.

Functional tools are valuable for screening, but they should not be used as the only evidence when the research objective involves health promotion, occupational safety, or community empowerment. For farmers, the ability to read a label is important, but so is the ability to judge whether pesticide advice is reliable, ask health workers for clarification, and apply protective practices in the field.

Digital Health Literacy Tools

Digital health literacy has become increasingly relevant because health information is now commonly accessed through smartphones, social media, online health portals, and messaging applications. The eHealth Literacy Scale (eHEALS) is an eight-item self-report measure developed to assess consumers' perceived knowledge, comfort, and skills in finding, evaluating, and applying electronic health information [7].

eHEALS is useful when the study focuses on access to online health information, digital health campaigns, telehealth, or health promotion delivered through electronic media. For rural and agricultural communities, digital health literacy is important but uneven. Some respondents may use smartphones daily, whereas others may have limited connectivity, limited digital confidence, or reliance on family members for online information.

Because eHEALS measures perceived ability, it may not always reflect actual performance. Respondents may overestimate or underestimate their digital skills. Recent discussions of eHealth literacy emphasize that digital environments have changed substantially since the original eHEALS was developed, with new forms of interactive media, algorithms, misinformation, and artificial intelligence influencing how people encounter health information [8]. Therefore, researchers using digital literacy tools should consider supplementing self-report items with practical questions about sources, verification habits, and ability to identify misleading information.

Agricultural Safety and Occupational Health Literacy Tools

Generic health literacy tools may not adequately capture the specific literacy demands of agricultural work. Farmers must understand hazard warnings, pesticide labels, safe mixing and storage procedures, symptoms of poisoning, heat exposure risks, zoonotic disease prevention, ergonomic practices, and the correct use of personal protective equipment. These tasks require the integration of functional literacy, risk perception, occupational knowledge, and practical decision-making.

The Agricultural Safety and Health Literacy Tool (ASHLT) was developed to measure agricultural safety and health literacy based on existing occupational health literacy concepts [9]. Such an instrument is important because agricultural health literacy is not limited to general healthcare information. It includes the ability to recognize workplace hazards, interpret safety instructions, evaluate risk information, and apply preventive behaviors in daily farming activities.

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For researchers working with farmers, occupation-specific tools can strengthen relevance. However, an agricultural safety tool may not fully measure broader health literacy domains such as chronic disease management, maternal and child health information, health service navigation, or digital information use. Therefore, tool selection should follow the research question. If the objective is pesticide safety, ASHLT or similar occupational tools may be appropriate. If the objective is general health literacy in a community, HLS-EU or HLQ may be more suitable.

A Purpose-Based Framework for Selecting Health Literacy Tools

The selection of a health literacy instrument should be treated as a methodological decision rather than an administrative choice. A practical framework can help researchers match the tool with the research purpose, population characteristics, field conditions, and planned use of results. The following five steps are proposed for rural and agricultural settings.

- Define the primary purpose of measurement: community survey, clinical screening, digital health assessment, agricultural safety assessment, or intervention planning.
- Match the conceptual domain to the purpose: multidimensional public health literacy for population surveys, functional literacy for clinical screening, digital literacy for online information behavior, and occupational health literacy for farming safety.
- Assess population and context: level of formal education, language, cultural communication practices, familiarity with written forms, digital access, and work schedules.
- Evaluate feasibility: number of items, interview duration, need for trained interviewers, respondent burden, scoring complexity, and availability of a validated local version.
- Plan adaptation and reporting: translation, cultural adaptation, pilot testing, reliability assessment, administration mode, scoring rules, cut-off points, and interpretation limits.

Table 1. Purpose-based framework for selecting health literacy measurement tools

Research purpose	Most suitable tool option	Why it fits	Additional consideration
Community survey in a rural area	HLS-EU-SQ10-IDN, HLS-EU-Q16, or HLS-EU-Q47	Captures access, understanding, appraisal, and application across public health domains.	Use short versions when field time is limited; interviewer-assisted administration is preferred for lowliteracy respondents.
Clinical screening of reading and numeracy	S-TOFHLA or Newest Vital Sign	Designed to assess practical comprehension of clinical materials, numbers, and labels.	Do not interpret as complete public health literacy; cultural familiarity with stimulus materials should be checked.
Digital health information behavior	eHEALS plus practical digital-use questions	Assesses perceived ability to find, evaluate, and use online health information.	Supplement with questions about connectivity, source checking, misinformation exposure, and familyassisted internet use.
Agricultural safety and occupational risk	ASHLT or HLS-EU plus agricultural safety module	Captures farming-specific demands such as hazard recognition, pesticide safety, and protective behavior.	May need local adaptation for crop type, pesticide practices, language, and availability of protective equipment.
Intervention development and program planning	HLQ,HLS-EU-Q47, or combined general and context-specific tools	Provides richer domain-specific information for designing targeted education and services.	Requires more time, trained interviewers, and careful interpretation of domain scores.

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Practical Considerations for Rural and Agricultural Settings

Several practical factors should guide instrument selection in rural and agricultural communities. First, language and cultural adaptation are essential. Translation alone is not enough; researchers should ensure that examples, response options, and health terms are understandable to respondents. Cognitive interviewing or pilot testing can identify terms that are difficult or culturally inappropriate.

Second, administration mode matters. Self-administered questionnaires may be efficient for educated populations, but interviewer-assisted administration may be more appropriate when respondents have limited reading ability. Interviewers should be trained to read questions neutrally, avoid leading respondents, and maintain confidentiality.

Third, length and respondent burden should be balanced against the need for detail. A short validated tool may be preferable in field surveys, while a longer multidimensional tool may be justified for intervention design. Fourth, scoring and categorization should be planned before data collection. Clear scoring rules prevent inconsistent interpretation and support comparability across studies.

Fifth, tool selection should consider whether the goal is classification, diagnosis of needs, program evaluation, or occupational risk prevention. A single instrument rarely answers every question. In some studies, combining a general health literacy tool with a short context-specific module may provide the best balance between conceptual coverage and feasibility.

Recommendation Matrix

Table 2. Expanded recommendation matrix for health literacy tools in rural and agricultural communities

Instrument	Conceptual domain	Respondent burden	Cultural adaptation need	Rural feasibility	Agricultural relevance	Recommended use
HLS-EU-Q47	Comprehensive access, understand, appraise, and apply across healthcare, disease prevention, and health promotion	High: 47 items and longer interview time	High: needs validated language version and culturally understandable examples	Moderate: useful but may be tiring in field surveys	Moderate: captures general health literacy but not specific farming hazards	Best for detailed population studies when time and trained interviewers are available
HLS-EU-Q16	Shorter multidimensional population health literacy	Moderate: 16 items	Moderate to high: requires validated translation and clear wording	High: more feasible than Q47 in community settings	Moderate: useful for general farmer health literacy but may need work-risk module	Suitable for community surveys where a shorter multidimensional measure is needed
HLS-EU-SQ10-IDN	Short Indonesian version of HLS-EU health literacy measurement	Low: 10 items and brief administration	Lower in Indonesia because a local version exists, but local dialect and comprehension still need pilot testing	Very high: feasible for interviewer-assisted rural surveys	Moderate: appropriate for general health literacy; add pesticide or occupational items if needed	Recommended for Indonesian rural surveys with limited field time and limited respondent literacy

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HLQ	Nine-domain needs assessment covering support, information, appraisal, engagement, navigation, and understanding	Moderate to high: 44 items	High: domain interpretation requires careful adaptation and explanation	Moderate: feasible with trained interviewers but may be long	Moderate: good for identifying service and communication needs; not fully farmingspecific	Useful for intervention design, program planning, and identifying specific health literacy needs
TOFHLA / S-TOFHLA	Functional reading comprehension and numeracy in healthcare contexts	Moderate for TOFHLA; lower for STOFHLA	High: clinical passages and numeracy tasks must fit local context	Moderate: useful but may feel test-like for respondents	Low to moderate: relevant for medication and forms, not farmingspecific risks	Use for clinical screening of functional literacy, not as the only measure of public health literacy
Newest Vital Sign	Rapid functional screening using interpretation of a nutrition label	Low: six questions and short administration	High: nutrition-label familiarity may vary across rural populations	High if stimulus is culturally familiar; lower if packaged food labels are uncommon	Low to moderate: relevant to label interpretation but not agricultural occupational safety	Use for quick screening with prior cultural adaptation and careful interpretation
eHEALS	Perceived digital health literacy and online health information use	Low: eight self-report items	Moderate: digital terminology and online behavior must be locally understood	Variable: depends on smartphone ownership, connectivity, and digital confidence	Indirect: useful when farmers obtain health or pesticide information online	Use for digital health studies; combine with questions on connectivity, misinformation, and actual online search behavior
ASHLT	Agricultural safety and occupational health literacy	Variable depending on version and adaptation	High: must reflect local crops, hazards, pesticide practices, and safety norms	Moderate to high if adapted to local farming practices	Very high: directly addresses agricultural hazards and safe work practices	Use for pesticide safety, occupational risk, and agricultural health promotion studies; combine with general health literacy tools when needed

Implications for Low- and Middle-Income Countries

The selection of health literacy tools has particular implications for low- and middle-income countries (LMICs), where rural and agricultural communities often experience overlapping educational, economic, infrastructural, and occupational vulnerabilities. In

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these contexts, a measurement tool must not only be psychometrically sound but also feasible, understandable, and respectful of the everyday realities of respondents. A long questionnaire may appear methodologically strong, but it may perform poorly when respondents have limited reading ability, limited time, or limited familiarity with formal health terminology.

For LMIC rural settings, short validated tools combined with interviewer-assisted administration may offer a pragmatic balance between validity and feasibility. Interviewer assistance can reduce exclusion of respondents with limited literacy, while a validated short tool reduces fatigue and improves completion. However, interviewers should be trained to avoid leading respondents, explain response options consistently, and maintain privacy, especially when questions involve health service use, chronic disease, or workplace safety.

Cultural sensitivity is also essential. Health literacy questions should be understood within local language, social relations, and health-seeking practices. In some rural communities, people may obtain health information from family members, neighbors, community health cadres, religious or traditional leaders, agricultural extension workers, and informal digital networks. Instruments that assume individual, independent, and text-based information seeking may overlook the social nature of health decision-making in these settings.

Agricultural relevance should be considered when health promotion programs address pesticide safety, occupational injury, zoonotic disease, heat stress, or the use of protective equipment. General health literacy tools can describe broad competencies, but they may need to be supplemented with context-specific modules to capture work-related health literacy. This is important because farmers often need to interpret risk information under practical constraints, such as cost of protective equipment, weather conditions, distance to health facilities, and seasonal workload.

For program implementation, measurement should lead to action. Findings from a health literacy tool should help health workers, village governments, agricultural extension officers, and community health cadres design health messages that are simple, repeated, culturally appropriate, and linked to farmers' daily work. In LMIC settings, tool selection should therefore be connected to intervention planning rather than used only as a descriptive academic exercise.

Implications for Future Research

Future studies in rural and agricultural communities should avoid treating health literacy as a single universal construct without considering context. The most appropriate instrument is the one that matches the research question, respondent characteristics, and intended use of the findings. For example, a study on pesticide safety should not rely only on a generic clinical screening tool, while a study on general community health promotion may require a broader instrument than an agricultural safety checklist.

Researchers should also report instrument adaptation procedures, reliability results, scoring methods, cut-off points, administration mode, and interviewer training. Transparent reporting improves comparability and helps future researchers decide whether the same tool can be used in similar communities.

Future research should also compare the performance of general tools and agricultural-specific tools in the same population. Such studies would help determine whether short general instruments adequately capture health literacy among farmers or whether context-specific modules are needed to improve validity and intervention usefulness.

LIMITATIONS OF THIS REVIEW

This review is narrative rather than systematic, so it does not claim to identify every health literacy instrument or provide pooled estimates of psychometric performance. The focus is on widely used or contextually relevant tools that can inform instrument selection for rural and agricultural communities. Because included studies vary in design, language, population, and validation procedures, comparisons should be interpreted as practical guidance rather than a definitive ranking of instruments.

Another limitation is that instrument feasibility may vary across countries, regions, languages, and agricultural systems. A tool that is feasible in one rural area may require additional adaptation in another setting with different dialects, education levels, health service structures, crops, and occupational hazards.

CONCLUSION

Health literacy measurement is not a technical formality but a methodological decision that shapes the validity and usefulness of research findings. Rural and agricultural communities require tools that are conceptually sound, culturally appropriate, feasible in field conditions, and sensitive to occupational and digital information demands. The HLS-EU family is appropriate for population-

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based public health surveys; the HLQ provides domain-specific profiles for intervention planning; TOFHLA, S-TOFHLA, and NVS are useful for functional screening; eHEALS is relevant for digital health contexts; and ASHLT provides an occupation-specific option for agricultural safety and health literacy. In rural and agricultural settings, especially in LMICs, the most appropriate approach is often a short-validated instrument supported by interviewer-assisted administration, cultural adaptation, pilot testing, and context-specific questions related to work hazards and access to health information.

RECOMMENDATIONS

Public health researchers should select health literacy tools according to research objectives rather than popularity alone. For field surveys among farmers, short validated instruments are recommended to reduce respondent burden. For intervention development, multidimensional tools or combined instruments should be considered. Before using any tool, researchers should conduct cultural adaptation, pilot testing, and reliability assessment in the target population. In rural and agricultural communities, researchers should also consider whether the selected tool captures digital access, health service navigation, social information sources, and work-related health risks.

DECLARATIONS

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