

Effectiveness of Nurse-Led Self-Management Interventions in Improving Disease Control, Treatment Adherence, and Quality of Life Among Adults with Chronic Diseases: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

Sabah Abbas Ahmed

Professor, Department of Adult Nursing, College of Nursing, Al-Bayan University, Baghdad, Iraq.

Email: sabah.a@albayan.edu.iq

Orchid ID: <https://orcid.org/0000-0003-4225-9339>

Abstract

Background: Nurse-led self-management interventions are increasingly used to support adults living with chronic diseases, but cross-disease evidence remains fragmented. This systematic review and meta-analysis evaluated their effectiveness for disease control, treatment adherence, and quality of life.

Methods: PubMed and Scopus were searched for peer-reviewed randomized controlled trials published from 2016 to 2026. Eligible studies enrolled adults with chronic diseases and compared a clearly nurse-led self-management intervention with usual care or another eligible comparator. Random-effects meta-analysis was conducted only for clinically compatible outcomes.

Results: Of 393 records identified, 121 duplicates were removed and 69 randomized controlled trials were included in the qualitative synthesis. Disease control was reported in 43 trials, quality of life in 32, and treatment adherence in 15. Nine trials contributed to the HbA1c meta-analysis, showing a significant reduction favoring nurse-led intervention (MD = -0.53 percentage points, 95% CI -0.85 to -0.21; $p = .001$; $I^2 = 88.2\%$). Five trials contributed to the systolic blood pressure meta-analysis (MD = -4.20 mm Hg, 95% CI -7.18 to -1.22; $p = .006$; $I^2 = 53.4\%$), although the Hartung-Knapp interval was wider because of the small number of studies. Adherence and quality-of-life findings were generally favorable but too heterogeneous for valid pooling.

Conclusion: Nurse-led self-management interventions improve selected chronic-disease control outcomes and frequently support treatment adherence and quality of life. Standardized outcome reporting and longer follow-up are needed to strengthen estimates across chronic conditions.

Keywords: chronic disease; nurse-led intervention; self-management; randomized controlled trial; treatment adherence; quality of life

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Introduction

Chronic conditions are the leading cause of death, disability and ongoing health needs worldwide, and the long-term burden of chronic conditions is increasingly calling for new models of care which go beyond episodic clinical care. The Global Burden of Disease 2021 (GBD 2021) analysis confirmed that chronic noncommunicable diseases (NCDs) continued to cause deaths and years of life lost in a wide range of settings, underscoring the importance of long-term solutions to support patients' lives, particularly throughout the NCD journey (GBD 2021 Causes of Death Collaborators, 2024). Effective management is a critical component of care for adults with diabetes mellitus, hypertension, cardiovascular disease, heart failure, chronic obstructive pulmonary disease (COPD), chronic kidney disease, arthritis and other long-term conditions, and it involves not only the clinical treatment of the condition, but also daily choices about taking medications, monitoring symptoms, eating, exercising, following up with their

health providers, and reacting to changes in their health status (Bodenheimer et al., 2002; Lorig & Holman, 2003).

Self-management has thus become an integral part of the care for chronic diseases. It encompasses the activities of people living with a long-term condition and self-management support encompasses the professional strategies used to enhance knowledge, confidence, problem-solving and practical skills to perform those activities (Lorig & Holman, 2003). Studies in chronic care suggest that providing education is not enough to ensure behavior change; more effective interventions also include elements focused on self-efficacy, motivation, goal setting, monitoring, and problem solving to enhance the likelihood of a clinically meaningful behavior change (Bodenheimer et al., 2002; van Hooft et al., 2017).

The nurse's role often includes patient education, behavioral counseling, assessment of symptoms, monitoring, care coordination and continuity from

both clinical and community-based settings, which places nurses in a prime position to provide self-management support. Nurse-led programs can be delivered in a variety of ways: face-to-face education, telephone follow-up, home visits, mobile health applications, telemonitoring or hybrid models, and may be disease-specific, based on behavioral or nursing theory (Chew et al., 2021; Crowley et al., 2022; Pack & Lee, 2021). With information provision being a major component, a realist review of nurse-led self-management interventions in chronic conditions found that interventions that focused on intrinsic processes like motivation and self-efficacy were more successful than interventions focused primarily on information provision, and it was not the professional label alone that was important (van Hooft et al., 2017). The effects of interventions based on self-management led by nurses are variable but often beneficial, as described in randomized controlled trials. Culturally adapted and theory-based nurse-led interventions have been shown to enhance self-care practices and self-efficacy and in some instances, lead to minor reductions in glycated hemoglobin (HbA1c) in type 2 diabetes (Asmat et al., 2024; Changsieng et al., 2023). Other trials, however, have failed to show any improvement in glycemic control with structured nursing contact, suggesting that the intensity of interventions, adherence to the protocols, comparator control, and patient characteristics may affect intervention effectiveness (Ismail et al., 2018). Likewise, nurse-led hypertension programs have been shown in some randomized trials to lower blood pressure and enhance self-care (Alsaqer & Bebis, 2022; Zhu et al., 2018), but less consistent results have been found for quality of life and self-efficacy.

The same trend can be seen with the heart failure literature. Several trials have found that structured nurse-led education, self-regulation programs, telephone follow-up and telemonitoring have positively affected self-care or quality of life outcomes or rehospitalization-related outcomes (Chew et al., 2021; Cui et al., 2019; Lambrinou et al., 2025; Mizukawa et al., 2019). However, not all large pragmatic trials have resulted in a demonstration of improvement in a major composite clinical outcome, where patient-reported outcomes and/or transition-care outcomes improved (Van Spall et al., 2019). These results indicate that self-management through nursing interventions has to be assessed not at the end point alone. Clinical disease control, adherence to treatment and quality of life are domains which are related, but which may respond differently and over different time periods.

Previous systematic reviews have also predominantly focused on a single disease, mode of delivery, setting or outcomes. In a previous cross-disease meta-

analysis, Massimi et al. (2017) found that the interventions had beneficial effects on systolic and diastolic blood pressure, but findings were inconclusive for HbA1c and several patient-reported outcomes such as quality of life. Recent reviews have focused on diabetes self-management education, heart failure transitional care, technology-enabled interventions or multimorbidity; however, few have been able to integrate the various literature streams around their respective diseases (Davis et al., 2021; Ruksakulpiwat et al., 2025; Sun et al., 2025). A new randomized-trial synthesis that compares aspects of disease control, treatment adherence and quality of life in a common framework is therefore warranted. This systematic review and meta-analysis will assess the effectiveness of nurse-led self-management interventions to improve these three outcome domains among adults with chronic diseases and, when possible, explore if there are differences based on disease group, intervention characteristics, delivery modality, and follow-up duration.

Literature Review

Self-management theory highlights the importance of what people with chronic illnesses do in order to manage their illness in most cases outside of their health-care interactions. Self-management includes medical management, maintenance of life roles and management of the emotional consequences of chronic illness, which involves skills such as problem solving, decision making, using resources, planning actions, and working with health care providers (Lorig and Holman, 2003). Bodenheimer et al. (2002) also posited that the way to manage chronic diseases is to move away from passive education and toward co-operative support for self-management. It is relevant in nursing practice, as nurses have repeated opportunities to touch base with patients and are able to provide education and behavioral reinforcement, monitor symptoms and review treatment, and adjust interventions to fit each patient's individual needs and interests, particularly by addressing motivation and confidence. van Hooft et al. (2017) identified that interventions led by nurses were more likely to be effective when they targeted patients' motivation and confidence, which relied on more than just knowledge transfer.

The previous cross-disease evidence is important as a benchmark for the present cross-disease review. Massimi et al. (2017) conducted a synthesis of 29 randomized controlled trials of self-management support through the nurse in the community with adults with chronic disease or multimorbidity. Their meta-analysis revealed pooled decreases of ~3 mmHg in SBP and ~1.4 mmHg in DBP, but the pooled decrease in HbA1c was small and not clearly different from no effect. Results for a number of other observer-

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and patient-reported outcomes, such as quality of life, were inconclusive. The authors also found significant clinical and methodological variations between interventions, which might account for variation in findings of effectiveness (Massimi et al., 2017).

Diabetes has, in turn, resulted in one of the largest evidence bases of nurse-led self-management. Azami et al. (2018) reported that a structured nurse-led diabetes SM education program reduced HbA1C, BP, and BW and improved self-efficacy and diabetes self-management behaviors as compared to usual care. These findings have been replicated in more recent RCTs with culturally adapted and theory-based, digitally supported models. Among the South Asian adult population with type 2 diabetes, a small yet statistically significant decrease in HbA1c levels was demonstrated as well as significant increases in South Asian adults' self-efficacy and self-care behaviors, following a nurse-led intervention based on the patient-centered approach (Asmat et al., 2024). Changsieng et al. (2023) have also shown a decrease in HbA1c, fasting glucose, knowledge, self-care agency, physical activity, diet and medication adherence following the supportive education delivered by the nurse. However, a cluster randomized trial of a nurse-delivered psychological intervention in primary care (Diabetes-6) failed to identify a difference in HbA1C or secondary clinical outcomes (Ismail et al., 2018). The differences indicate that there are dissociations between behaviour and physiological disease control, thus meaning that gains in behaviour and disease control do not always happen to the same degree or during the same follow-up period.

Also, the latest diabetes synthesis in the collected literature indicates benefit and heterogeneity. Sun et al. (2025) found that nurse-led diabetes self-management education had a significant effect on decreasing HbA1c at intermediate and longer follow-up, and on improving fasting blood glucose and self-efficacy. However, there was high heterogeneity for HbA1c and self-efficacy which means that there was a significant degree of variation between studies. This heterogeneity could be clinically reasonable since the nurse-led diabetes interventions vary in theoretical approach, number of sessions, how delivered, family engagement, follow-up intensity, and starting glycemic control level. The implication for meta-analysis is that effects of interventions should only be pooled when definitions of outcomes and clinical contexts are sufficiently compatible; meta-analyses should consider disease-specific and modality-specific subgroups of analyses where possible.

The second major evidence stream is in the area of hypertension and cardiovascular disease. Zhu et al. (2018) created a nurse-led model of hypertension management that includes aspects of self-management

support, decision support, clinical information systems, and delivery-system design. In that randomized trial, the intervention group had significantly greater decreases in both their systolic and diastolic blood pressure levels and showed a greater improvement in their self-care behavior compared to the usual care group, with no significant difference in quality of life or self-efficacy. In the context of COVID-19, Alsaqer and Bebis (2022) reported that public-health nursing and mobile-health support reduced the SBP, multiple dimensions of self-care and selected domains of quality of life in older adults with hypertension. The results have implications for nurse-led self-management as a potentially effective way to improve disease control; however, they also show that a patient's experience of change may not be in parallel with the physiological change.

The difference between proximal and downstream outcomes is further illustrated in the heart failure trials. A nurse-led time-focused self-regulation theory-based intervention for improving heart failure self-care, future orientation and behavioral automaticity was reported by Chew et al. (2021) but not all of the effects were significant after adjustment and there was no significant difference in quality of life. Cui et al. (2019) showed that structured nurse-led education facilitated adherence to medication prescription, dietary modification, symptom control, social support and reduced HF readmissions among Chinese patients in rural areas. Mizukawa et al. (2019) found a decrease in rehospitalization and an increase in quality of life in a collaborative nurse-led telemonitoring model. Lambrinou et al. (2025), more recently, identified that a combination of pre-discharge education and telephone support led to better self-care and certain quality of life areas. In contrast, the large cluster randomized trial of PACT-HF did not improve its primary composite clinical outcomes; however, there was an improvement in transition-related measures and health-related quality of life (Van Spall et al., 2019). As a group, these trials suggest that a nurse-led intervention can help improve self-care processes, or patient experience, but does not necessarily yield an immediate clinical event reduction.

The same trend extends to respiratory and renal disease studies. Nurse-led education and monitoring in patients with COPD have been developed to ensure recognition of symptoms and adherence to therapy and self-management. Although Bekelman et al. (2024) assessed a nurse and social worker palliative telecare intervention instead of a purely educational program, they showed that there was a clinically significant improvement in quality of life in adults with chronic obstructive pulmonary disease (COPD), heart failure, and interstitial lung diseases. Recently, Pack and Lee

(2021) conducted a study in the kidney disease and hemodialysis population and demonstrated that there was a beneficial effect of dietary self-management intervention through a smartphone app over time on serum phosphorus, serum potassium, self-efficacy and quality of life. These studies demonstrate that the appropriate definition of 'disease control' varies across each chronic condition and combining unrelated physiological markers to calculate one generic disease-control estimate would potentially result in an effect size having limited clinical significance.

Adherence to treatment is a key intermediate outcome, as it is the objective of many chronic disease interventions to change behaviour prior to a change in physiology. Adherence may involve taking medication, restricting diet or fluid, monitoring symptoms, attendance, self-monitoring, and utilizing condition-specific action plans. These studies showed that medication adherence and dietary changes improved after the nurse-led education on heart failure (Cui et al., 2019) and medication adherence improved among adults with uncontrolled type 2 diabetes (Changsieng et al., 2023). While studying multimorbidity in adults/older adults, Ruksakulpiwat et al. (2025) identified that the common targets of nurse-led interventions were medication adherence, self-management, self-efficacy, and clinical indicators. However, the format and validation of adherence measures were largely heterogeneous and they supported the use of continuous adherence scales and dichotomous adherence outcome measures but not as a single measure.

Quality of life is a complementary patient-centred endpoint, as often there are no direct links between improvements in laboratory results and improvements in daily functioning, symptom burden, emotional well-being, or perceived health. While there is some evidence of positive changes in quality of life following nurse-led interventions in diabetes, hypertension, heart failure, and other chronic conditions, null results are also found (Alsaqer & Bebis, 2022; Diriba et al., 2024; Van Spall et al., 2019; Zhu et al., 2018). There might be an explanation for these inconsistencies in generic versus disease-specific instruments, level of severity at baseline and length of intervention and when assessment was conducted. A meta-analytic approach is therefore required to obtain outcome-specific estimates, to synthesize the quality-of-life effects separately from disease-control/adherence effects.

As telephone, telehealth, mobile-health and hybrid approaches are increasingly adopted, nurse-led self-management is a dynamic and growing field, as evidenced by the recent literature. However, evidence is still spread throughout disease-specific and modality-specific reviews. In addition, Davis et al.

(2021) included continuity of care; Sun et al. (2025) included diabetes self-management education and Ruksakulpiwat et al. (2025) included randomized and quasi-experimental studies of multimorbidity instead of an RCT-only cross-disease meta-analysis. The current review aims to fill this gap by limiting the search to RCTs published in the last ten years (2016–2026) and stratifying effectiveness based on three prespecified domains: disease control, treatment adherence, and quality of life. This helps clinically different outcomes to be kept distinct and allows a more general evaluation of the effectiveness of nurse-led self-management interventions for adults with chronic disease.

Methodology

Review Design and Reporting Framework

This systematic review and meta-analysis assessed RCTs of nurse-led self-management interventions among adults with chronic diseases. The reporting followed PRISMA 2020 (Page et al., 2021). The review question was: What is the effectiveness of nurse-led self-management interventions compared with eligible control interventions among adults with chronic diseases for disease control, treatment adherence, and quality of life?

The main sources of identification were PubMed and Scopus. 393 publications were identified from the searches (197 from PubMed and 196 from Scopus). Deduplication identified 121 duplicate records using DOI, PMID and normalized title, and 272 unique records were screened. Of the 173 records excluded during the title/abstract screening, 99 full-text reports were assessed and 69 randomized controlled trials (RCTs) met the final criteria for eligibility.

Eligibility Criteria

Eligibility criteria were predetermined based on the PICOS approach and are outlined in Table 1. Participants were adults (18 years of age or older) with a chronic disease or multimorbidity represented in the search strategy. Individuals in mixed populations were only eligible if data for eligible adults could be disaggregated from mixed populations.

Self-management support had to be a nurse-led or nurse-delivered intervention and had to be part of an intervention that had a clearly identifiable element focused on self-management, as defined in the eligibility criteria. The delivery may include education, counselling, behaviour support, goal setting, symptom/treatment monitoring, adherence support, telephone follow-up, home visits, telehealth, mobile health or transitional care. Multidisciplinary programmes were only included if the nurse had a prominent and/or clearly differentiated role in the field of self-management.

Comparators were usual or standard care, routine nursing, attention control, general education, waiting-

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list control or some other suitable comparator. Studies had to report at least one of the outcomes, which had to be related to the title (disease control, treatment adherence or validated quality of life). Disease-control outcomes were only condition-specific and adherence and quality-of-life measures had to be clearly defined and validated if applicable.

The synthesis only included randomized controlled trials, including cluster and eligible pilot RCTs, published between 2016 and 2026 and peer-reviewed. As primary evidence, reviews were not analysed. The exclusion criteria included protocols with no results, observational and quasi-experimental studies, qualitative-only studies, studies involving only children and/or acute populations, studies with minimal or no nurse-led self-management component, poor reporting, and retracted articles.

Table 1. PICOS eligibility criteria

Domain	Included	Excluded
Population	Adults (≥ 18 years) with a chronic disease or multimorbidity represented in the search strategy.	Pediatric populations; acute-only conditions; mixed populations without separable eligible data.
Intervention	Clearly nurse-led or nurse-delivered self-management support, education, behavioral support, monitoring, telehealth, home visit, or transitional-care component.	Nursing involvement incidental or unclear; no substantive self-management component; pharmacist-, physician-, or other-professional-led intervention without a distinguishable nurse-led component.
Comparator	Usual/standard care, routine nursing, attention control, general education, waiting-list control, or another eligible comparator.	No comparator permitting an estimate of the nurse-led intervention effect.

Outcomes	At least one: disease control, treatment adherence, or validated quality of life.	No outcome corresponding to the fixed review title.
Design/limits	Peer-reviewed randomized controlled trials, including cluster RCTs and eligible pilot RCTs; 2016–2026; adults.	Reviews/meta-analyses for synthesis, protocols, observational or quasi-experimental designs, qualitative-only studies, inadequate reports, retracted articles.

Information Sources and Search Strategy

On 4th September 2026, electronic databases PubMed and Scopus were searched. 196 records were found after applying English-language, 2016–2026 and Article/Review filters to Scopus, while 197 records were found after applying the same filters to PubMed. Specific strategies for each database are repeated in Appendix A; the number of items in each search and handling rules are outlined in Table 2.

These two strategies both included nursing-delivery terms, self-management or self-care terms, chronic-disease terms, randomized-trial terminology and an adult concept. Relevant MeSH terms were also searched on PubMed. Review articles were excluded from the RCT analytic dataset, and included only if relevant for citation checking from the articles that were retained in the Scopus export.

Table 2. Database search and identification summary

Datab ase	Searc h date	Filters/li mits	Reco rds identi fied	Handlin g rule
Scopu s	Septe mber 4, 2026	English; 2016– 2026; Article and Review	196	Exported before deduplica tion; reviews retained only for citation chasing, not RCT synthesis .

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PubMed	September 4, 2026	2016–2026; adult concept embedded in search	197	Exported before deduplication.
Combined	—	DOI → PMID → normalized title deduplication	393 initial; 272 unique	121 duplicates removed; 272 unique records screened; 173 title/abstract exclusions; 99 full-text reports assessed; 30 full-text exclusions; 69 RCTs included.

Study Selection and PRISMA Workflow

PubMed and Scopus were combined to create one screening set and deduplicated based on DOI, PMID and normalized title. Screening involved two sequential stages: title/abstract screening and full-text screening, where the records at the former stage were screened based on uncertainty, to maximise sensitivity. Full-text articles were excluded where the design or population was not eligible, the intervention was not nurse-led, there was no substantive self-management component, or where there was no eligible outcome, a duplicate or secondary report, an inadequate report, or a retraction.

To avoid double counting, reports from the same randomized cohort were linked by the same trial identifier. The report that had the most thorough quantitative data for a specific outcome and time point was the primary source of data extraction, and other reports could provide information about interventions or methodology. The screening log (Page et al., 2021) was used to create the final PRISMA diagram.

Data Extraction and Outcome Coding

Study characteristics, disease group, randomisation design, sample sizes, participant characteristics, nursing role, comparator, intervention components and intervention delivery mode, duration of intervention, follow-up, definition of outcomes,

measurement instruments and numerical results were recorded using a standardised extraction form. Means, standard deviations, and sample sizes were reported for continuous outcomes and events and denominators were reported for dichotomous outcomes when available.

Outcomes were coded independently for each of the three areas (disease control, treatment adherence, quality of life) and by time of follow-up. If multiple measures were used to measure the same construct, the primary measure was used as the first choice, and the next valid measure available was used. Only where it was defensibly possible to make a conversion were missing statistics derived; the study was otherwise left in the narrative synthesis.

Risk of Bias

Risk of bias was assessed with the Cochrane Risk of Bias 2 framework across randomization, deviations from intended interventions, missing outcome data, outcome measurement, and selective reporting. Outcome-level judgments were classified as low risk, some concerns, or high risk, with appropriate considerations applied to cluster trials where relevant.

Statistical Analysis

Meta-analysis was conducted if two or more independent trials reported clinically compatible outcomes. Random-effects models were used as there was heterogeneity in interventions and populations. Outcomes in comparable units were combined as mean differences; comparable constructs measured on different scales were combined as standardized mean differences (where appropriate), and dichotomous outcomes were combined as risk ratios with 95% confidence intervals.

The effects of clinically distinct disease-control outcomes were not aggregated. HbA1c and systolic blood pressure were aggregated into coherent outcome groups, whereas respiratory, renal, rheumatologic, adherence, and quality-of-life outcomes were kept as stand-alone groups if they were not statistically compatible with other outcomes.

The heterogeneity was quantified with tau-squared, I-squared, Cochran's Q and interpreted alongside clinical differences between studies (Higgins et al., 2003). Follow-up analyses of subgroups for HbA1c and LOO sensitivity analyses for both quantitative syntheses were performed.

Funnel plots and asymmetry tests were not performed due to the fact that neither quantitative synthesis had at least 10 independent studies, which is generally recommended for meaningful assessments of funnel-plot asymmetry (Sterne et al., 2011). To prevent double counting shared comparators, multi-arm trials were managed.

This final PRISMA flow included the following: 393 database records identified (PubMed, n = 197; Scopus,

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n = 196); 121 duplicates removed; 272 unique records screened; 173 title/abstract exclusions; 99 full-text reports assessed; 30 full-text exclusions; and 69 randomized controlled trials included in the qualitative synthesis.

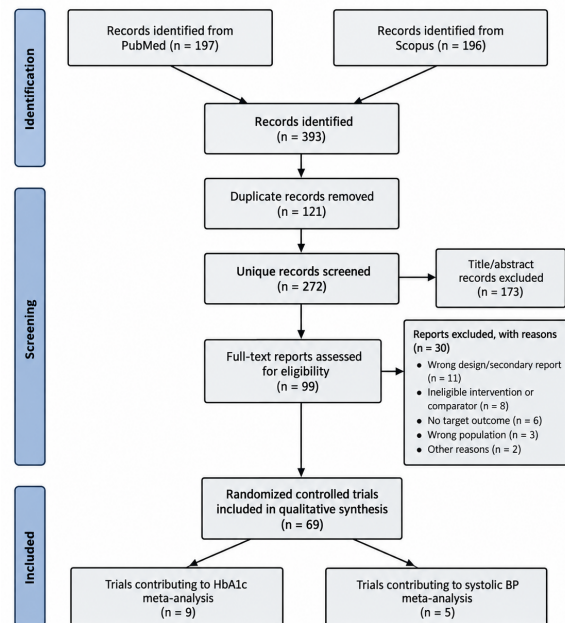
Results

Study Selection

Both database searches resulted in a total of 393 records, of which 197 were from PubMed and 196 were from Scopus. Matching on DOI, PMID and normalized title yielded 121 duplicate records, with 272 unique records that were screened. 173 records were screened out based on the title or abstract. Of the 99 full-text reports assessed, 30 were excluded based on prespecified criteria such as incorrect study design, secondary reporting, incorrect intervention/comparator, lack of target outcome, incorrect population, and other reasons. It was ultimately decided to include 69 randomized controlled trials in the qualitative synthesis and only those trials with clinically compatible numerical results were included in the quantitative synthesis.

The summary of the study-selection pathway is provided in Figure 1 and is presented in the PRISMA 2020 format with the movement of studies from their identification in the database to the final qualitative and quantitative synthesis sets.

Figure 1: PRISMA 2020 flow of study selection



Qualitative synthesis included 69 RCTs; quantitative pooling was restricted to clinically compatible outcomes.

Note. The quantitative syntheses were restricted to trials providing compatible effect estimates and variance information.

The included evidence was heterogeneous in both clinical population and intervention format. Programs ranged from structured face-to-face education and

motivational interviewing to telephone follow-up, telemonitoring, digital support, home-based monitoring, and hybrid chronic-care models. Most trials compared the nurse-led program with usual care, standard care, or an attention-type control.

Characteristics and Outcome Coverage

Table 3 summarizes the distribution of included randomized controlled trials across disease groups and the three prespecified outcome domains.

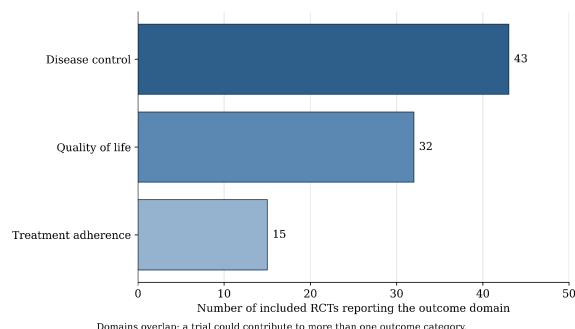
Table 3. Included RCTs and outcome-domain coverage by disease group

Disease group	RC Ts	Disea se contr ol	Treatme nt adheren ce	Quali ty of life
Diabetes	27	22	3	5
Heart failure / cardiovascular	19	7	3	15
Hypertensio n	9	7	5	3
COPD / asthma	6	3	2	5
Diabetes + kidney disease	3	2	1	1
CKD / hemodialysi s	3	1	1	2
Irritable bowel syndrome	1	0	0	1
Rheumatolo gic	1	1	0	0

Across the 69 included trials, diabetes formed the largest evidence base, followed by heart failure or cardiovascular disease, hypertension, respiratory disease, and kidney disease. Because trials could contribute to more than one domain, outcome counts overlap: disease control was reported in 43 trials, quality of life in 32, and treatment adherence in 15. Figure 2 presents the frequency with which the included trials reported disease control, treatment adherence, and quality of life.

Figure 2: Outcome coverage across included randomized trials

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Note. Bars show the number of included RCTs reporting each outcome domain; a study could contribute to more than one domain.

Compatible numerical data were available for two disease-control outcomes in sufficient numbers for formal pooling: HbA1c and systolic blood pressure. Studies reporting the same physiological measure but using different scales or incomplete variance information were retained in the narrative synthesis rather than forced into a pooled estimate.

Meta-Analysis of Disease Control

The study-level effect estimates entered into the random-effects meta-analyses are presented in Table 4.

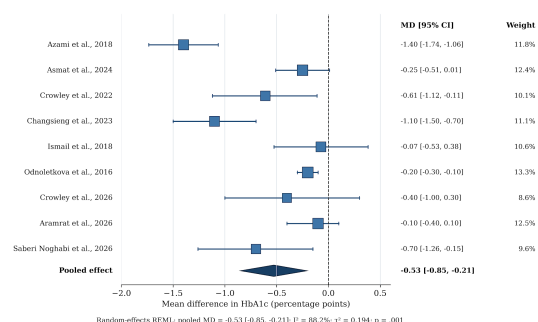
Table 4. Effect estimates entered in the random-effects meta-analyses

Outcome	Study	MD	95% CI lower	95% CI upper
HbA1c (%)	Azami et al., 2018	-1.40	-1.74	-1.06
HbA1c (%)	Asmat et al., 2024	-0.25	-0.51	0.01
HbA1c (%)	Crowley et al., 2022	-0.61	-1.12	-0.11
HbA1c (%)	Changsieng et al., 2023	-1.10	-1.50	-0.70
HbA1c (%)	Ismail et al., 2018	-0.07	-0.53	0.38
HbA1c (%)	Odnoletkova et al., 2016	-0.20	-0.30	-0.10
HbA1c (%)	Crowley et al., 2026	-0.40	-1.00	0.30
HbA1c (%)	Aramrat et al., 2026	-0.10	-0.40	0.10
HbA1c (%)	Saberi Noghabi et al., 2026	-0.70	-1.26	-0.15
Systolic blood pressure (mm Hg)	Azami et al., 2018	-5.50	-8.99	-2.01

Systolic blood pressure (mm Hg)	Ismail et al., 2018	-1.35	-6.84	4.14
Systolic blood pressure (mm Hg)	Changsieng et al., 2023	-2.60	-8.30	3.00
Systolic blood pressure (mm Hg)	Persell et al., 2018	-2.00	-5.20	1.30
Systolic blood pressure (mm Hg)	Alsaqer & Bebis, 2022	-11.95	-18.72	-5.18

A total of nine trials reported HbA1c measurements that were compatible across trials. In the restricted maximum-likelihood random-effects model, nurse-led self-management interventions decreased HbA1c by 0.53 percentage points compared with control (MD = -0.53, 95% CI -0.85 to -0.21, $p = .001$) and the heterogeneity was high ($I^2 = 88.2\%$). Using the Hartung-Knapp estimation method gave a wider but statistically significant interval (-0.89 to -0.16). The direction of the effect was consistently favorable, with pooled effects between -0.40 and -0.59 percentage points, according to a leave-one-out analysis. Follow-up subgroup analysis suggested a stronger short-term effect at ≤ 6 months (MD = -0.71, 95% CI -1.19 to -0.24) than at > 6 months (MD = -0.22, 95% CI -0.46 to 0.02). The forest plot of HbA1c synthesis is shown in Figure 3.

Figure 3: Effect of nurse-led self-management interventions on HbA1c

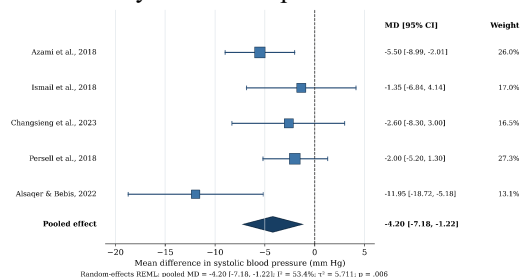


Note. MD = mean difference in percentage points. Negative values favor the nurse-led intervention. The diamond represents the REML pooled estimate.

Five trials provided compatible systolic blood pressure estimates with sufficient variance information. The conventional REML model favored nurse-led intervention by 4.20 mm Hg (MD = -4.20, 95% CI -7.18 to -1.22; $p = .006$), with moderate heterogeneity ($I^2 = 53.4\%$). Because only five studies were pooled, Hartung-Knapp estimation yielded a wider interval (-

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8.90 to 0.49), indicating greater uncertainty around the precise effect size. Nevertheless, leave-one-out analysis remained consistently favorable, with pooled estimates ranging from -3.16 to -5.07 mm Hg. Figure 4 shows the systolic blood pressure meta-analysis. Figure 4: Effect of Nurse-led self-management interventions on systolic blood pressure



Note. MD = mean difference in mm Hg. Negative values favor the nurse-led intervention. Because only five trials were pooled, Hartung-Knapp uncertainty is emphasized in the text.

Results of treatment-adherence outcomes were provided as continuous medication-adherence scores, proportions adhering to an adherence threshold, adherence measures specific to a medication regimen, or a self-care adherence index specific to a disease. Pooling of the constructs and scales was not statistically defensible because of the diversity of constructs and scales. Quality-of-life outcomes also varied, from generic health-related quality-of-life instruments to disease-specific quality-of-life instruments, symptom-burden scales and functional scores.

Treatment Adherence and Quality of Life

Representative comparative findings across the three prespecified outcome domains are summarized in Table 5.

Table 5. Representative comparative findings for the three prespecified outcome domains

Study	Condition	Outcome	Effect/result	Interpretation
Asmat et al., 2024	Type 2 diabetes	HbA1c	MD - 0.25 percentage points (95% CI -0.51 to 0.01)	Small effect; direction favored intervention
Crowley et al., 2022	Type 2 diabetes	HbA1c	MD - 0.61 percentage points (95% CI -1.12 to -0.11)	Favored comprehensive nurse-delivered telehealth

Changsieng et al., 2023	Type 2 diabetes	Medication adherence	Between-group change 1.1 points (P = .03)	Favored nurse-led supportive education
Alsaquer & Bebis, 2022	Hypertension	Systolic blood pressure	Modelled contrast favored intervention; intervention-group change approximately -14 mm Hg	Significant blood-pressure improvement reported
Lambrinou et al., 2025	Heart failure	Self-care and physical HRQoL	Education and/or telephone follow-up improved self-care and the physical HRQoL dimension	Favored structured nurse follow-up
Mizukawa et al., 2019	Heart failure	Quality of life	Quality of life improved versus usual care at 18 and 24 months (P < .05)	Longer-term QOL benefit
Tutur & Bicer, 2025	Hemodialysis	Adherence and quality of life	Multiple dietary/self-care and KDQOL-36 domains improved after	Favored nurse-led telephone follow-up

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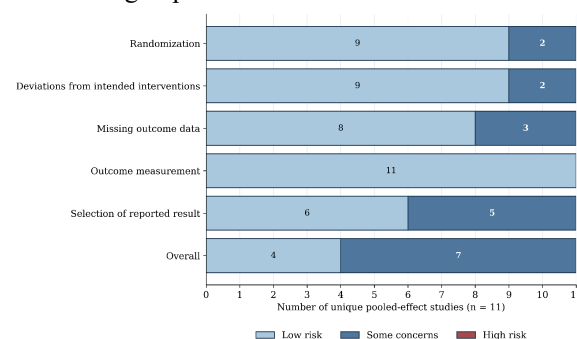
			telephon e counseli ng	
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The overall pattern of the narrative indicated that selected adherence and quality of life outcomes tended to be better with nurse-led interventions; however, the magnitude and extent of benefit depended on the type of disease, definition of adherence and quality of life outcomes, and the structure of the interventions. Studies of heart failure, respiratory disease, and kidney disease often reported on improved self-care behavior, management of symptoms or disease-specific quality-of-life domains, and several studies reported small or nonsignificant between-group differences on generic quality-of-life instruments.

Risk of Bias and Robustness

Risk-of-bias assessment was concentrated on the 11 unique studies contributing to the pooled estimates; three studies contributed to both outcome syntheses, producing 14 outcome-specific effect-size rows. Figure 5 summarizes the RoB 2 judgments across randomization, deviations from intended interventions, missing outcome data, outcome measurement, and selective reporting.

Figure 5: Risk of bias summary for studies contributing to pooled estimates



Note. Judgments are based on the five RoB 2 domains. No pooled study was classified as high risk overall in this assessment; several were rated as having some concerns.

Of the 11 different pooled-effect studies, 4 were considered overall low risk, 7 as having some concerns and none as high risk. Outcome measurement was low risk for all 11 studies, but selective reporting was the most common concern (5 of 11), followed by missing outcome data (3 of 11). All evidence together suggests that glycemic control measures significantly improved and that there may be a modest decrease in systolic blood pressure, and that there was significant between-study heterogeneity and some narrative evidence of benefits of adherence and quality of life.

Discussion

The results of this research have a number of implications. Self-management support by a nurse

seems to be most defensible as a structured intervention in chronic-disease management that involves individual education and behavioural reinforcement, monitoring and follow-up, instead of one-off provision of information. Another finding in the review is that continued contact is important: the greater HbA1c benefit at 6 months or less could indicate the need for planned contact over the longer term. The principal limitations of this review are that only two bibliographic databases were used, there was significant clinical and methodological heterogeneity and many adherence and quality-of-life outcomes were not statistically compatible. Its advantages are that it includes only RCTs, that it distinguishes between clinically different outcomes, that it includes sensitivity analyses and that it does not produce a single “disease-control” estimate which would bring together physiologically unrelated measures. Future studies should employ standardized adherence and quality-of-life measures, report all variance data and provide adequate follow-up to assess the sustainability of early treatment benefits.

There is cautious confidence in the quantitative findings based on the risk of bias profile. Of the 11 different studies used in the pooled estimates, 4 were considered low overall risk, 7 had some concerns and no studies were considered high overall risk. Some concerns focused primarily on selective reporting (5/11 studies), missing data on outcomes (3/11 studies); issues of randomization or deviations from intended interventions occurred in fewer studies. These restrictions have particular relevance because of the limited number of blood-pressure trials conducted and the high HbA1c heterogeneity. Publication bias testing was not performed due to the low number of independent studies included in the largest synthesis ($n = 9$), which is below the threshold at which funnel-plot asymmetry tests are informative (Sterne et al., 2011). Because treatment-adherence and quality-of-life constructs and instruments were too heterodox, they were not pooled. However, the narrative evidence was often favorable. For instance, Changsieng et al. (2023) reported an improvement of 1.1 points (between-group change, $p = .03$) in medication adherence and Lambrinou et al. (2025) reported an improvement in the physical dimension of health-related quality of life (between-group change, $F = 2.7$, $p = .046$) for in-person education. The findings are in line with previous studies and literature suggesting that nurse-led interventions can have a significant impact on behavioral and patient-reported outcomes despite small or inconsistent physiological outcomes (van Hooft et al., 2017; Li et al., 2022; Wong et al., 2022). If these outcomes cannot be quantitatively combined, it does not mean that they are not beneficial; it is rather a sign of measurement heterogeneity.

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The conventional random-effects estimate for the effect of nurse-led self-management interventions on systolic blood pressure was -4.20 mm Hg (-7.18 to -1.22), which was larger than the pooled reduction in blood pressure of approximately 3 mm Hg that was observed in the previous cross-disease review by Massimi et al. (2017). There was some heterogeneity ($I^2 = 53.4\%$, $\tau^2 = 5.711$), but leave-one-out estimates were still good and ranged between -3.16 and -5.07 mm Hg. But with only five studies available, the blood-pressure result is not as statistically stable as is indicated by the traditional confidence interval alone; the Hartung-Knapp interval was -8.90 to 0.49. Hence, the findings must still be interpreted as suggestive rather than definitive evidence of a small blood-pressure effect, as nurse-led care, with multiple follow-up visits and feedback and behavioural support, has been demonstrated to have a greater effect (Alsaqer & Bebis, 2022; Zhu et al., 2018).

The glycemic results are generally consistent with, and are as varied as, recent diabetes-specific evidence. Sun et al. (2025) reported an HbA1c reduction of -0.92 percentage points at 4-6 months (95% CI -1.44 to -0.41) and -0.54 percentage points beyond 6 months (95% CI -0.86 to -0.23), with high heterogeneity for HbA1c ($I^2 = 87.8\%$). The overall estimate we arrived at, -0.53 percentage points, is similar to that found by Sun et al. for the long-term effect, but we did not have as many individuals in our >6-month subgroup and the estimate crossed the null. This discrepancy could be due to the different trials included, baseline glycemic control, dose of the intervention and the different criterion used in the present review that the self-management component must be well defined as being under the lead of the nurses. The considerable levels of heterogeneity within both reviews support the notion that nurse-led diabetes interventions are not a homogeneous treatment but instead encompass a range of more or less intense programmes, with varying theoretical underpinnings, modes of delivery and follow-ups.

The HbA1c result is clinically important but needs to be viewed with some caution, taking account of the significant heterogeneity ($I^2 = 88.2\%$; $\tau^2 = 0.194$). Leave-one-out analyses yielded pooled effects between -0.40 and -0.59 percentage points, with the Hartung-Knapp interval still being statistically significant (-0.89 to -0.16). Follow-up also appeared relevant: trials assessed at 6 months or less showed a larger pooled reduction (MD = -0.71, 95% CI -1.19 to -0.24) than trials assessed after 6 months (MD = -0.22, 95% CI -0.46 to 0.02). This implies that structured nurse contacts have the most impact during active intervention and early follow-up and the impact may diminish with a reduction in nurse contact.

This review was a synthesis of 69 RCTs of self-management interventions delivered by nurses in various chronic diseases of adulthood. 43 trials reported disease-control outcomes, 32 trials reported quality of life, and 15 trials reported treatment adherence; trials could overlap across outcome domains. The quantitative evidence was most compelling in the area of glycemic control with nine trials that showed a pooled mean difference in HbA1c of -0.53 percentage points (95% CI -0.85 to -0.21; $p = .001$). In addition, nurse-led intervention was associated with a lower systolic blood pressure across five compatible trials (MD = -4.20 mm Hg, 95% CI -7.18 to -1.22, $p = .006$). These effects were associated with more general, but more variable, adherence and quality-of-life effects.

Conclusion

In summary, nurse-led self-management interventions are an effective strategy for improving selected outcomes among adults with chronic diseases. The clearest evidence supports better glycemic control and a probable reduction in systolic blood pressure, while the broader narrative evidence suggests additional benefits for treatment adherence and quality of life in many settings. The most promising programs are structured, patient-centered, and reinforced over time through continued nurse contact. Future randomized trials should prioritize standardized outcome reporting, longer follow-up, and clearer intervention descriptions so that the effectiveness of nurse-led self-management can be estimated more precisely across chronic disease groups.

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Appendix A. Database Search Strategies

Scopus

TITLE-ABS-KEY(

(
"nurse-led" OR "nurse led" OR "nurse-delivered" OR
"nurse delivered"
OR "nurse-managed" OR "nurse managed" OR
"nurse-directed" OR "nursing intervention*")

)

AND

(
"self-management" OR "self management" OR "self-care"
OR "self care"
OR "self-management support" OR "disease management")

)

AND

(
"chronic disease*" OR "chronic condition*" OR
"noncommunicable disease*" OR "non-communicable disease*" OR diabetes OR
hypertension
OR "cardiovascular disease*" OR "heart failure"
OR "chronic obstructive pulmonary disease" OR
COPD OR asthma
OR "chronic kidney disease" OR arthritis)

)

AND

(
random* OR "randomized controlled trial" OR
"randomised controlled trial"
OR RCT OR "controlled trial")

)

AND

(

"Nurses"[Mesh] OR "Nursing Care"[Mesh] OR
nurse-led[Title/Abstract]
OR nurse led[Title/Abstract] OR nurse-led

intervention*[Title/Abstract]

OR nurse-delivered[Title/Abstract] OR nurse
delivered[Title/Abstract]

OR nurse-managed[Title/Abstract] OR nurse
managed[Title/Abstract]

OR nurse-directed[Title/Abstract] OR nursing
intervention*[Title/Abstract]

)

AND

(

"Self-Management"[Mesh] OR "Self Care"[Mesh]
OR self-management[Title/Abstract]

OR self management[Title/Abstract] OR self-care[Title/Abstract]

OR self care[Title/Abstract] OR self-management
support[Title/Abstract]

OR disease management[Title/Abstract]

)

AND

(

"Chronic Disease"[Mesh] OR chronic
disease*[Title/Abstract]

OR chronic condition*[Title/Abstract] OR
noncommunicable disease*[Title/Abstract]

OR non-communicable disease*[Title/Abstract] OR
diabetes[Title/Abstract]

OR hypertension[Title/Abstract] OR cardiovascular
disease*[Title/Abstract]

OR heart failure[Title/Abstract] OR chronic
obstructive pulmonary disease[Title/Abstract]

OR COPD[Title/Abstract] OR asthma[Title/Abstract]
OR chronic kidney disease[Title/Abstract] OR
arthritis[Title/Abstract]

)

AND

(

"Randomized Controlled Trial"[Publication Type]
OR "Controlled Clinical Trial"[Publication Type]
OR random*[Title/Abstract] OR trial[Title/Abstract]

)

AND

(

adult[MeSH Terms] OR adult*[Title/Abstract]

)