## MANAGEMENT

**RECEIVED:**
20 August 2023
**ACCEPTED:**
20 September 2023
**RELEASED:**
20 October 2023

**UDC 338.46:614.2]:004.9**

**DOI 10.26661/2522-1566/2023-3/25-06**

# APPLICATION OF THE eHEALTH LITERACY IN DIGITAL HEALTH MANAGEMENT

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**Abstract**. The state policy in Ukraine regarding the informatization of the healthcare system, as well as the introduction of the latest information technologies, is aimed at eliminating the backlog in this area from the leading countries of the world and accelerating entry into the information space of the international community. It is currently impossible to bring Digital Health Management (DHM), practical medicine, medical education, and health science to the modern level without the use of theoretical knowledge. The study provides a conceptual framework for the development and use of eHealth literacy in DHM, as well as in national and international eHealth management activities. The purpose of this study is to explore the application of eHealth literacy instruments for assessment and implementation in DHM. Methodology: The study used a systematic review and analysis of articles published (from 2006 to 2022) in PubMed, Web of Science, and Scopus. The systematic review was conducted in accordance with PRISMA principles. The manual search strategy was used for the study. The methodological quality of each validation study was assessed using the COSMIN checklist and extracted data from the study. The research findings show that most of these instruments are only for planning and evaluating the results of medical interventions and for improving the skills of health professionals. However, existing eHealth Literacy instruments do not contain items of digital finance that could accelerate the integration of digital financial literacy into the health sector. Eight qualitative studies of eHealth literacy instruments were found useful for evaluation or implementation in DHM.

**Keywords:** eHealth literacy, digitalization, electronic healthcare, health management.
**JEL Classification:** G28, I18, H51.

## INTRODUCTION

Digital Health Management (DHM) is increasingly being adopted globally to address various public health issues. Digital Health Management combines technological innovation with transformation services to give people the support they need, when and where they require it. In 2006, Norman and Skinner introduced the eHealth literacy model, encompassing six domains of skills and abilities (basic, health, information, scientific, media, and computer) needed to effectively understand, process, and act on health-related information. Little is known about whether these domains of eHealth literacy are assessed or accounted for in DHM. DHM has the administrative and

managerial capabilities, organizational structures, and systems needed to fund and deliver health services more effectively and equitably.

The application of eHealth literacy in digital health management plays an important role in sector strategy for planning and evaluating the results of health interventions (World Health Organization [WHO], 2022), in public administration for synchronization and unification of cross-country information with an emphasis on the health sector (Hargreaves, Mates, Menon, Alderman, Devakumar, Fawzi & Patton 2022), in digital finance to accelerate the integration of digital financial literacy in the health sector (Gabani, Mazumdar & Suhrcke 2023), (Sobolieva-Tereshchenko & Zharnikova 2022), in health personnel management as an effective tool for improving the skills of health professionals (Efthymiou, Kalaitzaki & Rovithis 2023).

Studies about the application of healthcare in health management distinguish three main groups: research on healthcare management during COVID (Lou, Montreuil, Feldman, Fried, Lavoie-Tremblay & Bhanji, 2021) (Lokajova, A., Smahel, D. & Kvardova, N., 2023), studies on healthcare management at the district level and the effectiveness of the healthcare system (Liu, Desai, Fetene, Ayehu, Nadew, & Linnander 2022), (Proskurnia, O., 2018), (Yershov, S., 2018) articles on the use of a balanced scorecard in healthcare management (Huebner & Flessa (2022), (Amer, Hammoud, & Khatatbeh 2022), but there is few research on the implementation and application of eHealth literacy in digital health management (Sobolieva-Tereshchenko, 2023).

## LITERATURE REVIEW

A growing number of electronic resources, technologies, and an increasing number of health literacy measurement tools show the importance of people's skills in finding, understanding, and evaluating the health information that can be found on the Internet. However, no systematic review of eHealth literacy found a simultaneous assessment of research quality and a comparative analysis of eHealth literacy skills for implementation to DHM.

The eHealth Literacy Scale (eHEALS) for health management was developed by Cameron D. Norman and Harvey A. Skinner (2006). Cameron D. Norman suggested that elements of eHEALS can be developed that consider skills and tasks such as confidence in clear self-expression in online social interactions, ability to synthesize professional and non-professional advice, convenience, and ability to navigate information received through a mobile device, ability to use skills to filter relevant and trustworthy information.

eHEALS was the first electronic health literacy assessment system that assessed Internet users' skills in finding and applying medical knowledge online, but eHealth literacy levels were not associated with self-reported health status and were not a significant predictor of DHM.

Among different instruments designed to measure eHealth literacy, eHEALS is the most widely used. This eHealth literacy scale has been translated into many languages. Since 2006, the scale has been validated in many studies conducted with the participation of various groups of respondents: younger populations, adolescents, adults, old people, and patients with diseases. This has prompted researchers to conduct systematic reviews of eHealth literacy.

One of the first systematic reviews of eHealth literacy was presented among college students: with implications for eHealth education by Stellefson, M., Hanik, B., Chaney, B., Chaney, D., Tennant, B., and Chavarria, E. A. in 2011. The results of the survey showed that there is significant room for improvement in the ability of college students to access and evaluate eHealth information.

One previous narrative review of eHealth literacy instruments by Karnoe, A., and Kayser, L. (2015) simply summarized instruments rather than performing quality assessments or data syntheses. Later, Lee, J., Lee, E. and Chae, D. (2021) conducted a systematic review of the measurement properties of eHealth literacy tools to identify available eHealth literacy tools and evaluate their measurement properties to generate robust evidence for researchers and clinicians. Xie, L., Zhang, S., Xin, M., Zhu, M., Lu, W., and Mo, P. K. (2022) presented a systematic review of electronic health literacy and health-related outcomes among older adults. Despite the increased

number of studies in recent years, understanding of the relationships between eHealth literacy and Digital Health management is still limited.

## PAPER OBJECTIVE

The purpose of this study is the systematic review and analyze the role of eHealth Literacy Instruments in DHM as a driver of implementation for public administration. Our systematic review aimed to provide updated insights on eHealth Literacy Instruments by answering the following research questions:

RQ1: What are the existing measurement instruments in eHealth Literacy for implementation to DHM?

RQ2: What indicators are significant to evaluate studies and instruments of eHealth literacy for estimating the level of eHealth Literacy on DHM?

Thus, our systematic review of the eHealth Literacy measurement can identify all existing tools and provide information to determine which one is of the best quality studies for DHM.

## METHODOLOGY

Our systematic review framework is based on studies of all scales, tools, questionnaires, and instruments of eHealth Literacy since the publication of eHEALS. We searched Web of Science, PubMed, and Scopus for published articles on the measurement properties of instruments measuring eHealth Literacy and identified eligible articles using a standard set of selection criteria. We assessed the methodological quality of each validation study reported using the COSMIN checklist and extracted data from the study.

We selected eligible articles based on 3 main criteria: (1) availability of English full - text or Open Access article, (2) measuring eHealth literacy instruments as defined in the systematic review framework (3) use of relevant measuring instruments, and adequate description of the development and validation of eHealth Literacy measuring instrument. Our study focused on finding measuring instruments of eHealth Literacy (scales, toolkit, instruments, questionnaire).

This study included all original articles reporting psychometric properties of eHealth Literacy Instruments published after eHealth Literacy Scales. Articles were identified by searching three databases: Web of Science, PubMed, and Scopus. The databases were searched from January 2006 to January 2022. The study used a manual Search Strategy.

The search strategy was limited to eHealth literacy instruments whose psychometric information was presented transparently and accurately. Papers were retrieved using various combinations of the title, keywords, and abstracts of articles, including 'eHEALS', 'eHealth literacy instruments, 'e-Health literacy instruments, and 'electronic Health literacy instruments.'

Inclusion criteria were: English article published between 2006 and 2022 and Literature Free full text or Open Access. Exclusion criteria were dissertations, books, letters to the editor, papers presented at conferences, and abstracts of speeches. Eligibility criteria for inclusion were as follows: the study contained the research of the instruments of eHealth Literacy; the study included sample and formative, process, and outcome assessment of this eHealth Literacy instruments; and the study was a reviewed paper.

The initial search yielded 1699 articles, including 551 articles on the Web of Science, 611 articles on PubMed, and 537 articles on Scopus. All potentially relevant publications were extracted and analyzed. After the final evaluation, the necessary data were extracted and recorded. The literature search results were reviewed, screened titles and DOI, and duplicate results were excluded (1151), leaving 548 articles (criteria 1). So, the initial search cleared of duplicates for abstracts resulted in 548 articles, that were reviewed for relevance to the research question.

So, the initial search cleared of duplicates for abstracts resulting in 548 articles, that were reviewed for measuring eHealth literacy instruments as defined in the systematic review framework

(criteria 2). The main factors for ultimately excluding many articles included the following: the study described the models of eHealth Literacy; the study focused on Health Literacy, education and training of healthcare staff or other subsets of Health Literacy outside the scope of the eHealth Literacy Instruments. By the inclusion and exclusion criteria 2 from the study, the titles and abstracts of the articles were carefully examined, resulting in 242 articles.

Then, 242 articles were reviewed, and 15 articles were selected that used relevant measuring instruments (criteria 3). The main factors for ultimately excluding many articles included the following: the study provided a short description of the eHealth Literacy Instruments without providing results on the approbation. The additional factor in the final exclusion of many studies was that the study was empirical and conducted on eHealth Literacy Instruments adapted for use in different languages and/or in various populations.

Therefore, the 3 criteria effectively excluded papers that measure the actual results of testing the translation of eHealth Literacy Instruments, for example, approbation eHEALS, HLS-EU-Q, and a mix of diverse eHealth Literacy Instruments for different countries and/or various groups of adults, adolescent, old people with chronic (non-chronic) diseases.

Measuring instruments of eHealth Literacy provide insight into individuals' eHealth literacy skills. They can also provide a broader overview of the skills that play an important role in eHealth interactions, including interactive skills. However, measuring instruments of eHealth Literacy or hybrid scales are usually long, more complex, time-consuming for patients and professionals, and may not be feasible in specific settings.

To eliminate bias, when the long version of the scale or questionnaire is compared with the short version, and to eliminate systematic fallacy, when the large sample is compared with a small one, we added additional conditions. We excluded articles written by a single author with a sample of less than 100 participants. Additionally, we excluded the instruments of more than 50 items, because usually long scales are more complex, and time-consuming for patients and professionals, and might not be feasible in specific settings.

For example, Health LiTT is a multi-media touch screen self-test for assessing health literacy using the Talking Touchscreen, FLIGHT & VIDAS is a computerized indicator for estimating Good Health Today were excluded because they used a long 82-item and long 91-item instrument in the scale.

Computer-based and performance-based instrument to assess health literacy skills is the computer-based multidimensional health literacy instrument, Digital Health Literacy Assessment Tool (DHLAT) and EMHL is a test to evaluate the performance of the Mental Health Literacy on base EspaiJove.net were excluded because they have small sample 28, 23 and 19 participants respectively.

In total, for review of 15 full-text articles, w extracted the following data from eligible articles: (1) basic article information (authors, title, journal name, year of publication, study eligibility); (2) validation study details (design, objectives, setting, country); (3) description of respondents (type, sample population, size, mean age, gender, disease status); (4) instrument details (name, purpose, number of items, response scales, constructs purported to measure, constructs and domains of eHealth Literacy relevant to the conceptual framework); (5) details of instrument development (item generation, refinement procedures, administration, scoring methods, theoretical basis, limitations); and (6) results of statistical analyses and measurement properties evaluated (statistical methods, reported values for each measurement property). Therefore, 15 articles with an eHealth literacy instrument were selected for the COSMIN. evaluation. Then, 15 articles with full data extraction were independently reviewed, analyzed, and assessed by quality assessment of studies using the COSMIN checklist on a 4-point scale. (Terwee, Mokkink, Knol, Ostelo, Bouter & de Vet 2012). If two reviewers had doubts, the full version was analyzed and discussed together. Finally, only 8 articles were rated as quality and good according to the COSMIN Quality Assessment criteria. The study flowchart that details the study selection process along with the final search results is presented in Figure 1.

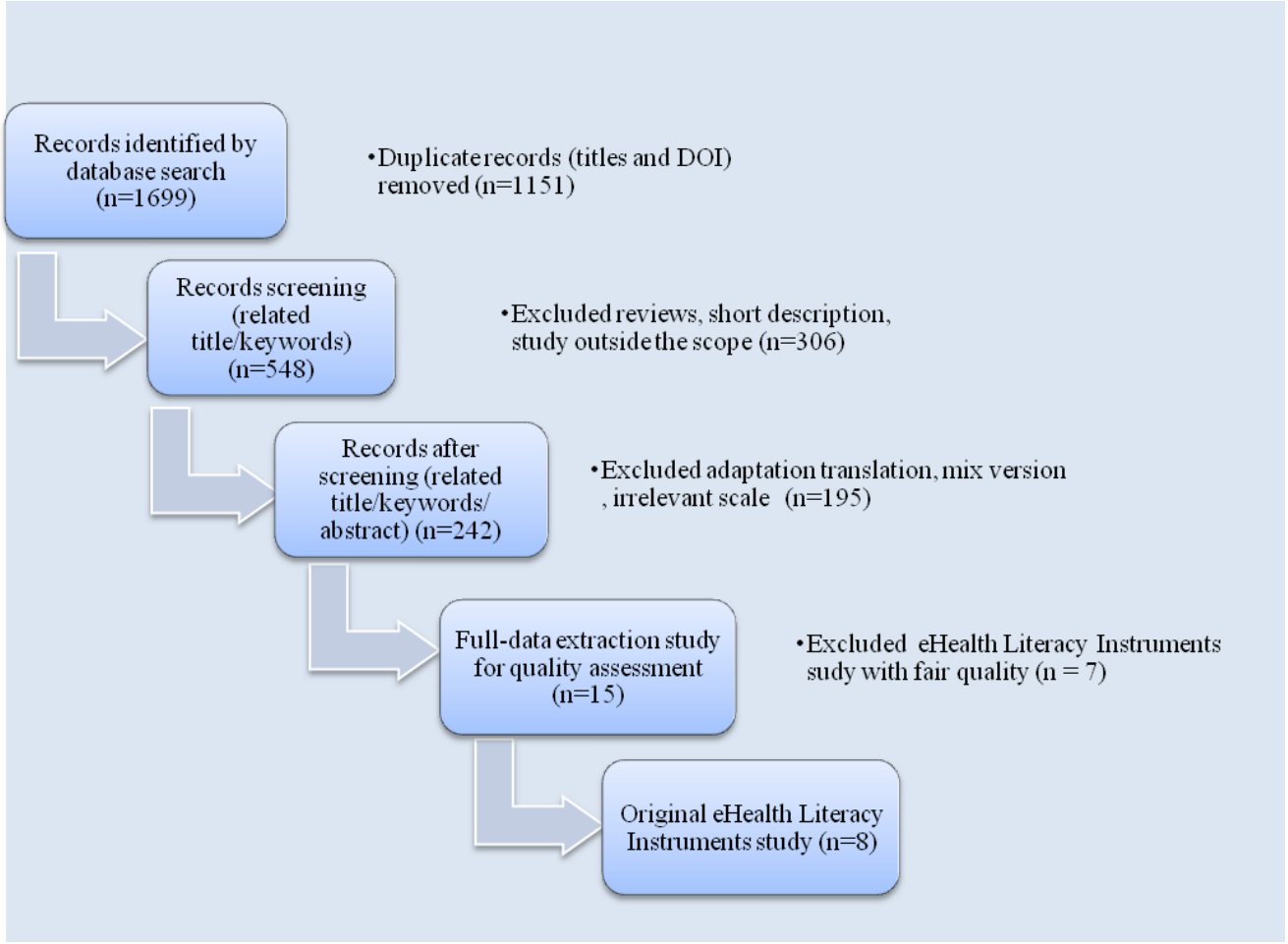


*Figure 1. Flowchart of the study selection process*

*Source: Own compilation*

The methodological quality of studies was assessed using the COSMIN checklist on a 4-point scale. (Terwee et al. 2012). This checklist is comparable to others that assess the quality of other types of studies included in the systematic review. The study met methodological standards for each measurement property tested (Table 1). Therefore, we rated the study as poor, fair, good, or excellent for each item in the respective dimension property.

After rating each item, we applied a worst-case scoring algorithm to obtain the COSMIN checklist quality score for per measurement property examined. For example, if one item in the box "Reliability" is scored poor, the methodological quality of the assessment of reliability in that study is rated as poor. A poor score on any item is thus considered to represent a fatal flaw.

*Table 1*

*Definition of the Quality Assessment of Studies*

| Measurement Property | | Reported Result | Definition |
|---|---|---|---|
| **Reliability** | 1. Internal consistency | poor, fair, good, or excellent | The degree/extent to which items in a (sub)scale are inter - correlated, thus measuring the same construct |
| | 2. Reliability | poor, fair, good, or excellent | The proportion of the total variance in the measurements due to true differences among patients |
| **Validity** | 4. Content validity | poor, fair, good, or excellent | The degree to which the content of an instrument is an adequate reflection of the construct to be measured |
| | 5. Structural validity | poor, fair, good, or excellent | The degree to which the scores of an instrument are an adequate reflection of the dimensionality of the construct to be measured |

*Guidelines for Implementing Quality Assessment of Studies (data processed by researchers).*
*Source: Terwee, C. B., Mokkink, L. B., Knol, D. L., Ostelo, R. W., Bouter, L. M., & de Vet, H. C., 2012.*

## RESULTS AND DISCUSSION

The Quality Assessment of Studies included investigators using COSMIN with a 4-point scale (Terwee et al. 2012). Each study was evaluated using items in the checklist and rated as Excellent, Good, Fair, or Poor. The lowest rating of any standard in the box was taken as the Quality of Studies.

Regarding the evaluation of each study, Internal consistency was the first parameter to be evaluated. Internal consistency included three requirements of design such as checking the unidimensional scale or a subscale, performing the analysis in a sample, and estimating continuous scores. Internal consistency was considered the most important dimension property, as the study should reflect the quality of scale or subscale and capacity of the study sample.

Next, the reliability of the study was assessed using three design requirements. Reliability included three design requirements, such as the adequacy of the sample size included in the analysis, the absence of flaws in the design or study methods, and the availability of the calculations of the intraclass correlation coefficient (ICC).

Finally, all the results for each study's properties were qualitatively summarized or quantitatively pooled. The summarized results were rated as Excellent, Good, Fair, or Poor. The overall rating of the quality of each study was determined by taking the lowest rating of any standard in the box (i.e. “the worst score counts” principle).

Subsequently, the remaining properties of studies such as Content validity included three requirements of design, and Structural validity included two requirements of design were evaluated. Based on research Quality Assessment of Studies of 15 articles with an eHealth literacy instrument using the COSMIN score identified eight articles rated “excellent” and “good”.

In summary, three articles Norman CD and Skinner HA (2006), Kelly, L., Ziebland, S., and Jenkinson, C. (2015). (2015), Liu, H. X., Chow, B. C., Liang, W., Hassel, H., & Huang, Y. W. (2021) were rated as “excellent”. Five articles of them Koopman R.J et al. (2014), Eun-Hyun Lee et al. (2022), Van der Vaart, R., and Drossaert, C. (2017), Zhang, L., and Li, P. (2022), and Sørensen,

K., Van den Broucke, S., Pelikan, J. M., Fullam, J., Doyle, G., Slonska, Z., Kondilis, B., Stoffels, V., Osborne, R. H., Brand, H., and HLS-EU Consortium (2013), Eun-Hyun Lee, Young Whee Lee, Kwan-Woo Lee, Hae Jin Kim, Seongbin Hong, So Hun Kim and Eun Hee Kang (2022) were rated as "good". (Table 2)

*Table 2*

*Articles rated quality and good of the Quality Assessment of COSMIN*

| # | Name | Authors | Year | Country | Number of items | Quality Assessment of COSMIN |
|---|---|---|---|---|---|---|
| 1 | eHealth Literacy Scale (eHEALS) | Norman CD, Skinner HA | 2006 | Canada | 8 | Excellent |
| 2 | European Health Literacy Questionnaire (HLS-EU-Q16) | European HLS project | 2009-2012 | EU | 16 | Good |
| 3 | Patient Readiness to Engage in Health Internet Technology (PRE-HIT) | Koopman R.J et al | 2014 | USA | 28 | Good |
| 4 | e-Health Impact Questionnaire (eHIQ) | Kelly Laura et al | 2015 | UK | 37 | Excellent |
| 5 | Digital Health Literacy Instrument (DHLI) | Van der Vaart, R et al | 2017 | Netherlands | 28 | Good |
| 6 | eHealth Literacy Scale in Web 3.0 contest (eHLS-Web 3.0) | Liu H et al | 2021 | China | 24 | Excellent |
| 7 | Problem-Based mHealth Literacy Scale (PB-mHLS) | Zhang, L., & Li, P. | 2022 | China | 33 | Good |
| 8 | Condition-specific eHealth literacy scale for diabetes (CeHLS-D) | Eun-Hyun Lee1et al | 2022 | South Korea | 10 | Good |

*Source: Own compilation*

The domains and samples used when developing the identified instruments and intended use are summarized in Table 3. All instruments were approbated on a large sample of 117 (eHIQ) to 1421 (eHLS-Web 3.0) percipients and different groups of adolescents and adults from 13 years old (eHEALS) to 84 years old (DHLI). Three instruments were tested in 2 stages (eHIQ, DHLI, eHLS-Web 3.0). The number of domains varied from 2 (CeHLS-D) to 8 (PRE-HIT).

*Table 3*

*Review of domains and samples in articles*

| # | Name | Year | Sample | Domains/Skills | Area of management |
|---|---|---|---|---|---|
| **1** | eHealth Literacy Scale (eHEALS) | 2006 | 664 adolescents (age 13-21) | Traditional literacy.<br>Media literacy.<br>Information literacy.<br>Computer literacy.<br>Science literacy.<br>Health literacy. | Planning and evaluating the results of health interventions. Tool for improving the skills of health professionals. |
| **2** | European Health Literacy Questionnaire (HLS-EU-Q16) | 2009-2012 | 8000 participants | Healthcare domain. Disease prevention domain. Health promotion domain.<br>Access information.<br>Understand information.<br>Appraise information.<br>Apply information. | Planning and evaluating the results of health interventions. Public administration for synchronization and unification of information. |
| **3** | Patient Readiness to Engage in Health Internet Technology (PRE-HIT) | 2014 | 200 patients with chronic conditions (age 18+) | Health Information Need.<br>Computer/Internet Experience, Expertise.<br>Computer Anxiety.<br>Preferred Mode of Interaction.<br>Relationship with Doctor.<br>Cell Phone Expertise.<br>Internet Privacy Concerns.<br>No News is Good News | Planning and evaluating the results of health interventions. Tool for improving the skills of health professionals. |
| **4** | e-Health Impact Questionnaire (eHIQ) | 2015 | 117 participants in Stage 1 + 102 participants in Stage 2 (age 18+) | Attitudes towards online health information.<br>Attitudes towards sharing health experiences online.<br>Confidence and identification.<br>Information and presentation.<br>Understanding and motivation. | Planning and evaluating the results of health interventions. Tool for improving the skills of health professionals. |
| **5** | Digital Health Literacy Instrument (DHLI) | 2017 | 200 respondents at T1 (age 18-84) + 67 respondents at T2 (age 18-65) | Operational skills.<br>Navigation skills.<br>Information searching.<br>Evaluating reliability.<br>Determining relevance.<br>Adding self-generated content.<br>Protecting privacy. | Planning and evaluating the results of health interventions. Tool for improving the skills of health professionals. |
| **6** | eHealth Literacy Scale in Web 3.0 contest (eHLS-Web 3.0) | 2021 | 1/1421 students (age 20.5 ± 1.4 years), 8 health experts (age 38.3 ± 5.9 years). 2/741students (age 21.3 ± 1.4 years) | Acquisition.<br>Verification.<br>Application.<br>Searching for eHealth information.<br>Communicating with service providers.<br>Building personal health data sets.<br>Self-tracking.<br>Protecting privacy | Planning and evaluating the results of health interventions. Public administration for synchronization and unification of information. Tool for improving the skills of health professionals. |

*Table 3 continuation*

| | | | | | |
|---|---|---|---|---|---|
| **7** | Problem-Based mHealth Literacy Scale (PB-mHLS) | 2022 | 433 responses aged 30 - 60 years | Mobile health needs.<br>Mobile phone operational skills.<br>Acquiring mHealth information.<br>Acquiring mHealth services.<br>Understanding of medical terms.<br>Mobile-based patient–doctor communication.<br>Evaluation of mHealth information.<br>mHealth decision-making. | Planning and evaluating the results of health interventions. Public administration for synchronization and unification of information. Tool for improving the skills of health professionals. |
| **8** | Condition-specific eHealth literacy scale for diabetes (CeHLS-D) | 2022 | 453 people with diabetes aged 56.8 ± 10.8 year | Cognitive actions for internet diabetes information.<br>Abilities of digital communication. | Planning and evaluating the results of health interventions. Tool for improving the skills of health professionals. |

*Source: Own compilation*

Most instruments can be successfully applied in planning and evaluating the results of health interventions and health personnel management as an effective tool for improving the skills of health professionals. Only a few instruments can be successfully applied in public administration for synchronization and unification of cross-country information with an emphasis on the health sector. However, digital finance accelerates the integration of digital financial literacy in the health sector. A set of knowledge about the pension system, insurance system, and medical social support very important area in eHealth Literacy instruments and needs included in Digital Health management.

## CONCLUSION

This is the first systematic literature review that specifically finds measurement instruments of eHealth literacy and estimates the quality of study for DHM. We found eight unique eHealth literacy instruments and conducted an analysis of eHealth literacy dimensions for DHM. This review highlighted that there were more than enough instruments for measuring eHealth literacy. Therefore, well developed instruments could be helpful if appropriately selected based on the goals of DHM.

Study has few limitations. Only three widely used databases were used for the literature search. In addition, the review of articles without reviews of books, letters to the editor, and abstracts of speeches may be insufficient to reflect the results of all research, and some relevant studies may have been removed. Literature containing limited information such as conference abstracts, review protocols, or a note were also excluded. Finally, only English literature was selected during the review process, which may result in an incomplete literature search. Further research expanding the study types excluded would be worthwhile.

For 17 years, along with the development of interactive communication technologies on the Internet, conceptual expansions of eHealth literacy have been required. This has led to the development of a new generation of instruments to measure both the wider (e.g. PRE-HIT, eHIQ, DHLI, eHLS-Web 3.0) and the deeper range of eHealth literacy (CeHLS-D). However, most of

these instruments have been assessed dimensions only for planning and evaluating the results of medical interventions and as an effective tool for improving the skills of health professionals.

In the future, studies will be required to comprehensively and in-depth study eHealth literacy measurement in the area of unification and standardization of eHealth literacy instruments and eHealth literacy skills. Separate attention should be paid to the inclusion of financial literacy subscales in the eHealth instruments for use in DHM. The future of DHM should comprehensively assess the measurement of eHealth literacy when designing or evaluating interventions to understand how and why health interventions can be effective.

## REFERENCES

Amer, F., Hammoud, S., & Khatatbeh, H. (2022). The deployment of balanced scorecard in health care organizations: is it beneficial? A systematic review. *BMC Health Services Research*, 22(65), 2-14. https://doi.org/10.1186/s12913-021-07452-7

Efthymiou, A., Kalaitzaki, A., & Rovithis, M. (2023). Cultural Adaptation of a Health Literacy Toolkit for Healthcare Professionals Working in the Primary Care Setting with Older Adults. *In Healthcare*, 11(5), 1-13. https://doi.org/10.3390/healthcare11050776

Gabani, J., Mazumdar, S., & Suhrcke, M. (2023). The effect of health financing systems on health system outcomes: A cross - country panel analysis. *Health Economics*, 32(3), 574-619. https://doi.org/10.1002/hec.4635

Hargreaves, D., Mates, E., Menon, P., Alderman, H., Devakumar, D., Fawzi, W., & Patton, G. (2022). Strategies and interventions for healthy adolescent growth, nutrition, and development. *The Lancet*, 399(10320), 198-210. https://doi.org/10.1016/S0140-6736(21)01593-2

Huebner, C., & Flessa, S. (2022). Strategic Management in Healthcare: A Call for Long-Term and Systems-Thinking in an Uncertain System. *International journal of environmental research and public health*, 19(14), 1-17. https://doi.org/10.3390/ijerph19148617

Karnoe, A., & Kayser, L. (2015) How is eHealth literacy measured and what do the measurements tell us? A systematic review. *Knowledge Management & E-Learning*, 7(4), 576-600. https://doi.org/10.34105/j.kmel.2015.07.038

Kelly, L., Ziebland, S., & Jenkinson, C. (2015). Measuring the effects of online health information: Scale validation for the e-Health Impact Questionnaire. *Patient education and counseling*, 98(11), 1418–1424. https://doi.org/10.1016/j.pec.2015.06.008

Koopman, R. J., Petroski, G. F., Canfield, S. M., Stuppy, J. A., & Mehr, D. R. (2014). Development of the PRE-HIT instrument: patient readiness to engage in health information technology. *BMC family practice*, 15, 18. https://doi.org/10.1186/1471-2296-15-18

Eun-Hyun Lee, Young Whee Lee, Kwan-Woo Lee, Hae Jin Kim, Seongbin Hong, So Hun Kim & Eun Hee Kang. Development and psychometric evaluation of a new brief scale to measure eHealth literacy in people with type 2 diabetes. *BMC Nurs*, 21, 297 (2022). https://doi.org/10.1186/s12912-022-01062-2

Lee, J., Lee, E. & Chae, D. (2021) eHealth Literacy Instruments: Systematic Review of Measurement Properties. *Journal of medical Internet research*, 23(11), 1-16. https://doi.org/10.2196/30644

Liu, L., Desai, M. M., Fetene, N., Ayehu, T., Nadew, K., & Linnander, E. (2022). District-level health management and health system performance: the Ethiopia primary healthcare transformation initiative. *International Journal of Health Policy and Management*, 11(7), 973. https://doi.org/10.34172%2Fijhpm.2020.236

Liu, H. X., Chow, B. C., Liang, W., Hassel, H., & Huang, Y. W. (2021). Measuring a Broad Spectrum of eHealth Skills in the Web 3.0 Context Using an eHealth Literacy Scale:

Development and Validation Study. *Journal of medical Internet research*, 23(9), 1-19. https://doi.org/10.2196/31627

Lokajova, A., Smahel, D. & Kvardova, N. (2023) Health-related social media use and COVID 19 anxiety in adolescence: health anxiety as covariate and moderator. *Front. Psychol*, 14 (2023). doi: https://doi.org/10.3389/fpsyg.2023.1079730

Lou, N., Montreuil, T., Feldman, L., Fried, G., Lavoie-Tremblay, M., & Bhanji, F. (2021). Evaluations of Healthcare Providers' Perceived Support from Personal, Hospital, and System Resources: Implications for Well-Being and Management from Healthcare in Montreal, Quebec, During COVID-19. *Evaluation & the Health Professions*, 44(3), 319–322. https://doi.org/10.1177/01632787211012742

Norman, C. D., & Skinner, H. A. (2006). eHEALS: The eHealth Literacy Scale. Journal of medical Internet research, 8(4), 1-8. https://doi.org/10.2196/jmir.8.4.e27

Proskurnia, O. (2018). Підвищення ефективності організації підприємницької діяльності з надання реабілітаційних послуг при впровадженні принципів менеджменту якості, *Менеджмент та підприємництво: тренди розвитку*, 2(04), pp 22-32. doi: https://doi.org/10.26661/2522-1566-2018-2/04-03.

Sørensen, K., Van den Broucke, S., Pelikan, J. M., Fullam, J., Doyle, G., Slonska, Z., Kondilis, B., Stoffels, V., Osborne, R. H., Brand, H., & HLS-EU Consortium (2013). Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q). *BMC public health*, 13, 1-10. https://doi.org/10.1186/1471-2458-13-948

Sobolieva-Tereshchenko, O., & Zharnikova, V.(2022). Current state and prospects for the development of Digital financial literacy in Ukraine. VUZF Review 7(2), 205-215. doi:10.38188/2534-9228.22.2.21

Sobolieva-Tereshchenko, O. (2023) *Electronic Health Literacy Scales: A Scoping Review and Comparable Analysis of the Skills and Trends.* [Proceedings of the 11th International scientific and practical conference. MDPC Publishing. Munich, Germany], 222-228. URL: https://sci-conf.com.ua/xi-mizhnarodna-naukovo-praktichna-konferentsiya-scientific-progress-innovations-achievements-and-prospects-23-25-07-2023-myunhen-nimechchina-arhiv/.

Sobolieva-Tereshchenko, O. (2023), Implementation eHealth Literacy Instruments in E-Government. Measurements and Trends. *Efektyvna ekonomika*, 8 (2023), 1-18. https://doi.org/10.32702/2307-2105.2023.8.14

Stellefson, M., Hanik, B., Chaney, B., Chaney, D., Tennant, B., & Chavarria, E. A. (2011). eHealth literacy among college students: a systematic review with implications for eHealth education. *Journal of medical Internet research*, 13(4), e102. https://doi.org/10.2196/jmir.1703

Terwee, C. B., Mokkink, L. B., Knol, D. L., Ostelo, R. W., Bouter, L. M., & de Vet, H. C. (2012). Rating the methodological quality in systematic reviews of studies on measurement properties: a scoring system for the COSMIN checklist. Quality of life research: an international journal of quality-of-life aspects of treatment, care and rehabilitation, 21(4), 651–657. https://doi.org/10.1007/s11136-011-9960-1

Van der Vaart, R., & Drossaert, C. (2017). Development of the Digital Health Literacy Instrument: Measuring a Broad Spectrum of Health 1.0 and Health 2.0 Skills. *Journal of medical Internet research*, 19 (1), e27. https://doi.org/10.2196/jmir.6709

World Health Organization. (2022). *Primary health care measurement framework and indicators: monitoring health systems through a primary health care lens*. Geneva: World Health Organization and the United Nations Children's Fund, Retrieved from https://apps.who.int/iris/bitstream/handle/10665/352201/9789240044234-eng.pdf

Xie, L., Zhang, S., Xin, M., Zhu, M., Lu, W., & Mo, P. K. (2022). Electronic health literacy and health-related outcomes among older adults: A systematic review. Preventive medicine, 157, 106997. https://doi.org/10.1016/j.ypmed.2022.106997

Sobolieva-Tereshchenko, O. & Zhukova, Y. (2023). Application of the eHealth literacy in digital health management. Management and Entrepreneurship: Trends of Development, 3(25), 70-81. https://doi.org/10.26661/2522-1566/2023-3/25-06

Yershov, S. (2018) Конкуренція на ринку медичних послуг України, *Менеджмент та підприємництво: тренди розвитку*, 3(05), pp 33-37. doi: https://doi.org/10.26661/2522-1566/2018-3/05-04.

Zhang, L., & Li, P. (2022). Problem-Based mHealth Literacy Scale (PB-mHLS): Development and Validation. JMIR mHealth and uHealth, 10(4), e31459. https://doi.org/10.2196/31459

## ЗАСТОСУВАННЯ ЕЛЕКТРОННОЇ МЕДИЧНОЇ ГРАМОТНОСТІ В ЦИФРОВОМУ УПРАВЛІННІ ОХОРОНОЮ ЗДОРОВ'Я

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Державна політика України щодо інформатизації системи охорони здоров’я, а також впровадження новітніх інформаційних технологій спрямовані на ліквідацію відставання держави в цій сфері від провідних країн Світу та прискорення входження в інформаційний простір міжнародної спільноти. В сучасних умовах Цифрове Управління Охороною Здоров'я (ЦУОЗ), практичну медицину, медичну освіту та науку про здоров’я неможливо вивести на сучасний рівень без використання теоретичних знань. Дослідження забезпечує концептуальну основу для розвитку та використання електронної грамотності охорони здоров’я в ЦУОЗ, а також платформу для управління електронною охороною здоров’я на національному та міжнародному рівнях. **Метою** цього дослідження є вивчення застосування інструментів електронної грамотності охорони здоров’я для оцінки та впровадження в ЦУОЗ. **Методологія**: у дослідженні використовувався систематичний огляд та аналіз статей, опублікованих (з 2006 по 2022 рік) у PubMed, Web of Science та Scopus. Систематичний огляд проводився відповідно до принципів PRISMA. Для дослідження використовувалася стратегія ручного пошуку. Методологічну якість кожного валідаційного дослідження було оцінено за допомогою контрольного списку COSMIN. **Результати** дослідження показують, що більшість інструментів електронної грамотності охорони здоров’я призначені лише для планування та оцінки результатів медичних втручань і для підвищення кваліфікації медичних працівників. Разом з цим, існуючі інструменти електронної грамотності охорони здоров’я не містять елементів фінансової оцінки інформації про здоров’я, його підтримку та поліпшення, які могли б прискорити інтеграцію цифрової фінансової грамотності в сектор охорони здоров’я. В підсумку, лише вісім якісних досліджень інструментів електронної грамотності охорони здоров’я були визнані прийнятними для оцінки та впровадження в ЦУОЗ.

**Ключові слова:** електронна грамотність охорони здоров'я, цифровізація, електронна охорона здоров'я, управління охороною здоров'я.