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Systematic review

Empowering patients through knowledge: the impact of health education and patient counseling on disease prevention and self-management in family medicine; A systematic review

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Abstract

Background: Health education and patient counseling support prevention and daily management of chronic illness in family medicine. Their clinical effects differ in interventions and conditions. This review examined behavioral, psychosocial, and clinical outcomes of structured educational and counseling interventions. **Methods:** Ten randomized trials involving adults recruited through primary care were included. Eligible interventions included structured education, behavioral counseling, digital support, and supported self-monitoring. Publications dated through 31 Jan 2026 were considered, and clinically diverse outcomes were summarized narratively without statistical pooling. **Results:** The trials included 13,326 participants. Group diabetes education improved selected behaviors and clinical measures, although glycemic benefits were inconsistent. Digital diabetes support reduced glycated hemoglobin by 0.24 percentage points relative to control. Supported blood pressure monitoring reduced systolic pressure by 3-5 mmHg. A diabetes

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prevention intervention reduced the odds of diabetes progression, with a combined odds ratio of 0.57. Walking interventions increased daily steps, and brief physician referral support increased weight loss. Two large evaluations of additional behavioral or organizational support found no improvement in their principal outcomes. **Conclusions:** Structured education and counseling improved selected prevention and self-management outcomes within primary care. Benefits depended on intervention content, practical support, comparator care, and the outcome measured.

Keywords: Patient education; counseling; family medicine; primary health care; self-management; disease prevention; health literacy.

Introduction

Family medicine provides a setting for connecting clinical treatment with the decisions that patients make between consultations. Self-management education develops problem-solving skills and confidence alongside understanding of the underlying condition, extending the purpose of education beyond information transfer. This partnership gives patients an active role in setting goals and addressing difficulties encountered during everyday care (1).

Health literacy affect patients' ability to understand health messages, interpret medication instructions, and use preventive services, creating differences in how educational information is received and applied. Lower health literacy has been associated with greater hospital and emergency service use and lower uptake of selected preventive measures. These associations establish a rationale for accessible communication, without proving that improving knowledge alone reverses the associated clinical disadvantages (2).

Patient activation describes the knowledge, skills, and confidence involved in managing health and sustaining action during periods of difficulty. Its distinction from factual knowledge is relevant when assessing interventions that aim to translate understanding into practical behavior (3). Personalized care planning adds collaborative identification of problems, agreement on goals, and decisions about actions, linking patient priorities with clinical management over time (4). The relationship between education and health

outcomes differs in disease pathways, intervention components, and the intensity of professional support provided to participants (4,5). In asthma, supported self-management involving monitoring, written action plans, and regular professional review has reduced hospital admissions and unscheduled care. This experience supports evaluating the entire support package, since information, practical training, treatment decisions, and follow-up operate together within these interventions (5).

Prevention offers another application of counseling, with physician advice increasing smoking cessation and behavioral interventions addressing dietary and physical activity risks. These findings connect education with disease prevention, although the outcomes range from reported behavior to measured risk factors and clinical events (6,7). Interpretation requires attention to the population studied, the comparator intervention, and whether the reported outcome directly measures prevention or represents an intermediate marker.

Across these approaches, an important clinical question concerns the circumstances in which education and counseling produce measurable benefits beyond usual primary care (1,4,7). A synthesis in preventive and disease-management interventions requires separation of changes in knowledge, confidence, behavior, and clinical status (2-4). This review examined these outcomes in original randomized primary-care studies, emphasizing intervention delivery, comparative effects, and implications for patient-centered family medicine.

Methods

This study was conducted according to the PRISMA 2020 domains and a population, intervention, comparator, and outcome framework for adult primary-care educational interventions. Eligible participants were adults with established chronic conditions or modifiable disease risks recruited through general practice or linked community services. The review focused on original randomized trials comparing structured patient support with usual care, basic information, or an alternative support strategy.

Literature identification combined searches for PubMed, WOS and Scopus with accessible Cochrane publications, journal records, and reference-list checking. Search concepts included family medicine, general practice, primary care, patient education, counseling, self-management, health literacy, prevention, and randomized trials. Eligibility was restricted to reports published on or before 31/05/2026, with bibliographic details and reported outcomes checked against original publication records.

Two authors independently reviewed study eligibility and extracted the reported findings. Screening distinguished interventions containing active education, counseling, goal setting, or self-monitoring instruction from interventions based on pharmacological treatment. Hospital-only education, pediatric studies, uncontrolled evaluations, protocols, and secondary reviews were excluded from the original-study synthesis.

Extraction covered publication details, country, recruitment setting, allocation design, participant numbers, intervention content, comparator care, follow-up duration, and outcome definitions. Clinical outcomes included glycated hemoglobin, blood pressure, weight, and progression to diabetes; behavioral outcomes included physical activity and objectively measured health behaviors.

Psychosocial outcomes included self-efficacy, illness beliefs, diabetes-related distress, shared decision making, and quality of life. Separate reports from identical cohorts were not double-counted.

Methodological interpretation considered the allocation unit, outcome ascertainment, follow-up completeness, and the distinction between objective measurements and participant questionnaires. Lack of participant masking was considered separately from masking of clinical assessors, since educational interventions are visible to recipients. Findings were organized into disease self-management, supported monitoring, and prevention, with individual study characteristics and comparative results presented in separate tables. Adjusted between-group estimates and confidence intervals were retained when available, while within-group changes were explicitly distinguished from comparative treatment effects. Publications describing multicomponent interventions were interpreted as evaluations of the entire package rather than isolated tests of knowledge acquisition.

Clinical heterogeneity in conditions, educational intensity, comparator support, and outcome scales supported narrative synthesis rather than a pooled effect estimate. Statistical nonsignificance was interpreted without assuming equivalence, and behavioral improvements were distinguished from prevention of clinical events. Only published aggregate information was used, without access to identifiable participant records or collection of new patient data.

Table 1: Risk-of-bias assessment (Cochrane RoB 2)

Study	Outcome assessed	D1	D1b*	D2	D3	D4	D5	Overall judgment
Davies et al., 2008 (8)	HbA1c at 12 months	L	H	L	SC	L	SC	High risk
Deakin et al., 2006 (9)	HbA1c at 14 months	L		L	SC	L	SC	Some concerns
Murray et al., 2017 (10)	HbA1c at 12 months	L		L	SC	L	L	Some concerns
Griffin et al., 2014 (11)	Objectively measured physical activity energy expenditure at one year	L		L	L	L	SC	Some concerns
Kennedy et al., 2013 (12)	Self-efficacy at 12 months	L	SC	L	SC	H	L	High risk
McManus et al., 2018 (13)	Systolic BP at 12 months: each monitoring intervention versus usual care	L		L	SC	L	L	Some concerns
McManus et al., 2021(14)	Systolic BP at 12 months	L		L	SC	L	L	Some concerns
Sampson et al., 2021 (15)	Incident diabetes by study exit: combined intervention groups versus control	L		L	L	L	L	Low risk
Harris et al., 2017 (16)	Accelerometer-measured daily steps at 12 months: each intervention versus control	L	L	L	L	L	L	Low risk
Aveyard et al., 2016 (17)	Weight change at 12 months	L		L	SC	L	L	Some concerns

Results

Ten randomized trials involving 13,326 participants formed the synthesis, with samples ranging from 314 to 5,599 and recruitment based in the United Kingdom (8-17). The studies addressed diabetes, hypertension, long-term conditions, obesity, and physical inactivity through group education, individual counseling, practice training, or digital support (8-17). Follow-up centered on 12 months, with longer observation in X-PERT and the Norfolk prevention trial (9,15).

DESMOND enrolled 824 adults with newly diagnosed diabetes and found no significant adjusted difference in glycated hemoglobin at 12 months: 0.05 percentage points, with a 95% confidence interval of -0.10 to 0.20 (8). Weight loss was greater following education, alongside improvements in illness beliefs and smoking cessation (8). X-PERT, involving 314 adults, reported glycated hemoglobin changes of -0.6% versus +0.1% at 14 months, together with improvements in knowledge and self-empowerment (9).

HeLP-Diabetes randomized 374 adults and reduced glycated hemoglobin by 0.24 percentage points relative to basic online information at 12 months, without a significant overall reduction in diabetes-related distress (10). ADDITION-Plus evaluated additional facilitator-led counseling among 478 adults already receiving intensive diabetes treatment (11). It found no significant between-group differences in objectively assessed physical activity, dietary intake, smoking, or medication adherence after one year (11).

WISE recruited 5,599 patients with diabetes, chronic obstructive pulmonary disease, or irritable bowel syndrome to evaluate practice-level self-management support (12). Training and patient resources produced no significant improvement in the primary outcomes of shared decision making,

self-efficacy, and quality of life (12). Follow-up at 12 months was completed by 72.8% of participants, making retention relevant to interpretation of this organizational intervention (12).

TASMINH4 included 1,182 participants with poorly controlled hypertension and linked home monitoring to clinician-directed medication titration (13). Adjusted systolic blood pressure differences were -3.5 mmHg for self-monitoring and -4.7 mmHg for telemonitoring relative to usual care (13). HOME BP, involving 622 participants, combined digital support with home monitoring and guided treatment management (14). Its systolic difference was -3.4 mmHg, with a 95% confidence interval of -6.1 to -0.8, at 12 months (14).

The Norfolk Diabetes Prevention Study randomized 1,028 adults with high-risk glycemic categories to usual care or lifestyle support with or without volunteer mentors (15). Combined intervention groups had lower odds of progression to diabetes, with an odds ratio of 0.57 and a 95% confidence interval of 0.38-0.87 (15). PACE-UP increased daily steps at 12 months by 642 with postal support and 677 with nurse support relative to usual care (16). In Aveyard's trial, brief physician referral support produced 1.43 kg greater adjusted weight loss than advice alone (17). These prevention findings distinguish measurable behavioral and weight changes from the diabetes incidence outcome reported in Norfolk (15-17).

Several comparisons involved active support rather than an untreated control, including individual education, basic online information, intensive diabetes care, and brief advice (9-11,17). Accordingly, treatment estimates represented additional benefit over comparators (9-11,17). Differences in outcomes reflected comparisons between intervention packages rather than a uniform educational exposure.

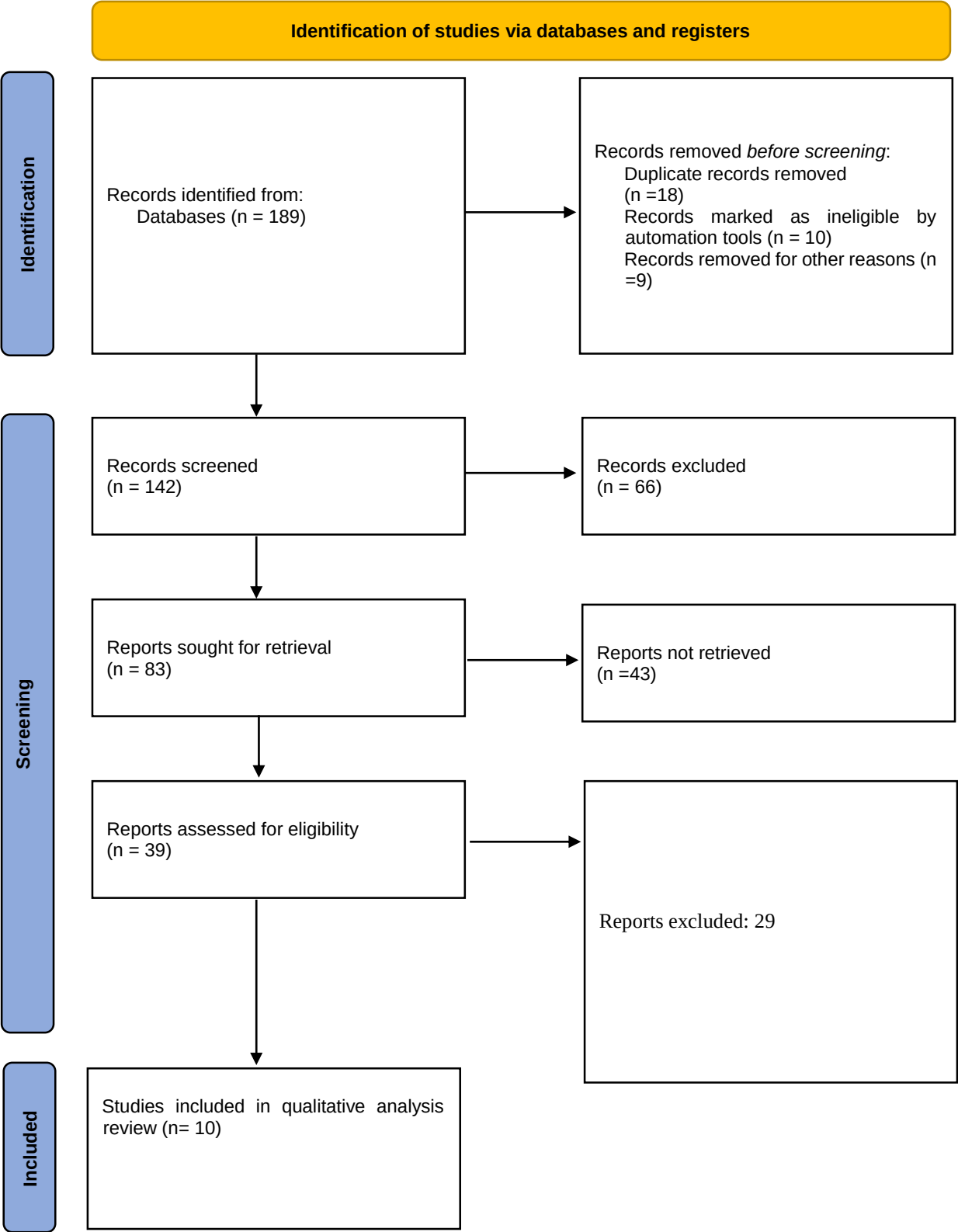


Figure 1: PRISMA flow chart

Table 1. Characteristics of the included studies

Study	Design; participants	Population	Intervention; comparator	Follow-up
DESMOND, 2008 (8)	Cluster RCT; 824	Newly diagnosed type 2 diabetes	Six-hour group education; usual care	12 months
X-PERT, 2006 (9)	Individual RCT; 314	Type 2 diabetes	Six 2-hour group sessions; individual appointments	14 months
HeLP-Diabetes, 2017 (10)	Individual RCT; 374	Type 2 diabetes	Interactive digital support; basic website	12 months
ADDITION-Plus, 2014 (11)	Individual RCT; 478	Recently diagnosed diabetes	Intensive care plus counseling; intensive care	12 months
WISE, 2013 (12)	Cluster RCT; 5,599	Diabetes, COPD, or IBS	Practice training and patient resources; routine care	12 months
TASMINH4, 2018 (13)	Individual RCT; 1,182	Uncontrolled hypertension	Supported monitoring with/without telemonitoring; usual care	12 months
HOME BP, 2021 (14)	Individual RCT; 622	Treated, uncontrolled hypertension	Digital monitoring and guided management; usual care	12 months
Norfolk, 2021 (15)	Individual RCT; 1,028	High-risk glycemic categories	Lifestyle groups with/without mentors; usual care	Mean 24.7 months
PACE-UP, 2017 (16)	Household-cluster RCT; 1,023	Adults aged 45-75 years	Postal or nurse-supported pedometer program; usual care	12 months
Aveyard, 2016 (17)	Individual RCT; 1,882	Adults with obesity	Brief facilitated referral; brief advice	12 months

Table 2. comparative outcomes

Study	Outcome	Finding
DESMOND (8)	HbA1c; weight	HbA1c MD 0.05 pp (-0.10 to 0.20); weight changes -2.98 versus -1.86 kg
X-PERT (9)	HbA1c change	-0.6 versus +0.1 pp; P<0.001
HeLP-Diabetes (10)	HbA1c; distress	HbA1c MD -0.24 pp (-0.44 to -0.049); overall distress difference nonsignificant
ADDITION-Plus (11)	Objective physical activity	MD +1.50 kJ/kg/day (-1.74 to 4.74); other objective behavioral outcomes nonsignificant
WISE (12)	Decision making; self-efficacy; quality of life	No significant improvement in these primary outcomes
TASMINH4 (13)	Systolic BP	Self-monitoring MD -3.5 mmHg (-5.8 to -1.2); telemonitoring MD -4.7 mmHg (-7.0 to -2.4)
HOME BP (14)	Systolic BP	MD -3.4 mmHg (-6.1 to -0.8)
Norfolk (15)	Incident diabetes	Combined interventions OR 0.57 (0.38-0.87); additional mentor benefit nonsignificant

PACE-UP (16)	Daily steps	Postal MD +642 (329-955); nurse-supported MD +677 (365-989)
Aveyard (17)	Weight loss	Adjusted additional loss 1.43 kg (0.89-1.97)

Discussion

The diabetes findings fit a wider literature in which structured self-management education has improved glycemic control, Steinsbekk et al. reported improvements following group education, supporting the relevance of collaborative learning and practical self-management support (19). Within our study the different results from DESMOND, X-PERT, and HeLP-Diabetes underline that educational programs do not produce a single predictable glycemic response (8-10).

Blood pressure findings agree with an individual patient data meta-analysis in which self-monitoring was more effective when accompanied by additional support (20). TASMINH4 and HOME BP connected patient participation with clinical decisions, including medication adjustment, so their benefits reflect combined management pathways (13,14). Attributing the entire reduction to counseling would overlook these treatment components and obscure the contribution of coordinated care between patients and primary-care professionals (13,14,20).

The behavior change wheel offers a framework linking capability, opportunity, and motivation with sustained action, placing knowledge within a broader set of behavioral determinants. Interpreted through this framework, goal setting, feedback, and accessible follow-up provide routes for translating understanding into everyday decisions, alongside the social and practical opportunities required for action (21). This is a conceptual interpretation of the trial findings, since the included comparisons did not isolate every proposed mechanism or establish

knowledge change as the mediator of clinical improvement (8-17,21).

Implementation requires attention to reach, adoption, delivery, and maintenance, consistent with the RE-AIM framework for evaluating health promotion interventions (22). The absence of patient-level improvement in WISE illustrates the difficulty of translating a practice-level support package into benefits experienced during routine care (12). Its findings place emphasis on evaluating actual intervention delivery and patient engagement alongside the availability of training materials and organizational resources (12,22).

Prevention findings further distinguish changes in risk-related behavior from changes in disease occurrence, with PACE-UP addressing activity, Aveyard's intervention addressing weight, and Norfolk measuring incident diabetes (15-17), their results support linking counseling with concrete actions, including monitored walking, facilitated referral, and repeated lifestyle support, without assuming equivalent effects across these different endpoints (15-17). The absence of additional benefit from volunteer mentors in Norfolk argues against treating greater intervention complexity as an automatic source of improved outcomes (15).

Interpretation is constrained by the United Kingdom setting of all ten trials, differences in comparator intensity, and the frequent use of multicomponent interventions (8-17). Digital delivery introduces additional selection considerations because access and willingness to use online support formed part of the context for participation in relevant trials (10,14). Questionnaire outcomes, incomplete follow-up, and variation in baseline treatment

further limit direct comparisons between programs (10-14). These limitations favor outcome-specific conclusions and explicit description of delivery conditions, while longer-term evaluation remains necessary for assessing maintenance and wider implementation across family-medicine services. The selected studies offered limited assessment of vaccination, screening uptake, and longer-term clinical complications, narrowing the prevention questions addressed by this synthesis. Outcome-specific interpretation is essential when translating educational achievements into claims about disease prevention across routine family medicine.

Conclusion

Health education and patient counseling improved selected clinical and behavioral outcomes in primary care, with benefits varying across intervention packages and patient groups. Structured diabetes education, supported blood pressure monitoring, walking programs, and facilitated weight-management referral produced measurable gains, while additional behavioral or organizational support did not consistently improve outcomes. Diabetes prevention was directly supported by one trial measuring progression to disease. Education was most meaningfully evaluated alongside goal setting, feedback, practical support, and clinical management, since interventions also incorporated monitoring, referral, and medication adjustment components.

Abbreviations

Abbreviation	Definition
ADDITION-Plus	Anglo-Danish-Dutch Study of Intensive Treatment in People with Screen Detected Diabetes in Primary Care-Plus
BP	Blood pressure
CI	Confidence interval
COPD	Chronic obstructive pulmonary disease

DESMOND	Diabetes Education and Self Management for Ongoing and Newly Diagnosed
HbA1c	Glycated hemoglobin
HeLP-Diabetes	Healthy Living for People with Diabetes
HOME BP	Home and Online Management and Evaluation of Blood Pressure
IBS	Irritable bowel syndrome
MD	Mean difference
OR	Odds ratio
PACE-UP	Pedometer And Consultation Evaluation-UP
pp	Percentage points
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomized controlled trial
RE-AIM	Reach, Efficacy, Adoption, Implementation, and Maintenance
TASMINH4	Telemonitoring and/or Self-Monitoring of Blood Pressure in Hypertension
WISE	Whole System Informing Self-management Engagement
X-PERT	Expert Education versus Routine Treatment

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