THE EFFECTIVENESS OF PATIENT EDUCATION INTERVENTIONS DELIVERED BY NURSES FOR IMPROVING HEALTH LITERACY IN CHRONIC DISEASE MANAGEMENT: A SYSTEMATIC REVIEW

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Abstract

Background: Low health literacy is common among people with chronic diseases and is associated with poorer self-management, higher hospitalization rates, and worse clinical outcomes. Nurses frequently deliver patient education and play a central role in chronic disease management, but the effectiveness of nurse-delivered education to improve health literacy across chronic conditions has not been synthesized comprehensively. **Aim:** To systematically review and synthesize evidence on the effectiveness of patient education interventions delivered by nurses for improving health literacy and related self-management outcomes in adults with chronic diseases. **Methods:** Systematic search of major databases (MEDLINE, CINAHL, Embase, Cochrane Library, and gray literature) from inception to [search date], selecting randomized controlled trials (RCTs), quasi-experimental studies and controlled before–after designs that evaluated nurse-delivered educational interventions for adults (≥18 years) with chronic disease and reported validated health literacy or related outcomes. Two reviewers independently screened, extracted data, and assessed risk of bias. Where appropriate, results were pooled using random-effects meta-analysis; heterogeneity and sensitivity analyses were conducted. **Results:** Across included studies (n = XX; total N = XXXX), nurse-delivered education was associated with small to moderate improvements in functional health literacy measures and meaningful improvements in disease-specific knowledge and self-management behaviors. Effect sizes varied by intervention intensity, use of teach-back and tailored materials, and baseline literacy levels. Several trials reported improved intermediate clinical outcomes (e.g., blood pressure, HbA1c) when education was combined with follow-up support. Study quality ranged from low to moderate; heterogeneity and variable outcome measures limited pooled estimates. **Conclusions:** Nurse-delivered patient

education can improve health literacy and self-management in chronic disease populations, particularly when interventions are tailored, use teach-back, and include follow-up. High-quality RCTs using standardized health literacy instruments and longer follow-up are needed to confirm effects on hard clinical outcomes and healthcare utilization.

Keywords: health literacy; nurse-delivered education; patient education; chronic disease management; teach-back; self-management.

I. Introduction

Health literacy, defined as the cognitive and social skills that determine an individual's motivation and ability to access, understand, appraise, and use health information, is recognized as a critical determinant of health outcomes, particularly for individuals living with chronic conditions who must perform complex self-management tasks. Low health literacy is strongly associated with poorer disease knowledge, reduced adherence to medication and lifestyle advice, increased hospitalization and emergency care use, and, in some contexts, higher mortality (Kickbusch et al., 2013; Berkman et al., 2011). Because chronic diseases such as diabetes, cardiovascular disease, and chronic respiratory illnesses require sustained self-management, medication adherence, symptom monitoring, lifestyle modifications, and navigation of healthcare systems, enhancing health literacy is essential for achieving effective long-term disease control and preventing complications (Nutbeam, 2000).

Nurses occupy a unique and central role in improving health literacy because they frequently provide patient education in inpatient, outpatient, and community care. Nurse-led education typically includes explanations of disease processes, treatment regimens, symptom monitoring, and lifestyle modifications. It often involves demonstrations, reinforcement of key messages, and coordination of follow-up care. Such education can be delivered through various formats including face-to-face sessions, group teaching, home visits, and telehealth modalities. Several studies indicate that structured nurse-led educational interventions can significantly improve patient adherence, self-management skills, and even intermediate clinical outcomes in chronic disease management (Berardinelli et al., 2024; Tao et al., 2023).

There are several mechanisms through which nurse-delivered education enhances health literacy. First, nurses can tailor health information to patients' literacy levels, cultural contexts, and individual needs. Second, the use of interactive teaching strategies such as teach-back, demonstrations, and motivational interviewing has been shown to improve comprehension and retention of health information. Third, nurses often provide repeated contacts and follow-up, which reinforces learning and supports behavior change. These mechanisms explain why interventions incorporating tailored information, active learning, and reinforcement tend to be more effective than brief or unstructured approaches (Berkman et al., 2011).

Conceptually, health literacy can be understood in terms of three domains: functional health literacy, which refers to basic reading and writing skills for everyday health tasks; communicative or interactive literacy, which involves more advanced skills for interpreting and applying health information; and critical health literacy, which encompasses higher-order skills for critically appraising information and engaging in shared decision-making (Nutbeam, 2000).

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Interventions can be designed to target one or more of these domains, and effectiveness should ideally be measured using validated instruments that capture the intended outcomes (Urstad et al., 2022).

While comprehensive reviews have evaluated health literacy interventions broadly, they often include heterogeneous provider groups and lack a focused synthesis on nurse-delivered education specifically. Evidence from individual trials and emerging systematic reviews suggests that nurse-led strategies are promising, but effects vary depending on intervention characteristics such as intensity, use of teach-back, cultural tailoring, and follow-up support (Berardinelli et al., 2024; Tao et al., 2023; Shao et al., 2023). This gap highlights the importance of a systematic review concentrating solely on nurse-delivered education and its direct impact on validated measures of health literacy, as well as related outcomes such as self-efficacy, self-management behaviors, and clinical indicators.

Rationale

The rationale for conducting this systematic review rests on the intersection of global health priorities and practical clinical considerations. Chronic diseases such as diabetes, hypertension, heart failure, and chronic obstructive pulmonary disease are leading causes of disability and mortality worldwide and account for the majority of health expenditures in both high- and low-resource settings (World Health Organization, 2013). Effective management of these diseases requires patients to take on extensive self-care responsibilities, including monitoring symptoms, adhering to complex medication regimens, making lifestyle changes, and navigating healthcare systems. Such responsibilities are especially challenging for patients with limited health literacy, who often struggle to comprehend health information, interpret prescriptions, or evaluate treatment choices (Berkman et al., 2011). This mismatch between the complexity of care and the patient's ability to process health information contributes to health disparities, poorer outcomes, and avoidable healthcare utilization.

Nurses, as consistent and accessible providers of patient education, are uniquely positioned to bridge this gap. They interact with patients across the care continuum, from hospital discharge planning to community follow-up, and have the opportunity to reinforce information and provide culturally sensitive, individualized education. Unlike one-time interventions, nurse-delivered education often occurs iteratively, allowing for the use of interactive techniques such as teach-back, which ensures comprehension, and motivational interviewing, which fosters self-efficacy and readiness to change (Ha Dinh et al., 2016). Moreover, nurse-led programs are scalable: in many healthcare systems, nurses represent the largest segment of the workforce, making them essential in reaching diverse populations at risk of low health literacy.

Despite the growing emphasis on health literacy as a determinant of chronic disease outcomes, previous reviews have typically evaluated mixed interventions delivered by multiple health professionals without disaggregating the unique contribution of nurses. Given that nursing practice emphasizes patient education and empowerment, a focused synthesis is needed to establish the effectiveness of nurse-delivered interventions specifically. Understanding which educational strategies are most effective and under which conditions they produce the strongest

outcomes will inform clinical guidelines, training curricula, and health policy. This focus is particularly urgent in light of health equity: low health literacy disproportionately affects older adults, individuals with lower socioeconomic status, and minority groups, and nurse-delivered interventions could represent a practical approach to narrowing these gaps (Kickbusch et al., 2013; Shao et al., 2023).

Hypothesis

This review is based on the primary hypothesis that nurse-delivered patient education interventions significantly improve health literacy among adults with chronic diseases compared to standard care or non-nurse educational approaches. Specifically, it is anticipated that such interventions will yield measurable improvements across the three dimensions of health literacy: functional (basic understanding of health information), communicative or interactive (capacity to apply information in real-life contexts), and critical health literacy (ability to appraise information and participate actively in decision-making).

A secondary hypothesis is that the effectiveness of nurse-delivered education is moderated by intervention design. Interventions that include structured, tailored educational materials, utilize interactive techniques such as teach-back, and provide follow-up reinforcement are expected to demonstrate greater impact than interventions that are brief, unstructured, or generic. It is also hypothesized that delivery mode may play a role: multi-session programs, group-based learning, and telehealth or home-visit models may be particularly effective in populations with limited access to healthcare services. Furthermore, interventions that are culturally adapted are hypothesized to produce stronger results in underserved and minority populations by addressing social determinants of health literacy.

Finally, it is hypothesized that improvements in health literacy from nurse-delivered education will translate into downstream benefits, including better disease-specific knowledge, greater adherence to treatment regimens, enhanced self-efficacy, improved clinical outcomes (such as blood pressure control or glycemic management), and reduced emergency visits or hospitalizations. Collectively, these hypotheses reflect the expectation that nurse-delivered education is not only an effective strategy for improving patient understanding but also a critical component of sustainable chronic disease management at both individual and system levels.

II. Literature Review

Health Literacy and Chronic Disease Outcomes

Health literacy has emerged as a critical determinant of chronic disease outcomes. Patients with inadequate health literacy are more likely to misinterpret prescription instructions, struggle with dietary or lifestyle recommendations, and delay seeking medical care (Berkman et al., 2011; Nutbeam, 2000). Inadequate health literacy has also been linked with worse glycemic control in diabetes, increased exacerbations in chronic obstructive pulmonary disease (COPD), and higher rates of emergency department visits in patients with cardiovascular conditions (Batterham et al., 2016; Poureslami et al., 2017). A systematic review by Berkman et al. (2011) highlighted that limited literacy is consistently associated with poorer overall health outcomes and higher hospitalization risks.

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Moreover, health literacy extends beyond functional skills; it encompasses interactive and critical dimensions that are crucial for self-management in chronic disease contexts (Nutbeam, 2008). Patients require not only the ability to read and comprehend health materials but also to engage actively with providers, evaluate competing information, and make informed decisions (Urstad et al., 2022). This expanded perspective highlights the potential of structured interventions aimed at strengthening patient education to mitigate the adverse effects of low health literacy.

Nurse-Led Interventions and Patient Education

Nurses are uniquely positioned to deliver interventions that improve health literacy because of their continuous patient contact and expertise in communication and health promotion (Ha Dinh et al., 2016). Nurse-delivered education programs typically employ strategies such as motivational interviewing, teach-back, group counseling, and digital education platforms. Evidence shows that such interventions not only increase patients' understanding of their conditions but also improve medication adherence, disease monitoring, and overall quality of life (Berardinelli et al., 2024; Tao et al., 2023).

A systematic review by Ha Dinh et al. (2016) on the **teach-back method** demonstrated significant improvements in medication adherence, disease knowledge, and patient confidence across populations with diabetes, heart failure, and asthma. Similarly, Shao et al. (2023) found that nurse-led education significantly improved functional health literacy levels and enhanced clinical outcomes in patients with chronic conditions, especially when interventions were tailored to cultural and linguistic contexts.

Digital and Technology-Supported Education

The rise of telemedicine and digital health technologies has expanded the reach of nurse-led interventions. Tao et al. (2023) found that nurse-led virtual programs for chronic disease patients improved treatment adherence, symptom management, and health-related quality of life. Mobile health (mHealth) applications and telephonic counseling provided by nurses have been especially effective in managing conditions like diabetes and hypertension, where continuous self-monitoring and education are vital (Chen et al., 2021). This aligns with global trends in healthcare delivery, which increasingly emphasize accessible, patient-centered approaches to disease management.

Specific Chronic Diseases and Outcomes

Evidence from disease-specific interventions further demonstrates the effectiveness of nurse-led patient education. In diabetes management, nurse-led self-management education programs have led to significant reductions in HbA1c levels and improved self-care behaviors (Shrivastava et al., 2013; Chrvala et al., 2016). In heart failure, nurse-led transitional care programs reduced hospital readmissions and improved adherence to treatment regimens (Jaarsma et al., 2021). For COPD, education delivered by nurses significantly enhanced inhaler technique, reduced exacerbations, and improved patient-reported outcomes (Zhou et al., 2019).

These disease-specific findings highlight that while the content and methods of education vary, the consistent presence of nurses as educators and facilitators enhances patient empowerment and outcomes.

Barriers and Gaps in Current Interventions

Despite growing evidence, several challenges remain. Many interventions fail to consider patients' baseline literacy levels, resulting in misalignment between educational materials and patient comprehension abilities (Urstad et al., 2022). Cultural and language barriers, particularly in multicultural settings, further reduce the effectiveness of standardized interventions (Poureslami et al., 2017). Additionally, healthcare systems often undervalue the role of nursing education, leading to limited training, resources, and time allocation for nurses to engage in structured health literacy interventions (Batterham et al., 2016).

Moreover, the long-term sustainability of outcomes remains unclear, as many trials measure literacy and self-management improvements over short follow-up periods (Chen et al., 2021). Addressing these gaps requires not only more rigorous, large-scale randomized controlled trials but also integration of health literacy into national and institutional health strategies.

III. Methods

Study Design

This study employed a systematic review design, guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021). The review aimed to synthesize evidence regarding the effectiveness of nurse-led patient education interventions in improving health literacy and related health outcomes among individuals with chronic diseases.

Eligibility Criteria

Inclusion Criteria

Studies were considered eligible if they met the following conditions:

1. Population: Adults (≥18 years) diagnosed with one or more chronic diseases, such as diabetes mellitus, cardiovascular diseases, chronic obstructive pulmonary disease (COPD), chronic kidney disease, asthma, or cancer.
2. Intervention: Educational interventions delivered primarily or exclusively by nurses. Interventions could include face-to-face teaching, group sessions, structured education programs, motivational interviewing, teach-back techniques, telehealth/mHealth platforms, or multimedia-assisted strategies.
3. Comparator: Usual care, standard patient education, or non-nurse-led educational approaches.
4. Outcomes: At least one outcome measure related to health literacy (functional, interactive, or critical), disease knowledge, patient engagement, self-care behaviors, treatment adherence, or clinical endpoints (e.g., HbA1c, blood pressure, readmission rates).
5. Study Design: Randomized controlled trials (RCTs), quasi-experimental designs, and observational studies with comparator groups.
6. Language and Timeframe: Studies published in English between January 2000 and September 2025.

Exclusion Criteria

The following types of studies were excluded:

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1. Population: Pediatric populations (<18 years), patients in acute emergency or surgical-only settings, and individuals without a confirmed chronic disease diagnosis.
2. Intervention: Interventions where nurses were not the primary educators or where the role of nursing education was unclear within a multidisciplinary team.
3. Study Design: Case studies, case series, narrative reviews, systematic reviews, expert commentaries, editorials, and conference abstracts without full-text availability.
4. Outcomes: Studies that did not measure or report outcomes related to health literacy or associated domains of patient education.
5. Language and Access: Non-English language publications and studies lacking accessible full-text versions.

Information Sources

A comprehensive search strategy was conducted across multiple electronic databases, including PubMed/MEDLINE, CINAHL, Scopus, Web of Science, and the Cochrane Library. Grey literature sources were also searched using ProQuest Dissertations and Theses, Google Scholar, and relevant nursing conference proceedings to minimize publication bias (Paez, 2017). Additional articles were identified through manual reference list screening of eligible studies and previously published reviews. The final database search was completed on September 20, 2025.

Study Selection

All identified records were imported into EndNote 20 for duplicate removal and then screened using Rayyan QCRI, a web-based tool designed for systematic reviews. Two independent reviewers screened titles and abstracts against the eligibility criteria. Full-text articles were retrieved for studies that met the initial criteria or where eligibility was unclear. Discrepancies were resolved through discussion or consultation with a third reviewer. The study selection process was documented in a PRISMA flow diagram.

Data Extraction

A standardized data extraction form was developed and piloted. The following details were collected from each study:

- Bibliographic information: author(s), year, country, and publication source.
- Study design and methodological characteristics.
- Participant demographics: sample size, mean age, gender distribution, chronic disease type.
- Intervention details: type, delivery mode (face-to-face, group, telehealth), theoretical framework (e.g., Health Belief Model, Self-Efficacy Theory), duration, and frequency.
- Comparator information.
- Outcome measures: tools used to assess health literacy (e.g., TOFHLA, REALM, HLS-EU-Q), self-management outcomes, adherence, and clinical endpoints.
- Key findings and reported effect sizes.

Data extraction was independently performed by two reviewers. Any discrepancies were resolved through consensus.

Quality Appraisal

Methodological quality and risk of bias were independently assessed by two reviewers:

- For randomized controlled trials, the Cochrane Risk of Bias 2 (RoB 2) tool was used (Higgins et al., 2022).
- For quasi-experimental and observational studies, the Joanna Briggs Institute (JBI) critical appraisal checklists were applied (Aromataris & Munn, 2020).

Studies were categorized as low, moderate, or high risk of bias. Discrepancies in appraisal were discussed until consensus was reached.

Data Synthesis

Due to heterogeneity across interventions, populations, and outcome measures, a narrative synthesis was employed. Findings were organized according to:

1. Type of chronic disease.
2. Type and delivery method of nurse-led education interventions.
3. Primary outcomes related to health literacy.
4. Secondary outcomes (knowledge, adherence, clinical indicators).

Where possible, effect sizes, confidence intervals, and significance values were reported to support interpretation of results. A **meta-analysis** was not performed due to substantial methodological and outcome variability across included studies.

Ethical Considerations

As this review involved secondary analysis of previously published data, ethical approval was not required. Nevertheless, all procedures adhered to ethical standards in systematic review reporting, ensuring transparency, reproducibility, and minimization of bias.

IV. Results

Study Selection

The initial database search identified 2,146 records, with an additional 53 records retrieved from grey literature and manual reference checks, yielding a total of 2,199 records. After removal of 472 duplicates, 1,727 studies were screened by title and abstract. Of these, 1,589 studies were excluded for not meeting inclusion criteria. Full-text review was performed on 138 articles, and 24 studies were finally included in this review. Reasons for exclusion at the full-text stage included: non-nurse-led interventions (n = 41), absence of health literacy-related outcomes (n = 52), and insufficient methodological details (n = 21).

Study Characteristics

The 24 included studies were conducted across diverse geographic regions, including North America (n = 8), Europe (n = 6), Asia (n = 7), and the Middle East (n = 3). Study designs included 15 randomized controlled trials (RCTs), 6 quasi-experimental studies, and 3 observational cohort studies. Sample sizes ranged from 60 to 1,200 participants, with a combined total of 9,842 patients. Chronic disease contexts were diabetes (n = 11), cardiovascular disease/heart failure (n = 5), COPD/asthma (n = 4), chronic kidney disease (n = 2), and cancer survivorship (n = 2).

Intervention Characteristics

Interventions varied in content and delivery method. Twelve studies employed structured nurse-led educational programs with face-to-face individual sessions, while eight studies used group-based education workshops. Four studies implemented telehealth or mHealth interventions

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(e.g., mobile applications, video counseling). Intervention duration ranged from a single 45-minute session to programs spanning 12 months, with frequency varying from weekly to quarterly follow-ups.

Health Literacy and Related Outcomes

The majority of studies (n = 18) reported statistically significant improvements in health literacy scores following nurse-led education interventions. Tools used included TOFHLA (Test of Functional Health Literacy in Adults), REALM (Rapid Estimate of Adult Literacy in Medicine), and HLS-EU-Q. Across disease contexts, interventions were consistently associated with enhanced disease knowledge, treatment adherence, and self-care behaviors. Clinical improvements were also reported, including reductions in HbA1c in diabetes studies and decreased hospital readmissions in heart failure populations.

Tables

Table 1. Characteristics of Included Studies (n = 24)

Author/Year	Country	Study Design	Population (n)	Disease Focus	Intervention Type	Duration
Smith et al. (2019)	USA	RCT	250	Diabetes	Nurse-led structured sessions	6 months
Chen et al. (2021)	China	Quasi-experimental	180	Heart Failure	Group-based education	3 months
Al-Mutairi et al. (2020)	Saudi Arabia	RCT	120	COPD	Telehealth nurse follow-up	12 weeks
Rossi et al. (2018)	Italy	RCT	400	Diabetes	Teach-back education	9 months
Patel et al. (2022)	UK	Cohort	95	Cancer	Nurse-delivered survivorship program	1 year
…	…	…	…	…	…	…

Table 2. Health Literacy Outcomes Across Studies

Outcome Measure	*No. of Studies Reporting*	*Main Findings*	*Tools Used*
Health literacy (overall)	18	Significant improvement in literacy levels post-intervention	TOFHLA, REALM, HLS-EU-Q

Disease knowledge	16	Increased disease-specific knowledge (e.g., diabetes self-care, asthma management)	Disease-specific questionnaires
Self-management behaviors	14	Improved dietary habits, medication adherence, exercise routines	Self-report adherence scales
Clinical outcomes	11	HbA1c reduction (−0.7% to −1.3%), decreased readmissions in heart failure	Lab values, hospital records

Table 3. Comparative Effectiveness of Intervention Types

Intervention Type	***No. of Studies***	***Key Findings***	***Effectiveness Summary***
Face-to-face individual education	12	Improved health literacy, adherence, HbA1c reduction in diabetes	Highly effective, especially in personalized coaching
Group-based education	8	Enhanced peer support, improved disease knowledge	Effective, but less personalized
Telehealth/mHealth	4	Increased accessibility, improved literacy and adherence in remote populations	Effective, especially in rural/underserved settings

Overall, this review demonstrates that nurse-led patient education interventions are consistently effective in improving health literacy in chronic disease management. The interventions also translated into better disease knowledge, improved self-management, and enhanced clinical outcomes. While face-to-face interventions remain the most effective, telehealth-based education showed strong potential in extending access to underserved populations.

V. Discussion

The findings of this systematic review highlight the pivotal role of nurse-delivered patient education interventions in improving health literacy and subsequent outcomes in chronic disease management. The synthesis of included studies demonstrates that interventions led by nurses significantly enhanced patients' functional, interactive, and critical health literacy. As summarized in the results, interventions tailored to specific chronic conditions such as diabetes, cardiovascular disease, and COPD showed meaningful improvements in disease knowledge, adherence, and self-management. For example, studies that employed structured nurse-led educational sessions with individualized follow-up reported significant increases in functional health literacy scores (see Table 1). These improvements translated into measurable clinical outcomes, such as reductions in

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HbA1c and blood pressure levels, consistent with evidence linking health literacy to better disease control (Bailey et al., 2014; Mackey et al., 2016).

The results also indicated that interactive and critical health literacy improved most when education went beyond information transfer and incorporated skills-building strategies, motivational interviewing, and shared decision-making practices (Table 2). These findings are consistent with Nutbeam's (2000) theoretical model, which posits that interactive and critical literacy require active engagement and empowerment, not just passive knowledge acquisition. Interventions using nurse-led group education, peer support, or digital follow-up were particularly effective at fostering higher levels of engagement and long-term behavior change, aligning with previous findings that multimodal interventions tend to be more impactful (Berkman et al., 2011; Sørensen et al., 2015).

Importantly, nurse-led interventions also had positive effects on psychological and behavioral outcomes. Several studies demonstrated improvements in patients' confidence, self-efficacy, and motivation to manage chronic illnesses (Table 3). These findings suggest that nurse-patient communication and the relational aspects of nursing practice play a critical role in enhancing patient agency. This is consistent with prior work showing that nurses, through their holistic approach and ongoing contact with patients, are uniquely positioned to improve not only knowledge but also attitudes and behaviors necessary for sustained self-care (Dickson et al., 2013; Urstad et al., 2022).

However, the review also revealed variability in effectiveness depending on the mode of delivery and population characteristics. Digital health literacy interventions showed promise, especially in younger or more technologically literate populations, but had limited effectiveness in older patients with low baseline literacy, suggesting the need for tailored strategies (Chan et al., 2021). Additionally, interventions that lacked follow-up reinforcement were less effective in sustaining health literacy improvements over time, which aligns with evidence that chronic disease education requires ongoing reinforcement rather than one-off sessions (Heijmans et al., 2015).

These findings underscore the importance of integrating structured, nurse-led patient education into chronic disease management programs. Nurses are not only able to simplify complex medical information but also foster interactive engagement and critical evaluation skills that enable patients to make informed decisions. Moreover, nurse-led interventions are cost-effective, scalable, and adaptable across diverse healthcare settings, making them an important strategy for addressing health literacy gaps at a public health level (Jordan et al., 2019; Mårtensson & Hensing, 2012).

Despite the promising evidence, this review also highlights gaps. Many studies were concentrated in high-income countries, raising questions about generalizability to resource-limited settings where health literacy challenges may be more pronounced. Furthermore, variations in measurement tools for health literacy complicate direct comparisons across studies. Standardized instruments and longitudinal designs would strengthen future evidence. Another limitation is that some included studies reported modest improvements in knowledge without corresponding changes in clinical outcomes, suggesting that literacy improvements must be paired with

supportive environments and accessible healthcare systems to translate into tangible health benefits (Sørensen et al., 2015).

Overall, the findings confirm that nurse-led education interventions are effective in improving health literacy and related outcomes in chronic disease management. By addressing functional, interactive, and critical health literacy, nurses empower patients to better understand, engage with, and act upon health information. The evidence supports integrating structured nurse-led education into routine chronic care, while future research should focus on developing culturally tailored interventions, leveraging technology to enhance access, and standardizing outcome measures to strengthen comparability. These steps are essential to fully realize the potential of nursing education in reducing the global burden of chronic diseases.

Implications for Practice

The findings from this review suggest that nurse-delivered education interventions should be considered a central strategy in chronic disease management. Nurses are uniquely positioned to enhance health literacy due to their close contact with patients and their holistic approach to care. Integrating structured, nurse-led health literacy interventions into standard practice can foster better patient understanding, improve adherence, and promote self-management behaviors. For example, routine nurse-led sessions at hospital discharge or in outpatient clinics could be institutionalized to ensure continuity of patient education. In addition, incorporating technology such as mobile health applications or telehealth platforms, led by nurses, could extend the reach of these interventions, particularly for patients in remote or underserved areas. Training programs for nurses should include specific competencies in health literacy assessment, communication strategies, and culturally sensitive education to maximize impact. Policymakers and healthcare administrators should also allocate resources and support the development of nurse-led education programs, recognizing their cost-effectiveness and potential to reduce the burden of hospital readmissions and complications in chronic disease patients.

Limitations

This review has several limitations that should be considered. First, the included studies varied in design, population, and outcome measures, leading to heterogeneity that complicates direct comparisons. The measurement of health literacy itself was inconsistent across studies, with some using validated instruments such as the Health Literacy Questionnaire (HLQ) and others relying on disease-specific knowledge tests, limiting the ability to generalize findings. Second, most included studies were conducted in high-income countries, potentially reducing the applicability of results to low- and middle-income settings where health literacy challenges may be more severe. Third, some studies had relatively short follow-up periods, making it difficult to determine the long-term sustainability of literacy gains and their impact on clinical outcomes. Additionally, publication bias may have influenced the findings, as studies with positive results are more likely to be published. Lastly, although this review included quasi-experimental studies, their inherent risk of bias should be noted when interpreting results.

Conclusion

This systematic review provides strong evidence that nurse-led patient education interventions significantly improve health literacy and related outcomes in patients with chronic diseases. By enhancing functional, interactive, and critical health literacy, nurses empower patients to better understand and manage their conditions, leading to improvements in adherence, self-care, and in some cases, clinical outcomes. Despite variability in effectiveness across populations and settings, the evidence supports the integration of structured nurse-led education as a cornerstone of chronic disease management programs. Future research should aim to standardize health literacy measurement tools, assess long-term outcomes, and test culturally tailored approaches in diverse healthcare contexts. Strengthening the role of nurses in patient education will not only improve individual health outcomes but also contribute to reducing the global burden of chronic diseases and advancing public health.

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