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Health Literacy in Low- and Middle-Income Countries: What is the Evidence for Noncommunicable Diseases?

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Abstract: Health literacy is defined as a person's ability to access, understand, appraise and apply health information in order to make sound health decisions. It has emerged as a key determinant of health outcomes, more particularly in noncommunicable diseases. Low health literacy has been associated with lower use of health care services and poorer health outcomes, including increased morbidity and mortality. During the second meeting of the EMAC-AOC Group (Epidemiology of Chronic Diseases – Central & Western Africa) health literacy and noncommunicable diseases in Low- and Middle-Income Countries were discussed to explore options for interventional studies in sub-Saharan Africa on noncommunicable diseases prevention and control. We reviewed how health literacy is defined, how it is associated with health outcomes and health inequities, and what instruments are available to assess it. Several published studies, systematic reviews, especially in Low- and Middle-Income Countries, as well as national and international recommendations were discussed to explore potential approaches to improve health literacy in a study evaluating interventions for the prevention and control of noncommunicable diseases in Africa.

Key words: Health Literacy, Low- and Middle-Income Countries, Noncommunicable Diseases.

Introduction

Noncommunicable diseases (NCDs) are a major global health challenge. Low- and middle-income countries (LMICs) bear a significant burden of NCDs, with high rates of morbidity and mortality. According to the World Health Organization (WHO), NCDs account for approximately 71% of all deaths globally, and LMICs are disproportionately highly affected.¹

Twenty-five specialists in Public Health, Cardiovascular and Metabolic Diseases, Neurology, Mental Health, Genetics and Pharmacy from Benin, Congo Republic, Gabon, Ivory Coast, Senegal, Togo and France belonging to the “Epidémiologie des Maladies Chroniques – Afrique de l’Ouest et Centrale” Group (EMAC-AOC - Epidemiology of Chronic Diseases – Central & Western Africa) gathered in Limoges (France) in January 2023 during a three-day meeting to explore options to evaluate interventions for the prevention and control of NCDs in sub-Saharan Africa through multi-national studies.

Health literacy (HL) is an important determinant of health outcomes, particularly for NCDs. This paper examines the concept of HL and its implications for the prevention and control of NCDs in LMICs. It summarizes some of the sessions and workshops which took place during the second meeting of the EMAC-AOC Network.

Defining Health Literacy

HL has recently become a topic of great relevance among researchers, health professionals and policy-makers across various disciplines with close to 20,000 papers published since 1982 (Figure 1).

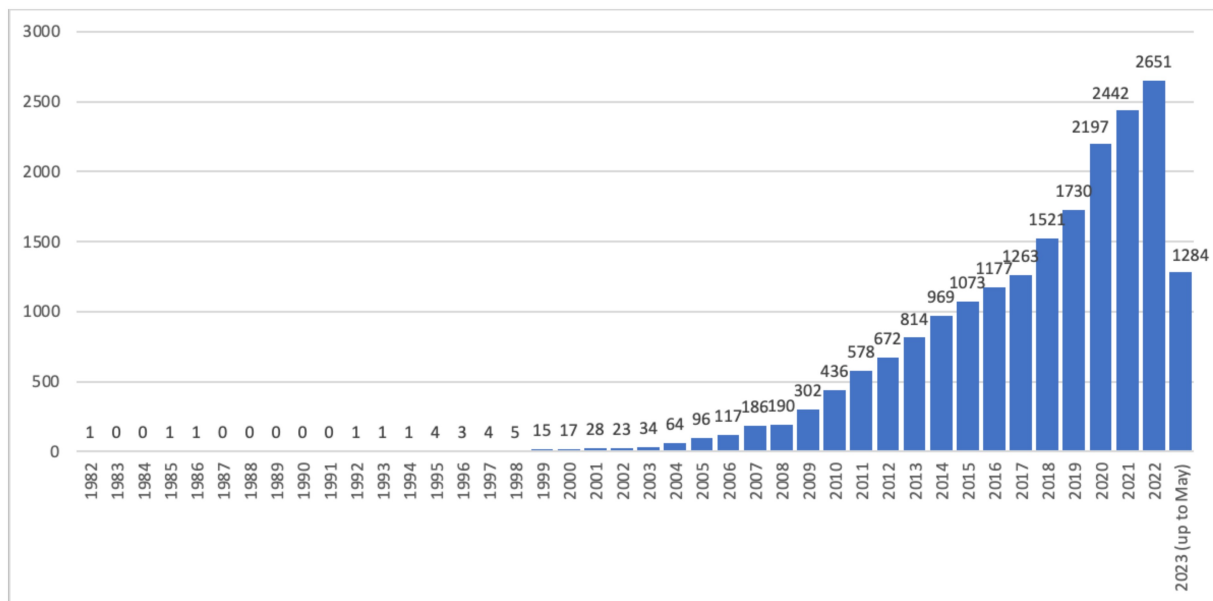


Figure 1: Number of HL publications per year between 1982 and May 2023 (PubMed) - Total = 19,901

There have been numerous definitions of HL over the last few years, with 26 published between 1995 and 2015.² Most recently, the WHO has defined HL as: *“people’s knowledge, confidence and comfort — which accumulate through daily activities and social interactions and across generations — to access, understand, appraise, remember and use information about health and health care, for the health and well-being of themselves and those around them”*.³

In other words, HL encompasses a range of skills, including reading, writing, numeracy, and communication, as well as cultural and social factors that influence health-related behavior. As such, it has emerged as a critical component of effective prevention and management of NCDs in LMICs, as in the rest of the world.

Another key concept related to HL is the *“empowerment for health”*.⁴ Individuals with strong HL will have the required skills and capabilities to engage in various health-enhancing behaviors, including personal and social actions. These actions may involve encouraging others

to make healthy choices, such as smoking cessation or participating in preventative screening programs. As a result, individuals with high HL not only experience better health outcomes and have access to a broader range of opportunities and options to maintain good health, but they also might have a greater impact on the health of others.⁵

Health literacy, health outcomes and health inequalities: an overview

Numerous studies have shown an association between low HL and poor health outcomes, including increased morbidity and mortality, and health inequalities, as summarized in Figure 2.⁶⁻²⁰

2. ⁶⁻²⁰

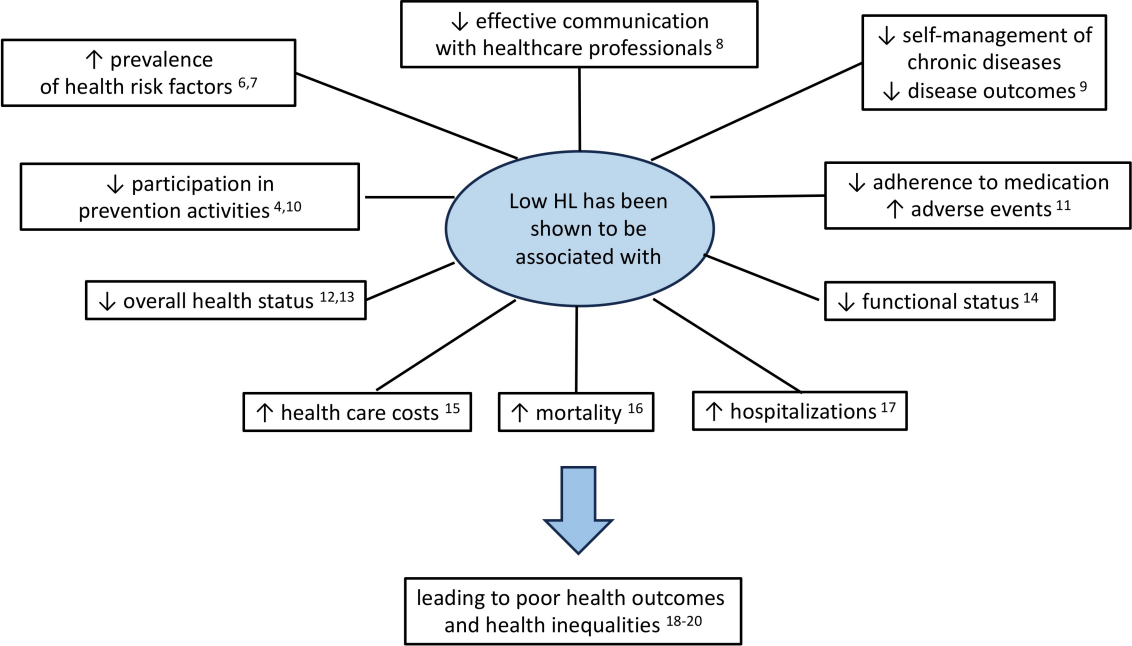


Figure 2: Graphical summary of studies published about the association of low HL with poor health outcomes.

Several reviews have also shown low HL to be associated with poorer health outcomes, including increased morbidity and mortality from NCDs, and poorer use of health care services.²¹⁻²³

Individuals with limited ability to access, understand and apply health-related information are more likely to experience negative consequences. They might struggle to seek information and guidance, to comprehend health-related instructions, health education materials, or doctors' advice, leading to medication errors, missed appointments, and inadequate self-care. This can also delay diagnosis and treatment, resulting in worsened conditions and increased hospitalizations. Overall, the literature has shown low health literacy to exacerbate health disparities and to contribute to higher morbidity and mortality rates among affected populations.⁷⁻²³

How to assess health literacy?

Several tools have emerged which aim to encompass the entire scope and dimensions covered by the concept of HL. We will review below some of the most commonly used instruments.

The Health Literacy Questionnaire (HLQ) is now one of the most widely used HL measures worldwide.²⁴ It is a multidimensional tool based on the theoretical framework of the WHO definition of HL. The HLQ explores nine dimensions of HL through 44 items and has been shown to display robust psychometric properties. It is easily self-administered and has been validated in multiple languages and in over 25 countries.^{24,25}

The European Health Literacy Survey Questionnaire (HLS-EU-Q) is another comprehensive instrument to measure HL in populations.²⁶ It includes 47 items in its full version (HLS-EU-Q47), addressing self-reported difficulties in accessing, understanding, appraising and applying information in tasks concerning decisions making in healthcare, disease prevention, and health promotion. Shorter versions have been developed (16 items for HLS-EU-Q16, 12 items for HLS-

EU-Q12 and HLS-SF12) and validated in various countries, including 17 in Europe and 6 in Asia, and various populations.²⁷⁻³²

Another tool is the Functional, Communicative and Critical Health Literacy – Health Literacy Scale (FCCHL- HLS14) which explores 3 dimensions of HL in adult patients with chronic diseases via a 14-item scale and through a self-report questionnaire.³³ Initially developed in Japan, it has now been validated in several countries, languages and populations.^{34,35}

Health Literacy and NCDs in LMICs: current challenges

LMICs face unique challenges in addressing HL and NCDs. These challenges include limited access to health information and services, low levels of formal education and literacy, and cultural and linguistic diversity. In many LMICs, there is a lack of trained healthcare providers, and health systems are often under-resourced and overburdened. These factors contribute to low HL and poor health outcomes for people with NCDs.

In a systematic review including 13 studies from four countries in South Asia, it was shown that the majority of people with NCDs had an inadequate HL. Levels of inadequate HL varied between studies, countries and diseases: diabetes (26.0%–80.9%), cardiovascular disease (51.8%–83.4%), and COPD (74.8%–79.0%). Beyond the expected factors such as poor disease knowledge, and limited or no educational background, it has been shown that belonging to an indigenous or marginalized community from rural areas, and being female, were also factors associated with inadequate HL.³⁶

A study conducted in Ethiopia among adults with NCDs (hypertension, cardiovascular diseases, diabetes, COPD, asthma and epilepsy), reported a low level of HL for 43.9% to 54.2% of the participants depending on the item surveyed. It also showed that HL levels varied according to

socio-demographic and disease characteristics of patients. Interestingly the most commonly cited source of information was healthcare professionals (43.9%) well ahead of radio (22.8%) and TV (20.6%), underlining the importance of the information conveyed by healthcare professionals to their patients.³⁷

In another systematic review³⁸ aiming at evaluating HL interventions, their content and their effectiveness in chronic conditions, 39 unique interventions were included (of which 20.5% were in LMICs), mainly in diabetes and heart disease. A significant change in HL was found in 28 studies (71.8%), although the authors stated that the methodological quality of the studies was generally poor, in particular with 37 of the 39 including studies at risk of bias (23 at high risk), heterogeneity of the definitions of HL and of the magnitude of the effects.

In rural Uganda, a study was conducted among Community Health Workers (CHWs) whose activities were focused on infectious diseases and maternal-child health.³⁹ CHWs were enthusiastic about raising NCD awareness and integrating NCD care into their role. They nevertheless emphasized that they needed to be empowered through NCD training, to be equipped with the proper reporting and referral tools, and with strong and visible collaborations with medical personnel. Interestingly, the lack of financial remuneration for their role did not appear to be a major barrier to providing NCD services.

Improving Health Literacy: exploring potential approaches for LMICs and NCDs

In a systematic review evaluating HL interventions to improve health outcomes in LMICs, data from 23 published studies, conducted in 14 countries (mainly in Asia and Africa), were analyzed.⁴⁰ The authors identified four main groups of HL interventions: traditional HL interventions (such as lectures, didactic sessions, dissemination of printed materials, use of visual aids), art-based HL interventions (drama classes, drawings, storytelling, etc.), interactive learning strategies (group discussions, peer-support programs), and technology-based HL interventions (using mobile devices, internet websites, digital devices). They represented 43%, 39%, 26% and 13% of all interventions, respectively. All HL interventions were effective and improved the knowledge and awareness of the population. A few of the studies which evaluated behaviors also showed positive outcomes regarding preventive health practices and behaviors, and health-promoting behaviors.

In addition, in this review, as well as in another by Stormacq⁴¹, it was shown that multi-faceted interventions, using a combination of both educational materials and interventionists (professional or lay) to deliver the intervention, were more effective than single modality interventions.

In another systematic review and meta-analysis of health education interventions to promote HL in adults living in LMICs with NCDs (cancer, cardiovascular disease, chronic respiratory disease, or diabetes)⁴², including 53 studies, the authors concluded that HL interventions were effective (especially in diabetes) in promoting disease knowledge, attitudes and behaviors, with a significant effect shown in all three components.

Although conducted in the Organization for Economic Cooperation and Development (OECD) countries, a systematic review of interventions to improve HL for chronic disease behavioral

risk factors, showed some interesting findings.⁴³ Among the 52 studies included, authors could classify interventions into 6 different types: group education (28.8%), written materials (23.1%); individual counseling (21.2%); multiple interventions (19.2%), telephone counseling (3.8%); and computer/web-based (3.8%). Overall, 73% of all studies were associated with change in HL, and 75% with a change in smoking, nutrition, alcohol, physical activity and weight (SNAPW). Positive outcomes for SNAPW were more frequently (43% of studies) reported for low intensity interventions (≤ 3 points of contact hours) than with high intensity interventions (≥ 8 points of contact/hour, 33% of studies).

An open-label randomized controlled trial conducted in Mali to evaluate the effectiveness of peer-led self-management education for patients with poorly controlled type 2 diabetes⁴⁴ is also very insightful. The intervention group received one year of culturally tailored structured patient education (every 3 months) delivered in the community by five trained peer educators. The authors demonstrated that this intervention resulted in substantial improvements in glycaemic control (HbA1C) and anthropometric parameters (body mass index, mean waist circumference) compared to standard of care.

Improving health literacy: additional recommendations

As HL has been gaining critical importance in public health⁴⁵, national and international policies and action plans have been developed to address the issue of low HL.^{3,46-51}

As stated by the WHO, *“effective responses to HL issues can improve health outcomes and reduce health inequities. Policies and practices must promote identification of HL issues and the implementation of targeted responses”*.⁵¹

In its recommendations for the development and implementation of HL interventions in LMICs, the WHO has highlighted three key principles⁵¹:

- To be effective, HL interventions need to be tailored to the specific needs of the local population and consider the unique contexts in which they exist (healthcare systems, availability and use of mass media, cultural norms etc.).
- Collaborating with local stakeholders to co-create HL interventions is a powerful way to engage the community and generate innovative and effective solutions.
- To maximize the sustainability and scalability of these interventions in LMICs, it is important to leverage existing health and social resources and to design healthcare services that are appropriate and rooted within local communities.

However, in order to truly address HL in a comprehensive and organized manner, it is necessary to a) integrate HL into high-level systems and organizational policies and practices, b) ensure that health information is presented in a clear, concise, and relevant manner, and that interpersonal communication is effective and tailored to the needs of the audience, c) integrate HL into education for consumers and healthcare providers.⁴⁸

Integrating health literacy as part of interventions for the prevention and control of NCDs in LMICs.

After reviewing the evidence about the importance of HL as a determinant of health outcomes, and discussing the effects of HL interventions for NCDs in LMICs, the EMAC-AOC Group was strongly in favor of integrating HL interventions as part of any package of interventions for the prevention and control of NCDs.

Although several members highlighted how essential it was to have HL interventions well aligned with the specific needs of the local population and with the unique contexts of their countries, especially with regard to low literacy levels as well as cultural and social factors which influence health-related behaviors ⁵², everyone agreed that integrating HL activities and assessing them in the context of a study evaluating interventions for the prevention and control of NCDs in Africa would be extremely valuable.

Conclusion: LMICs face unique challenges in addressing HL and NCDs. However, there is evidence that HL interventions in LMICs can help improve health outcomes for people with NCDs. The EMAC-AOC Group will leverage relevant key learnings from the published literature and from the various national and international recommendations to develop effective HL interventions, and they will design studies to evaluate them in sub-Saharan Africa.

Contributors

PEB and PMP contributed to the review of the published evidence on HL for NCDs in LMICs, and to the preparation of the presentation given at the 2nd meeting of the EMAC-AOC Group. All authors contributed to the interpretation of the data, to the drafting of the article and to the final approval of the version to be published.

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Declaration of interests

PEB is a former Sanofi employee and owns Sanofi shares. Other authors have nothing to disclose in the context of the submitted work.

References

1. World Health Organization. (2019). Noncommunicable diseases: Key facts. <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>. Accessed on 2 May 2023
2. Sørensen K. Defining health literacy: Exploring differences and commonalities , in International Handbook of Health Literacy : Research, practice and policy across the lifespan. Policy Press 2019 ; p5-20.
3. World Health Organization. Health literacy development for the prevention and control of noncommunicable diseases. 2022; Volume 1. Overview.
4. World Health Organization. Health Promotion Glossary. 1998, p. 6 <https://www.who.int/publications/i/item/WHO-HPR-HEP-98.1> Accessed on 2 May 2023
5. Nutbeam D. Defining, measuring and improving health literacy. HEP. 2015; 42: 450-455
6. Aung, M. N., Lorga, T., Srikrajang, J., Promtingkran, N., Kreuangchai, S., Tonpanya, W., Vivarakanon, P., Jaiin, P., Praipaksin, N., & Payaprom, A. Assessing awareness and knowledge of hypertension in an at-risk population in the Karen ethnic rural community, Thasongyang, Thailand. International Journal of General Medicine. 2012; 5, 553-561. <https://doi.org/10.2147/IJGM.S29406> PMID:22807644
7. Yamashita, T., & Kart, C. S. Is diabetes-specific health literacy associated with diabetes-related outcomes in older adults? Journal of Diabetes. 2011; 3(2), 138-146. <https://doi.org/10.1111/j.1753-0407.2011.00112.x> PMID:21599867
8. Schillinger, D., Bindman, A., Wang, F., Stewart, A., & Piette, J. Functional health literacy and the quality of physician-patient communication among diabetes patients. Patient Education and Counseling. 2004; 52(3), 315-323. [https://doi.org/10.1016/S0738-3991\(03\)00107-1](https://doi.org/10.1016/S0738-3991(03)00107-1) PMID:14998602
9. Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., Palacios, J., Sullivan, G. D., & Bindman, A. B. Association of health literacy with diabetes outcomes. Journal of the American Medical Association. 2002; 288(4), 475-482. <https://doi.org/10.1001/jama.288.4.475> PMID:12132978
10. Von Wagner, C., Knight, K., Steptoe, A., & Wardle, J. Functional health literacy and health-promoting behaviour in a national sample of British adults. Journal of Epidemiology and Community Health. 2007; 61(12), 1086-1090. <https://doi.org/10.1136/jech.2006.053967> PMID:18000132
11. Lindquist, L. A., Go, L., Fleisher, J., Jain, N., Friesema, E., & Baker, D. W. Relationship of health literacy to intentional and unintentional non-adherence of hospital discharge medications. Journal of General Internal Medicine. 2012; 27(2), 173-178. <https://doi.org/10.1007/s11606-011-1886-3> PMID:21971600
12. Howard, D. H., Sentell, T., & Gazmararian, J. A. Impact of health literacy on socioeconomic and racial differences in health in an elderly population. Journal of General Internal Medicine. 2006; 21(8), 857-861. <https://doi.org/10.1111/j.1525-1497.2006.00530.x> PMID:16881947
13. Tokuda, Y., Doba, N., Butler, J. P., & Paasche-Orlow, M. K. Health literacy and physical and psychological wellbeing in Japanese adults. Patient Education and Counseling. 2009; 75(3), 411- 417. <https://doi.org/10.1016/j.pec.2009.03.031> PMID:19403259

14. Wolf, M. S., Gazmararian, J. A., & Baker, D. W. Health literacy and functional health status among older adults. *Archives of Internal Medicine*. 2005; 165(17), 1946-1952. <https://doi.org/10.1001/archint.e.165.17.1946> PMID:16186463
15. Herndon, J. B., Chaney, M., & Carden, D. Health literacy and emergency department outcomes: A systematic review. *Annals of Emergency Medicine*. 2011; 57(4), 334-345. <https://doi.org/10.1016/j.annemergmed.2010.08.035> PMID:21035902
16. Sudore, R. L., Yaffe, K., Satterfield, S., Harris, T. B., Mehta, K. M., Simonsick, E. M., Newman, A. B., Rosano, C., Rooks, R., Rubin, S. M., Ayonayon, H. N., & Schillinger, D. Limited literacy and mortality in the elderly: The health, aging, and body composition study. *Journal of General Internal Medicine*. 2006; 21, 806-812. <https://doi.org/10.1111/j.1525-1497.2006.00539.x> PMID:16881938
17. Mitchell, S. E., Sadikova, E., Jack, B. W., & Paasche-Orlow, M. K. Health literacy and 30-day postdischarge hospital utilization. *Journal of Health Communication*. 2012; 17(Suppl. 3), 325-338. <https://doi.org/10.1080/10810730.2012.715233> PMID:23030580
18. Aboumatar, H. J., Carson, K. A., Beach, M. C., Roter, D. L., & Cooper, L. A. The impact of health literacy on desire for participation in healthcare, medical visit communication, and patient reported outcomes among patients with hypertension. *Journal of General Internal Medicine*. 2013; 28(11), 1469-1476. <https://doi.org/10.1007/s11606-013-2466-5> PMID:23690237
19. Al Sayah, F., Majumdar, S. R., Williams, B., Robertson, S., & Johnson, J. A. Health literacy and health outcomes in diabetes: A systematic review. *Journal of General Internal Medicine*. 2013; 28(3), 444-452. <https://doi.org/10.1007/s11606-012-2241-z> PMID:23065575
20. Bostock, S., & Steptoe, A. Association between low functional health literacy and mortality in older adults: Longitudinal cohort study. *BMJ (Clinical Research Ed.)*. 2012 344, e1602. <https://doi.org/10.1136/bmj.e1602> PMID:22422872
21. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med*. 2011 ; 155(2) : 97–107.
22. Easton P, Entwistle VA, Williams B. Health in the ‘hidden population’ of people with low literacy. A systematic review of the literature. *BMC Public Health*. 2010 ; 10 : 459.
23. Osborn CY, Paasche-Orlow MK, Bailey SC, Wolf MS. The mechanisms linking health literacy to behavior and health status. *Am J Health Behav*. 2011 Jan-Feb;35(1):118-28. Doi: 10.5993/ajhb.35.1.11. PMID: 20950164; PMCID: PMC3085858.
24. Osborne, R.H., Batterham, R.W., Elsworth, G.R. *et al.* The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health* 13, 658 (2013). <https://doi.org/10.1186/1471-2458-13-658>
25. Debussche X, Lenclume V, Balcou-Debussche M, Alakian D, Sokolowsky C, Ballet D, Elsworth GR, Osborne RH, Huiart L. Characterisation of health literacy strengths and weaknesses among people at metabolic and cardiovascular risk: Validity testing of the Health Literacy Questionnaire. *SAGE Open Med*. 2018 Sep 21;6:2050312118801250. Doi: 10.1177/2050312118801250. PMID: 30319778; PMCID: PMC6154264.
26. Sørensen, K., Van den Broucke, S., Pelikan, J.M. *et al.* Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy

Survey Questionnaire (HLS-EU-Q). *BMC Public Health*. 2013; **13**, 948.

<https://doi.org/10.1186/1471-2458-13-948>

27. Bas-Sarmiento P, Poza-Méndez M, Fernández-Gutiérrez M, González-Caballero JL, Falcón Romero M. Psychometric Assessment of the European Health Literacy Survey Questionnaire (HLS-EU-Q16) for Arabic/French-Speaking Migrants in Southern Europe. *Int J Environ Res Public Health*. 2020 Nov 5;17(21):8181. Doi: 10.3390/ijerph17218181. PMID: 33167475; PMCID: PMC7663905.

28. Waldherr, K, Alferts T., Peer S. Development and validation of the HLS-EU-Q12. September 2021. https://m-pohl.net/sites/m-pohl.net/files/inline-files/Waldherr%20et%20al_0.pdf

29. Mekhail KT, Burström B, Marttila A, Wångdahl J, Lindberg L. Psychometric qualities of the HLS-EU-Q16 instrument for parental health literacy in Swedish multicultural settings. *BMC Public Health*. 2022 Feb 12;22(1):293. Doi: 10.1186/s12889-021-12346-8. PMID: 35151303; PMCID: PMC8841050.

30. Duong TV, Aringazina A, Kayupova G, Nurjanah, Pham TV, Pham KM, Truong TQ, Nguyen KT, Oo WM, Su TT, Majid HA, Sørensen K, Lin IF, Chang Y, Yang SH, Chang PWS. Development and Validation of a New Short-Form Health Literacy Instrument (HLS-SF12) for the General Public in Six Asian Countries. *Health Lit Res Pract*. 2019 Apr 10;3(2):e91-e102. Doi: 10.3928/24748307-20190225-01. PMID: 31294310; PMCID: PMC6607763.

31. Finbråten, H.S., Wilde-Larsson, B., Nordström, G. *et al.* Establishing the HLS-Q12 short version of the European Health Literacy Survey Questionnaire: latent trait analyses applying Rasch modelling and confirmatory factor analysis. *BMC Health Serv Res* **18**, 506 (2018). <https://doi.org/10.1186/s12913-018-3275-7>

32. Pelikan JM, Link T, Straßmayr C, Waldherr K, Alferts T, Bøggild H, Griebler R, Lopatina M, Mikšová D, Nielsen MG, et al. Measuring Comprehensive, General Health Literacy in the General Adult Population: The Development and Validation of the HLS19-Q12 Instrument in Seventeen Countries. *International Journal of Environmental Research and Public Health*. 2022; 19(21):14129. <https://doi.org/10.3390/ijerph192114129>

33. Ishikawa H, Takeuchi T, Yano E. Measuring functional, communicative, and critical health literacy among diabetic patients. *Diabetes Care*. 2008 May;31(5):874-9. Doi: 10.2337/dc07-1932. Epub 2008 Feb 25. PMID: 18299446.

34. Youssoufa M Ousseine, Alexandra Rouquette, Anne-Deborah Bouhnik, Laurent Rigal, Virginie Ringa, et al.. Validation of the French version of the Functional, Communicative and Critical Health Literacy scale (FCCHL). *Journal of patient-reported outcomes / J Patient Rep Outcomes*, 2018, 2 (1), pp.3. 10.1186/s41687-018-0027-8

35. Levic, M.; Bogavac-Stanojevic, N.; Krajnovic, D. Cross-Cultural Adaptation and Validation of the Functional, Communicative and Critical Health Literacy Instrument (FCCHL-SR) for Diabetic Patients in Serbia. *Healthcare* 2022,10,1667. <https://doi.org/10.3390/healthcare10091667>

36. Khatiwada B, Rajbhandari B, Mistry SK, Parsekar S, Yadav UN. Prevalence of and factors associated with health literacy among people with Noncommunicable diseases (NCDs) in South Asian countries: A systematic review. *Clinical Epidemiology and Global Health*, 2022 Volume 18, <https://doi.org/10.1016/j.cegh.2022.101174>.

37. Tilahun et al. Communicative health literacy in patients with non-communicable diseases in Ethiopia: a cross-sectional study *Tropical Medicine and Health* (2021) 49:57 <https://doi.org/10.1186/s41182-021-00345-9>

38. Larsen MH, Mengshoel AM, Andersen MH, Borge CR, Ahlsen B, Dahl KG, Eik H, Holmen H, Lerdal A, Mariussen KL, Thoresen L, Tschamper MK, Urstad KH, Vidnes TK, Wahl AK. "A bit of everything": Health literacy interventions in chronic conditions – a systematic review. *Patient Educ Couns*. 2022 Oct;105(10):2999-3016. Doi: 10.1016/j.pec.2022.05.008. Epub 2022 May 23. PMID: 35641366
39. Ojo T, Hawley N, Desai M, Akiteng A, Guwatudde D, Schwartz JI. . Exploring knowledge and attitudes toward non-communicable diseases among Village Health Teams in Eastern Uganda: a cross-sectional mixed methods study. *BMC Public Health* (2017) 17:947 DOI 10.1186/s12889-017-4954-8
40. Meherali S, Punjani NS, Mevawala A. Health Literacy Interventions to Improve Health Outcomes in Low- and Middle-Income Countries. *Health Lit Res Pract*. 2020 Dec 11;4(4):e251-e266. Doi: 10.3928/24748307-20201118-01. PMID: 33313935; PMCID: PMC7751448.
41. Stormacq C, Wosinski J, Boillat E, Van den Broucke S. Effects of health literacy interventions on health-related outcomes in socioeconomically disadvantaged adults living in the community: a systematic review. *JBI Evid Synth*. 2020 Jul;18(7):1389-1469. Doi: 10.11124/JBISRIR-D-18-00023. PMID: 32813388.
42. Heine M, Lategan F, Erasmus M, Lombaard CM, Mc Carthy N, Olivier J, van Niekerk M, Hanekom S. Health education interventions to promote health literacy in adults with selected non-communicable diseases living in low-to-middle income countries: A systematic review and meta-analysis. *J Eval Clin Pract*. 2021 Dec;27(6):1417-1428. Doi: 10.1111/jep.13554. Epub 2021 Mar 22. PMID: 33749092.
43. Taggart J, Williams A, Dennis S, Newall A, Shortus T, Zwar N, Denney-Wilson E, Harris MF. A systematic review of interventions in primary care to improve health literacy for chronic disease behavioral risk factors. *BMC Fam Pract*. 2012 Jun 1;13:49. Doi: 10.1186/1471-2296-13-49. PMID: 22656188; PMCID: PMC3444864.
44. Debussche X, Besancon S, Balcou- Debussche M, Ferdynus C, Delisle H, Huiart L, et al. Structured peer-led diabetes self- management and support in a low-income country: The ST2EP 17 randomized controlled trial in Mali. *PloS ONE*. 2018; 13(1): e0191262. <https://doi.org/10.1371/journal.pone.0191262>
45. Van den Broucke S. Health literacy: a critical concept for public health. *Arch Public Health*. 2014 Apr 1;72(1):10. Doi: 10.1186/2049-3258-72-10. PMID: 24685171; PMCID: PMC3994208.
46. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. National Action Plan to Improve Health Literacy. 2010. Washington, DC: Author.
47. Public Health England & UCL Institute of Health Equity. Improving health literacy to reduce health inequalities. 2015
48. Australian Commission on Safety and Quality in Health Care. Health literacy: Taking action to improve safety and quality. Sydney. 2014.
49. Schaeffer D, Hurrelmann K, Bauer U, Kolpatzik K. Nationaler Aktionsplan Gesundheitskompetenz. Die Gesundheitskompetenz in Deutschland stärken. 2018. KomPart, Berlin.
50. Conférence Nationale de la Santé – « La littératie en santé – usagers et professionnels : tous concernés ! » Pour un plan d'action à la hauteur des inégalités sociales de santé. 2017.

51. Dodson S, Good S, Osborne RH. Health literacy toolkit for low- and middle-income countries: a series of information sheets to empower communities and strengthen health systems. New Delhi: World Health Organization, Regional Office for South-East Asia, 2015.

52. Mouanga AM, Mbassa Menick D, Moukouta CS, Dzalamou M, Milandou R, Ossou-Nguet PM, Bandzouzi Ndamba B. Corps, souffrance et relation à l'autre dans la culture africaine : l'exemple de la République du Congo. *L'Information psychiatrique* 2018 ; 94 (1) : 33-40
doi:10.1684/ipe.2018.1738