

SYSTEMATIC REVIEW

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Health literacy interventions and health literacy-related outcomes for older adults: a systematic review

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Abstract

Background Older adults, identified as 65 years and over, a population for which low health literacy is prevalent, represented most people attending primary health care services provided by the Health Service Executive (HSE) in Ireland in 2019. Any limitation in a person's health literacy, specifically their ability to access, understand and use health information, can affect their ability to make healthcare related decisions. Information on the evidence for health literacy interventions is also required by healthcare providers and policy makers to inform decision-making and service development to improve outcomes for older people. This review aimed to synthesise the evidence on health literacy interventions and health literacy-related outcomes for older adults. The specific objectives were to (1) identify what health literacy interventions exist in relation to older adults' ability to access, understand, and use health information, (2) determine the health literacy-related outcomes of these interventions, and (3) identify any trends or patterns which may exist between intervention type and outcome.

Methods This review was conducted by following PRISMA guidelines. The electronic databases PubMed, Embase and Scopus were searched for relevant studies concerning health literacy interventions for older persons. Study data were subsequently analysed using a narrative thematic approach in the context of the three key health literacy characteristics; the ability to access, understand and use health information.

Results Thirty-four studies were identified that met the inclusion criteria. The findings show a potential link between individual-focussed health literacy interventions and positive health literacy-related outcomes in relation to older persons' ability to understand and use health information. The review also found that use of health literacy level assessment tools varied with studies either using different tools for the same older adult cohort, or failing to assess pre-intervention health literacy levels altogether.

Conclusions The potential trend found between individual-focused interventions and positive health literacy outcomes suggests that implementing health literacy-related interventions directly to the individual is key. Furthermore, our study found an inconsistency amongst the included studies in relation to the implementation of health literacy assessment tools, with different tools used across most studies, and some studies choosing not to utilise any assessment tool.

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Background

Health literacy is defined as the ability of individuals to ‘gain access to, understand and use information in ways which promote and maintain good health’ [1]. Thus, health literacy is a key skill in relation to engaging with health information and services. It is important to acknowledge differing viewpoints and debates concerning the tenets of health literacy, which look beyond the aforementioned three key tenets of accessing, understanding and using information, as identified by the World Health Organisation. It is stated that trust is a key factor which informs and affects health literacy, in particular that health literacy is positively associated with trust in physicians and the healthcare system [2]. Furthermore, an expanded definition of health literacy is proposed that includes gaining patient trust in combination with engaging in health information sharing and education, which could consequently improve care [3]. Health literacy is also seen as interactive, referring to the skills that can be used in everyday social situations to extract health-related information and derive meaning from different forms of health interaction and communication [4, 5]. However, the role of trust, and a deeper analysis of the processes of health literacy in patients, are beyond the scope of this review.

Older adults, identified as 65 years and over, represented most people attending Health Service Executive (HSE) primary care services in 2019, as older persons constituted approximately 57% of public health nurse (PHN) face to face visits, 62% of occupational therapy (OT) face to face visits, and 44% of physiotherapy new referrals [6]. It is stated that low health literacy, specifically a limitation in the ability to access, understand and use health-related information, is prevalent amongst older adults and affects healthcare-related decision-making [7]. Low health literacy can limit a person’s ability to undertake and engage with health-related tasks including reading and following written and oral instructions, navigating the processes involved with accessing healthcare services, and adhering to medical recommendations and advice [7]. Low health literacy in older adults is linked to higher hospitalisation rates, inability to manage chronic disease, and increased mortality [8, 9]. It is also stated that unnecessary healthcare costs for both the patient and the healthcare system can be incurred as a result of inadequate health literacy which contributes to misunderstanding of health information and patient non-compliance [9]. Thus, interventions which aid, develop and promote health literacy in older adults is key for this population, along with healthcare systems and services. Few systematic reviews have been conducted which examine health literacy interventions and health literacy-related outcomes for older persons. The last review undertaken, which focused on older persons and health

literacy-related outcomes of health literacy interventions, was conducted in 2012 [10]. Thus, this review seeks to examine newer studies conducted since 2012. Furthermore, although reviews have previously examined health literacy in relation to older adults, these have either focused on electronic, or digital, health literacy, the comprehensibility of health-related documents, and associated health outcomes [11–13]. To our knowledge, no systematic review has been conducted since 2012 which addresses health literacy interventions with health literacy-related outcomes, rather than health outcomes, for older adults with a focus on non-digital health literacy. Examining health literacy interventions in the context of health literacy-related outcomes is critical to inform healthcare providers and health policy makers in relation to understanding what interventions can be implemented to improve older adults’ ability to access, understand and use health information. Therefore, the aim of this review was to synthesise the evidence on health literacy interventions and health literacy-related outcomes for older adults. This review focuses on health literacy outcomes concerning older adults’ ability to access, understand and use health information. Thus, the outcomes examined by this review are based on and derived from health literacy characteristics as defined by the World Health Organisation.

The specific objectives were to:

- Identify what health literacy interventions exist in relation to older adults’ ability to access, understand, and use health information.
- Determine the health literacy-related outcomes of health literacy interventions for older adults.
- Identify any trends or patterns which may exist between health literacy intervention type and health literacy-related outcomes for older adults.

Measurement of health literacy is conducted using a variety of methods, or tools, including the Short Test of Functional Health Literacy in Adults (STOFHLA), and the Rapid Estimate of Adult Literacy in Medicine–Revised (REALM-R). STOFHLA focuses on patient functional health literacy and reading comprehension by testing patients’ ability to read and interpret health text passages [14]. REALM-R focuses on word recognition and pronunciation [15]. This review will touch on the key measurement tools used in the included studies, with profiles of these tools included in Appendix G.

Methods

This systematic review followed the guidance of, and is reported in accordance with, the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) statement [16]. The PRISMA checklist is

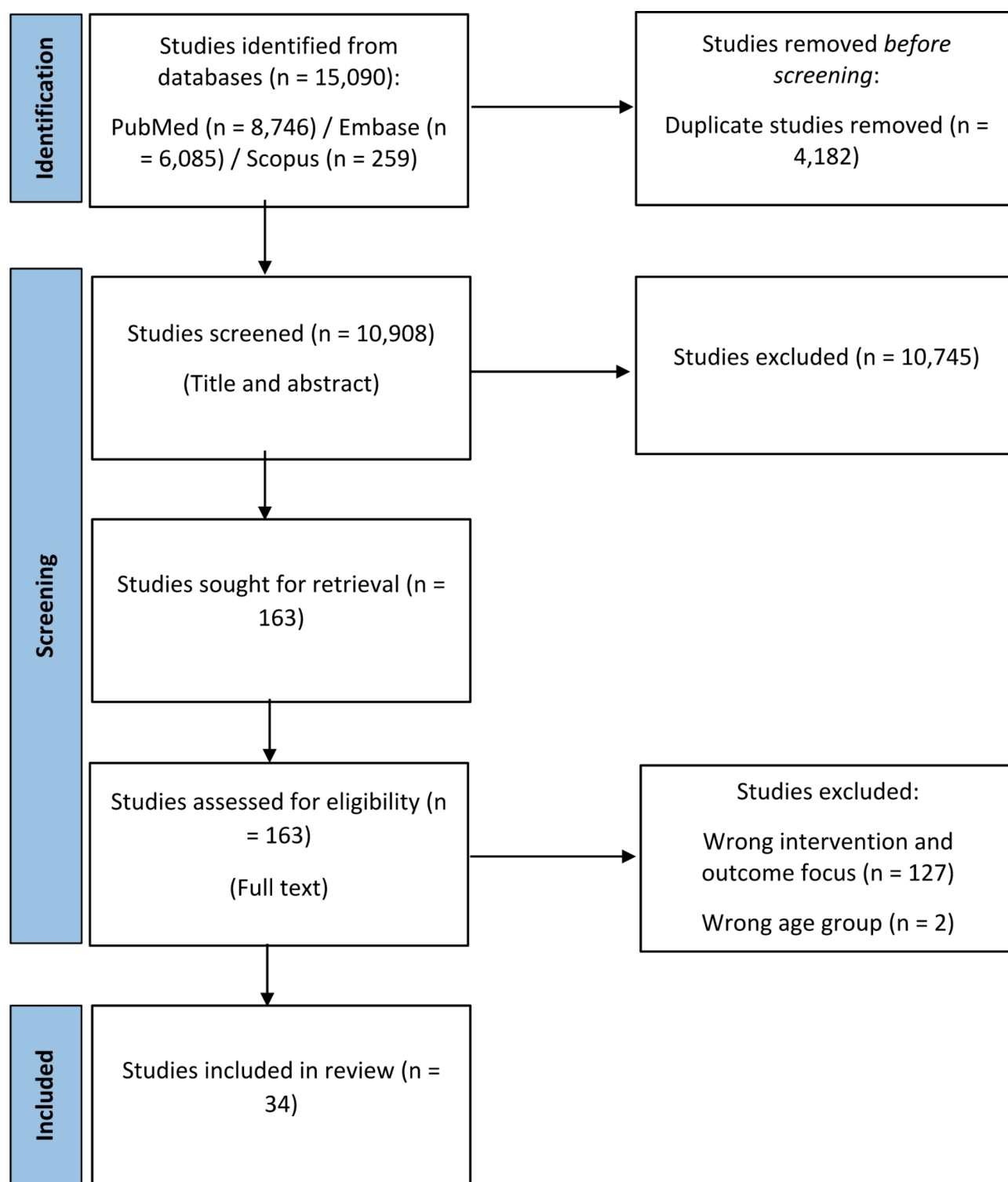


Fig. 1 PRISMA flow diagram of study identification and selection process

presented in Appendix A. A flow diagram which adheres to PRISMA guidelines and explains the literature search process is also included in Fig. 1. This review was not registered, and a protocol was not prepared.

Search strategy

The electronic databases PubMed, Embase and Scopus were searched up to 9th August 2023. The search included studies published in English between 2012 and 2023. The following Medical Subject Headings (MeSH)

search terms were used: health literacy, consumer health information, aging, aged, and frail elderly. These terms were used in combination with the following free text terms: intervention, tool, skills, education, program, programme, older adults, and ageing. This approach was taken to ensure a comprehensive search was conducted. The full search strategy is available in Appendix B. This search strategy was undertaken by the lead author (NM) and cross-checked by a second author (DJ).

Eligibility criteria

The inclusion and exclusion criteria are outlined below using the Population Intervention Outcome (PIO) framework.

Types of population: Studies with older adults aged ≥ 65 years were deemed eligible for inclusion. Studies which targeted younger adults or children were excluded.

Types of interventions: Studies of interventions that targeted one or more of the three key components of health literacy; defined as the ability to (i) access, (ii) understand, and (iii) use health information, were eligible for inclusion. Interventions which addressed older adults with a range of illnesses, along with studies which did not target any specific disease or illness were eligible for inclusion. Interventions which focussed on e-health and digital literacy were excluded.

Types of outcomes: Studies were eligible for inclusion if they focussed on health literacy-related outcomes. This specifically includes data and findings pertaining to interventions which focussed on older adults' ability to (1) access, (2) understand and (3) use health-related information, and any findings in relation to how interventions affected these areas of health literacy for older adults. All results that were compatible with these outcomes in each study were sought. Studies which only addressed specific health outcomes or health behaviour-related outcomes were excluded.

Types of studies: Peer-reviewed publications of primary research in English language were deemed eligible for inclusion in the review. Book chapters, conference papers, reviews, newspaper articles and dissertations were excluded.

Selection of studies and data extraction

All search results were extracted and compiled using reference management software Zotero, and subsequently transferred and merged into a Microsoft Excel worksheet to enable easier screening. Titles and abstracts of studies were then screened manually to exclude any duplications. This was followed with in-depth full text screening to determine the relevance of the remaining studies including in relation to study aim, target study cohort, and health literacy interventions and outcomes. Decision making concerning the aforementioned inclusion criteria

and whether the studies were included in or excluded was conducted via manual screening by one reviewer (NM). The author worked independently to screen each record and retrieve each report. The following information was extracted from the included studies: population/health topic, health literacy assessment measure, intervention type, intervention characteristics, and health literacy-related outcomes (see Appendix C). Data were extracted independently by one reviewer (NM) and cross-checked by two reviewers (MB & VL). Any differences of opinion or disagreements which occurred concerning this process, including in relation to relevance, validity or quality of data, were discussed democratically whilst reviewing the data in question until a unanimous decision was reached.

Data synthesis

A narrative thematic data synthesis approach was undertaken. This was due to the high level of heterogeneity within the included studies, particularly in the context of the diversity of intervention type and characteristics, which impeded the ability to perform quantitative analysis. Firstly, analysis was conducted to identify health literacy intervention characteristics and approaches, including intervention duration, frequency, materials used, actors involved, and whether the intervention was face to face or group-based, in-person or online. Subsequently, data were analysed in the context of broad health literacy outcomes achieved by the interventions. Finally, a deeper synthesis and analysis was conducted in relation to health literacy outcomes of interventions in the context of the three key themes or components; accessing, understanding and using health-related information. Data were analysed in the context of each theme, along with intervention characteristics, to determine any potential patterns or trends between intervention, health literacy component, and outcome.

Quality appraisal

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) tool was used to assess the certainty of evidence provided by the included studies [17]. Risk of bias, inconsistency, indirectness, imprecision, and publication bias were all assessed manually using GRADE. The GRADE appraisal tool is predominantly used for assessing quantitative studies, and may therefore be biased against qualitative study designs. However, the authors feel that the tool still remains the most appropriate way in which to assess the diverse range of study designs included in this review. The GRADE assessment, including risk of bias, was undertaken by two authors independently (NM & DJ) and assessments compared.

Results

This section firstly provides an overview of the characteristics of the studies included in the review. The section subsequently provides an outline of the health literacy assessment tools used in the included reviews, followed by the results of the evidence appraisal process. Furthermore, this section examines the characteristics of the health literacy interventions used, followed by the health literacy outcomes of the included interventions. Finally, the section provides a deeper analysis of patient health literacy outcomes in the context of the three key health literacy components; accessing, understanding and using health information. Thus, this results section provides an examination of the characteristics of included reviews, followed by the interventions utilised, and the health literacy outcomes achieved. The section provides a deep synthesis and analysis concerning how interventions addressed and interlinked with the health literacy tenets; patients' ability to access, understand, and use health-related information.

Database searches yielded 15,090 results, with 10,908 results remaining after duplicates were removed. Following title and abstract screening 163 reports remained for full text screening. At this stage, a further 129 studies were excluded due to wrong intervention, outcome, and population group. Therefore, 34 studies were included in this review (see Fig. 1).

Characteristics of included studies

Characteristics of included studies are summarised in Appendices C & D. In total, 5,370 participants were included. All studies were published between 2012 and 2023. Studies originated from the United States ($n=13$) [18–30], Hong Kong ($n=4$) [31–34], Canada ($n=3$) [35–37], Brazil ($n=2$) [38, 39], Taiwan ($n=2$) [40, 41], Australia ($n=2$) [42, 43], and one each from Iran [44], Thailand [45], Japan [46], China [47], Singapore [48], Egypt [49], Sweden [50], and the Netherlands [51].

Eleven studies included older adults aged ≥ 65 years [19, 20, 23, 33, 35–39, 43, 46, 50], eight studies included participants aged ≥ 60 [31, 32, 39, 44, 45, 47–49], seven studies included those aged ≥ 55 [18, 26–30, 51], and four studies included people aged ≥ 50 [21, 24, 34, 41]. Four studies did not provide age criteria information, but stated that older persons were the target cohort whilst providing a mean age of participants [22, 25, 40, 42]. It is clear that the definition of older persons is ambiguous in relation to defining a starting age for this population group. Studies varied concerning criteria for the minimum age for older persons, as can be seen above, with the lowest minimum age determined as 50, and the highest minimum age identified as 65.

Eleven studies were disease or condition-specific and focused on colorectal cancer ($n=2$) [24, 51],

complementary medicines ($n=2$) [29, 43], hypertension ($n=1$) [22], diabetes ($n=1$) [34], diabetes and hypertension ($n=1$) [49], heart failure ($n=1$) [21], chronic kidney disease ($n=1$) [45], fall prevention for people with low vision ($n=1$) [20], and advance care planning / end of life care ($n=1$) [31]. A further 12 studies specifically focused on medication information [19, 25–27, 30, 32, 33, 35–37, 48, 50], one study addressed discharge instructions [23], and one study examined post-discharge recommendations [42]. Nine studies were not disease or condition-specific and focussed on general health literacy information [18, 28, 38–41, 44, 46, 47].

In relation to three components of health literacy, specifically accessing, understanding, and using health information, 16 studies examined participant understanding of health information [22–27, 30, 33, 35–37, 42, 48–51], 13 studies focused on all three components of health literacy [18, 21, 28, 29, 32, 34, 38, 39, 41, 43, 45–47], four studies addressed accessing and understanding information [19, 20, 31, 44], and one study analysed participants' ability to understand and use information [40].

Health literacy assessment tools

Different health literacy assessment tools were used across the included studies. The Short Test of Functional Health Literacy in Adults (STOFHLA) was the most popular health literacy framework as this assessment tool was used in five studies. Twelve different methods were used across 18 of the included studies, and the remaining 16 studies did not use a health literacy measurement tool (see Appendix Table 2). The most commonly used tools after the STOFHLA were the Rapid Estimate in Adult Literacy in Medicine– Revised (REALM-R) ($n=2$), the Health Literacy Scale for Japanese Adults (HLS-14) ($n=2$), the Modified LaRue Tool (MLT) ($n=2$), and the Newest Vital Sign (NVS) ($n=2$). The 16 studies which did not use a health literacy assessment tool therefore implemented a health literacy intervention without first determining the health literacy level of participants. The inclusion of a health literacy assessment into these studies would provide key information regarding the base level of health literacy prior to intervention, which in turn would better inform the results of the intervention.

An overview of the most commonly used assessment tools is included in Appendix G, in addition to the key characteristics of tools which were used by two or more studies.

Certainty of evidence

Fifteen studies were randomised controlled trials (RCT) [21, 24–26, 30, 31, 33, 34, 42, 43, 46–48, 50, 51] and 19 studies were classed as non-RCT [18–20, 22, 23, 27–29, 32, 35–41, 44, 45, 49]. Due to the heterogeneity of the included study designs, the authors feel that any

further examination of study design would not benefit the review. The GRADE assessment determined that the overall certainty of evidence was very low due to small sample size, sampling bias due to convenience sampling, or no sampling information provided, lack of a control group, and certain trials being either single-blind or not blinded. Only one study out of the 34 included studies did not contain a small sample size [48], whilst 22 studies presented sampling bias [20, 23, 25–31, 33, 34, 36, 37, 39, 41–46, 49, 50], ten studies lacked a control group [18, 20, 27, 29, 35, 37–40, 45], three studies were single blind [46, 47, 50], and one was not blinded [28]. Furthermore, 21 studies did not fully answer the review question as these studies did not address all health literacy elements, specifically accessing, understanding and using health information [19, 20, 22–27, 30, 31, 33, 35–37, 40, 42, 44, 48–51]. Results of the quality appraisal are presented in Table 3 in Appendix E.

Studies were individually assessed for risk of bias, indirectness, and imprecision. Evidence certainty was determined to be very low for 26 studies [18, 20, 23, 25–31, 33–46, 49, 50], low for five studies [19, 24, 32, 47, 51], and moderate for three studies [21, 22, 48]. Subsequently, studies were grouped by outcome and assessed for inconsistency and publication bias. After combining these quality assessments, the collective evidence certainty for each of the four outcome groups was determined to be very low. Although inconsistency relating to health literacy assessment was noted across studies and in some cases lack of health literacy assessment, studies were not downgraded in certainty as this factor was not identified as a potential issue by GRADE, and any effect on certainty is difficult to gauge.

Health literacy interventions for older adults

Most studies ($n=22/34$) were researcher-led in relation to implementing the intervention [18–20, 22–24, 26–29, 32–36, 38, 43, 47–51]. Four studies were pharmacist-led [21, 25, 30, 37], three were nurse-led [31, 39, 45], two were led by trained intervention providers and instructors [40, 41], two were doctor-led [42, 44], and one intervention was led by a physical therapist and physical education teacher [46].

Most studies ($n=22/34$) favoured an individual-based intervention approach [19, 21–27, 30, 32–38, 42, 43, 47, 48, 50, 51], whilst 12 studies conducted group-based interventions [18, 20, 28, 29, 31, 39–41, 44–46, 49].

A range of different intervention delivery formats were utilised including face to face information, teaching and/or reading sessions (with or without tests) ($n=15$) [20, 21, 23, 24, 27, 30, 33, 35–38, 42, 45, 47, 48], face to face educational workshops ($n=9$) [18, 26, 29, 31, 39, 41, 44, 46, 49], computer or web-based information delivery and/or tests ($n=5$) [19, 22, 43, 50, 51], a gamification

(board game) programme ($n=1$) [40], audio information recording ($n=1$) [25], home visits ($n=1$) [32], a comic book ($n=1$) [34], and a two-intervention (one per group) approach consisting of in-person lectures and remote computer-based lessons ($n=1$) [28].

The most frequently used approach was a single face to face information, teaching and/or reading session which was utilised by nine studies [21, 23, 27, 30, 31, 36, 38, 42, 48]. This was followed by a single or one-off intervention in the form of a test ($n=7$) [22, 24, 26, 32, 33, 35, 37]. Aside from once-off interventions, the most used intervention was a 12 by weekly workshop (2 h) format which was utilised by two studies [41, 44]. All other studies used their own unique intervention frequency (see Appendix D).

The materials used in conjunction with interventions were also varied. The most used materials consisted of printed educational information handouts or instructions, which were utilised by 15 studies [18, 20, 21, 23, 24, 26, 27, 29, 30, 36, 38, 39, 42, 43, 49]. Six studies used, or required participants to make use of, computers in relation to the intervention [19, 22, 28, 31, 50, 51]. Three studies utilised printed postcards, posters and photos [37, 40, 44], whilst other studies used medication boxes and labels ($n=2$) [33, 48], comic books (with or without a pamphlet) ($n=2$) [32, 34], pictogram cards ($n=1$) [35], printed questionnaires ($n=1$) [45], an electronic audio recording device ($n=1$) [25], and a combination of printed brochures and questionnaires ($n=1$) [47]. No materials were specified in two studies [41, 46].

Health literacy outcomes

The World Health Organisation (WHO) defines the characteristics of health literacy as the ability of people to access, understand, and use health information [1]. The focus of this review aligns with these characteristics by examining health literacy-related outcomes in the form of the ability to access, understand and use health information in the context of health literacy interventions for older adults. Included studies reported health literacy-related outcomes in relation to accessing, understanding, and using health information, with studies either examining these elements in isolation, or in combination to address a more comprehensive assessment of health literacy levels and outcomes. Twelve studies reported improved understanding of information [21–26, 33, 36, 37, 42, 48, 49, 51]. Ten studies reported improvements in accessing, understanding and using health information [29, 32, 34, 39, 41, 43–47]. Five studies stated improvements in participants' ability to understand and use health information [21, 27, 30, 40, 50], and three studies reported improvements in relation to accessing and understanding information [19, 20, 31]. One study reported improved access to and use of information

[18]. However, the above studies, and consequently their results, lack robustness due to small sample sizes, sampling bias, lack of a control group and lack of double-blinding, as analysed in the evidence quality assessment. Only two studies claimed no difference or improvement in health literacy score [28, 38], whilst one study just stated that the pictograms utilised in the intervention were not well understood [35]. No studies examined the ability to access health information as an outcome in isolation. This was also the case in relation to using information.

Synthesis was conducted by outcome as defined by the previously outlined key inclusion criteria in the form of the elements of health literacy addressed by each study. The included studies were categorised by outcome using colour coding to identify the outcomes(s) addressed by each individual study (see Appendix F). This categorisation consequently formed the basis for the data analysis and discussion.

Studies focusing on accessing, understanding, and using health information

A range of intervention types contributed to improvements in older adults' ability to access health information. Intervention types included group educational and discussion workshops, individual computer-based medication label tests, an individual pharmacist-patient discussion, and an individual comic book reading and test. Outcomes and improvements were seen in the form of general improved ability to find and access a range of different health information ($n=7$) [18, 29, 39, 41, 44, 45, 47], improved access which consequently led to improved medication adherence ($n=1$) [21], and more specifically, improved capacity to access medication label information ($n=3$) [19, 32, 34]. A secondary outcome can be seen in relation to the pharmacist-patient discussion intervention as this led to improved medication adherence in addition to the initial primary outcome concerning improved ability to access health information [21]. This indicates a positive relationship between pharmacist-patient discussion and medication adherence and accessing health information.

This review found positive outcomes concerning improved understanding of health information. Interventions included an individual pre-discharge teaching session and discussion, a computer-based revised health passage test, talking pill bottles with 60 s audio medication instructions, a redesigned prescription label comprehension survey, a pictogram comprehension assessment, picture icons and dosing instructions with a teach back exercise, and an educational brochure and test. These yielded improvements in relation to improved patient discharge-related information comprehension ($n=2$) [23, 42], medication knowledge and understanding ($n=6$) [19,

25, 26, 30, 32, 50], knowledge acquisition ($n=4$) [36, 37, 40, 46], medication purpose and dosing comprehension ($n=1$) [27], and fall prevention information and strategies comprehension ($n=1$) [20]. One intervention, a group-based information session and educational booklet, also contributed to a secondary outcome in the form of improved medication adherence [49]. Another secondary outcome was derived from a group-based educational talk which provided a primary health literacy-related outcome concerning improved Advance Care Planning (ACP)-related knowledge and understanding [31]. In turn, this facilitated a decrease in decisional conflicts [31].

These interventions show improved comprehension across a variety of different types of health information.

Interventions which improved older adult's ability to use or apply health information included group educational workshops concerning communication with healthcare providers, group decision-making and communication activity sessions, a health promotion game session, individual educational comic book reading, and community-based participatory workshops. Outcomes included an improved ability to use health information to engage with healthcare professionals and navigate health services ($n=2$) [18, 39], along with improved application of health information in relation to cooking, oral health and physical exercise ($n=1$) [40], and taking and storing medications ($n=2$) [32, 39]. Community-based participatory workshops also contributed to health-related empowerment, indicating that this particular intervention contributes to a secondary outcome in the form of empowerment in addition to the primary outcome concerning the ability to use health information [41]. Therefore, interventions across the included studies show improvement in relation to using and applying health information for a wide scope of health and wellbeing topics and applications.

The majority of studies showed improvements in participants' health literacy levels ($n=31$) [18–27, 29–34, 36, 37, 39–51]. The three studies which did not show any health literacy-related improvement utilised an individual pictogram comprehension test ($n=1$) [35], an individual focused 20 min information and guidance session, ($n=1$) [38], and a group 8 x weekly 90 min in-person lecture/discussion vs. a remote 8 x weekly 1 h 30 min online lesson ($n=1$) [28]. A potential trend exists between individual-focussed health literacy interventions and health literacy improvements concerning participants' ability to understand and use health information. However, no further trend could be identified in relation to other content or characteristics of these interventions.

Therefore, although improvements can be correlated with individual-focussed interventions, any health literacy-related outcomes and improvements were achieved

regardless of other intervention characteristics including; whether a study implemented a face-to-face workshop, teaching sessions or online lessons, or whether the intervention was researcher, nurse, pharmacist, or physician-led.

Studies which identified improvements in all three elements of health literacy showed a variation in relation to approaches as 6 studies adopted a group intervention approach [29, 39, 41, 44–46], whilst 4 studies involved individual focused interventions [32, 34, 43, 47]. Furthermore, although half of the studies in this group which yielded improvements were researcher-led ($n=5$) [29, 32, 34, 43, 47], different actors also led interventions with 2 nurse-led [39, 45], 1 led by an intervention provider [41], 1 by a healthcare practitioner [44], and 1 by a physical therapist and physical education teacher [46]. However, regardless of intervention leader type or whether the intervention approach was group or individual-based, all studies noted improvements in accessing, understanding and using health information.

Contrastingly, the majority (11/12) of studies which showed improvements solely in relation to understanding health information conducted individual-focussed intervention approaches [22–26, 33, 36, 37, 42, 48, 51], whilst one study indicated improvement whilst using a group approach [49]. This shows a trend between an individual-focussed intervention approach and improvement of a person's ability to understand health information. Although the majority of these studies were researcher-led ($n=9$) [22–24, 26, 33, 36, 48, 49, 51], 2 studies were pharmacist-led [25, 37], and 1 was led by a healthcare practitioner [42]. Of those studies which showed improvements concerning accessing and understanding health information (3/4), 2 studies were group focused [20, 31], with 1 implementing an individual-focused intervention [19]. These studies were led by researchers ($n=2$) [19, 20], and a nurse ($n=1$) [31]. All studies identified improvements. Studies which showed improvements in participants' ability to understand and use health information ($n=5$) [21, 27, 30, 40, 50] indicate a trend between intervention approach and the aforementioned health literacy outcome as the majority of studies (4/5) involved implementation of an individual-based intervention [21, 27, 30, 50], whilst 1 study involved a group-based intervention [40]. These studies were led by researchers ($n=2$) [27, 50], pharmacists ($n=2$) [21, 30], and a trained program game instructor ($n=1$) [40]. Thus, a trend is identified between the implementation of an individual-focussed intervention approach and improvement in relation to a person's ability to understand and use health information. Therefore, this review identifies a trend between the implementation of individual-focussed health literacy interventions and an improved ability to understand and/or use health information. However, no

distinct pattern can be identified concerning intervention leader and health literacy intervention outcomes in relation to accessing, understanding and using health information.

A range of health literacy intervention strategies were utilised across the studies examined, including face to face information, teaching and/or reading sessions (with or without tests) ($n=15$) [20, 21, 23, 24, 26, 27, 30, 33, 35–38, 42, 47, 48], face to face educational workshops ($n=9$) [18, 29, 31, 39, 41, 44–46, 49], computer or web-based information delivery and/or tests ($n=5$) [19, 22, 43, 50, 51], a gamification (board game) programme ($n=1$) [40], audio information recording ($n=1$) [25], home visits ($n=1$) [32], a comic book ($n=1$) [34], and a two-intervention (one per group) approach consisting of in-person lectures and remote computer-based lessons ($n=1$) [28]. This data are displayed in Appendix D.

Discussion

This review contributes knowledge concerning health literacy interventions implemented and health literacy-related outcomes achieved for older adults. The review uncovers an inconsistency in relation to pre-study health literacy assessments and the variety of tools used along with a lack of utilising health literacy assessment tools prior to intervention. It is essential that the correct type of assessment tool is used for the intended purpose of the study, and the style of administration, purpose for measure, and availability of time and resources should all be considered when selecting a health literacy assessment tool [52].

Existing research shows that there is need for a standardized, validated clinical health literacy screening tool for older adults in order to improve health literacy assessment consistency and accuracy [53]. Inconsistencies in type or presence of health literacy assessment tools, for example studies using different types of assessment tool across the same type of study cohort to assess the same component of health literacy, can create an uneven baseline in relation to indicating and understanding patient health literacy levels prior to intervention. This was the case with the included studies which used different assessment tools for the same cohort type, older adults, to assess the same health literacy component, whether this be accessing, understanding or using health information. Thus, this review concurs with the aforementioned study [53] in relation to the importance of, and need for, a standardized health literacy assessment tool. Finally, the lack of a standardized assessment tool, or the lack of any assessment tool, as is the case with the included studies, can result in uncertainty in relation to the study findings which, in turn, can affect the analysis provided in this review.

In relation to the health literacy interventions implemented, different intervention types (for example educational workshops, patient-physician discussions, text reading exercises, game-based sessions) produced the same positive results across studies concerning improved accessing, understanding and use of health information. It was found that a positive relationship and trend existed between individual-focused interventions and health literacy outcomes concerning improved understanding and using of health information. This relationship contrasts with a review which states that the type of intervention, for example group, individual or community based approach, is not of major importance [53]. This trend is significant as it identifies a consistent trend for positive health literacy-related outcomes, and is also important from the perspective of participant power as individuals may feel more comfortable and be more inclined to raise questions and queries in an individual situation. However, implementing this approach as a broad template across health services could be problematic due to a lack of researcher and practitioner time in which to conduct individual interventions, along with cost implications. Nevertheless, this individual-focused approach is identified as a potential basis for health literacy intervention design when aiming to achieve positive outcomes relating to understanding and using health information.

In addition, this review concurs with existing research which acknowledges the importance of involving the community pharmacy in conducting health literacy interventions, particularly concerning medication adherence [52, 54]. This review found that pharmacist-patient discussion intervention led to improved medication adherence in addition to an initial primary outcome concerning improved ability to access health information [21]. This indicates a positive relationship between pharmacist-patient discussion and medication adherence and accessing health information. These findings suggest that engaging community pharmacists in the conducting of health literacy interventions with older adults in local communities could improve health literacy in older adults. The findings also interlink and concur with a study which examines pharmacists' perspectives on health literacy interventions, and which identifies a willingness of pharmacists to use interventions including medication-related teach-back, which was described as useable with patients of all ages and not time consuming [55]. This review also finds that practitioner-patient discussions and education sessions are effective in improving health literacy in the form of comprehension, adherence, and knowledge in older adults [21, 23, 29, 31, 39, 44, 46, 47, 49]. A further study highlights the importance of multi-pronged pharmacy-based health literacy interventions which incorporate clear health communication discussion along with picture prescription cards and reminder

telephone calls in order to improve health literacy [54]. Thus, local pharmacist-implemented, multi-pronged interventions which incorporate an individual patient-pharmacist educational discussion session, a medication-related teach-back exercise, prescription picture cards, and reminder telephone calls, could provide a template with which to improve health literacy in older adults.

Although a previous review found that the development of culturally relevant health literacy programs for older adults is needed and that health literacy skills are intrinsically connected with health outcomes, that review did not examine potential optimal approaches to health literacy interventions or any patterns which may exist between intervention type and outcomes [10]. This review updates and furthers the work undertaken in 2012 by Manafo and Wong, and offers a different perspective by examining health literacy interventions and health literacy-related outcomes using a narrative thematic analysis, in the context of the three key characteristics of health literacy. Furthermore, this review finds an interlinkage not addressed by previous reviews; the positive relationship between individual-focussed interventions and the ability to understand and use health information. These findings provide an insight in relation to the effectiveness of the individual-focussed health literacy interventions approach and how this could be the optimal strategy in relation to achieving improved health literacy levels in older adults. Practical implications can be drawn from this review as these findings concerning the positive relationship contribute to debates surrounding how best to engage patients with health literacy interventions and achieve positive health literacy-related outcomes. These findings can also inform healthcare service policy in this context.

Strengths and limitations

This review provides an insight into previous research concerning the health literacy interventions which exist for older adults, along with what health literacy-related outcomes are targeted and achieved. This review shows that a trend can be identified between individual-based health literacy interventions and positive outcomes relating to understanding and using health information for the older adult population. This study also unpacks the use of health literacy assessment tools in conjunction with health literacy interventions for older adults, and finds an inconsistency relating to the type of tool used, or indeed if an assessment tool is used at all.

In terms of limitations of the study, it was not possible to conduct meta-analyses using data from existing studies due to heterogeneity amongst studies and insufficient quantitative data available for analysis. Thus, this review relied on a narrative reporting of qualitative interpretation and analysis of intervention approaches and

outcomes. In addition, the quality of the evidence from the included studies is predominantly low or very low, which limits generalizability. Furthermore, the argument put forward in this review concerning the positive relationship between individual-focussed interventions and health literacy outcomes is subjective due to the nature of the qualitative narrative thematic analysis method chosen, and the lack of statistical analysis of the included studies. The review was also unable to provide a comprehensive analysis of the sample populations due to the aforementioned sample diversity.

Future research

The included studies varied widely in relation to their assessment of health literacy, as a variety of different assessment methods and tools were used. The creation of a standardised health literacy assessment tool would facilitate a reliable and consistent way in which to measure and examine older adults' health literacy. Further studies could also examine the characteristics of health literacy assessment tools, including identification of any comparable criteria or methods used by these tools, with the aim of identifying or devising the optimum assessment tool for implementation in older persons' health literacy assessment.

Conclusions

This systematic review addressed a main aim which was to synthesise the evidence on health literacy interventions and health literacy-related outcomes for older adults. The review also addressed the following key objectives; (1) to identify what health literacy interventions exist in relation to older adults' ability to access, understand, and use health information; (2) to determine the health literacy-related outcomes of health literacy interventions for older adults; and (3) to identify any trends or patterns which may exist between health literacy intervention type and health literacy-related outcomes for older adults. The review found that health literacy interventions conducted by different actors including researchers, nurses, pharmacists and physicians, and which utilised methods or strategies including face to face workshops, online education and assessments, discussions, questionnaires, and pictograms, amongst individual and group settings, all achieved improvements in the three key elements of health literacy for older adults; accessing, understanding, and using health information. It is also found that a potential pattern exists between individual-focussed health literacy interventions and health literacy improvements concerning participants' ability to understand and use health information. Aside from these trends, any notion that one particular type of health literacy intervention works better than others to improve accessing, understanding and using health

information for older adults cannot be substantiated as different intervention strategies and characteristics, conducted by different actors in different settings, are seen to yield improvements.

However, not all studies assessed these elements in combination, with some focussing on one or two of the three elements. Furthermore, research examining health literacy interventions and outcomes should include generalizable and consistent approaches. Studies should address all three health literacy elements, use the same or similar health literacy assessment frameworks, include a control group, gain a larger sample size and implement true random sampling, along with blinding. This would consequently provide robust, reliable data concerning how and which health literacy interventions can aid and improve older adults' ability to access, understand and use health information.

This review also found that use of health literacy assessment tools to assess older adult's health literacy levels is inconsistent across the included studies, with multiple different types of tools used across the 34 studies, and 16 studies not using an assessment tool. Tools used consisted of different characteristics and scoring systems. Whilst it is important to use the correct assessment tool for the intervention purpose, consistency of pre-intervention health literacy assessments is needed when examining the same cohort and health literacy-related outcome.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-025-12457-7>.

Supplementary Material 1. [56-60].

Patient and public involvement statement

Patients and the public were not involved with the creation of this systematic review.

Summary box

What is already known on this topic: Low health literacy is prevalent amongst older adults and affects healthcare-related decision-making, whilst also contributing to higher hospitalisation rates, an inability to manage chronic disease, and increased mortality. In turn, low health literacy can also contribute to unnecessary costs for the healthcare system. There is a need to review the evidence for health literacy interventions to inform decision-making and service development to improve outcomes for older people.

Authors' contributions

NM, MB, VL, CT, and AW participated in the planning and design of this work. This work was conducted and reported by NM, MB, VL, and DJ. NM and MB are guarantors for this work. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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Data availability

The datasets used and/or analysed during this study are included in this published article (and its supplementary information files).

Declarations

Ethics approval and consent to participate

An ethics approval was not required for this systematic review.

Consent for publication

Not applicable - manuscript does not include data from any individual person.

Competing interests

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