Journal of Multidisciplinary Healthcare

Dovepress
Taylor & Francis Group

Open Access Full Text Article

REVIEW

A Systematic Review of Continuity of Care Strategies for Enhancing Diabetes Self-Management in Older Adults in Asian Countries

Citra Windani Mambang Sari[1,2], Hartiah Haroen[1], Neti Juniarti[1], Lisda Amalia[3], Jerico Franciscus Pardosi[4]

[1]Doctoral Program, Faculty of Medicine, Universitas Padjadjaran, Sumedang, West Java, Indonesia; [2]Department of Community Nursing, Faculty of Nursing, Universitas Padjadjaran, Sumedang, West Java, Indonesia; [3]Department of Neurology, Faculty of Medicine, Universitas Padjadjaran, Hasan Sadikin General Hospital, Bandung, West Java, Indonesia; [4]School Public Health and Social Work, Faculty of Health, Queensland University of Technology, Brisbane, QLD, Australia

Correspondence: Citra Windani Mambang Sari, Faculty of Nursing, Universitas Padjadjaran, Jl. Raya Ir. Soekarno KM. 21, Hegarmanah, Jatinangor, Sumedang, West Java, 45363, Indonesia, Fax +62227795596, Email citra.windani@unpad.ac.id

Background: Diabetes mellitus is a major health challenge among older adults in Asia. Challenges include limited healthcare access and poor self-care adherence. Continuity of care has emerged as a key strategy to enhance diabetes self-management in this population.

Purpose: This review aimed to identify the continuity of care strategies in improving diabetes self-management among older adults in Asian countries.

Methods: This systematic review was conducted following the PRISMA guidelines and registered on PROSPERO (CRD420251017515). A comprehensive search was performed in five major databases, including CINAHL, PubMed, ScienceDirect, Scopus, and Taylor & Francis. Inclusion criteria covered full-text, english-language experimental studies in Asian countries. Studies were excluded due to lack of full-text access, non-English language, and secondary research. Data analysis was carried out using descriptive qualitative and thematic analysis.

Results: A total of 12 included studies were analyzed in this review. Three categories of continuity of care strategies were identified such as social support and educational interventions, community-based interventions and integrated health management, and technology-based interventions and health monitoring. Most of the studies analyzed in this review indicate that continuity of care improves medication adherence, self-efficacy, physical activity, glycemic control, patient satisfaction, and quality of life among older adults with diabetes. For instance, several interventions reported reductions in HbA1c ranging from 0.28% to 0.7%, indicating meaningful clinical improvements in glycemic control among older adults.

Conclusion: Continuity of care is an effective strategy for enhancing diabetes self-management among older adults, with a combination of educational, technological, and community-based interventions yielding optimal outcomes. Integrating technology into diabetes monitoring can improve medication adherence, while social support programs and community health services play a vital role in enhancing patients' overall well-being. This study highlights the need for tailoring continuity of care strategies to the social and cultural contexts of Asian countries to maximize long-term effectiveness.

Keywords: continuity of care, diabetes mellitus, older adults, self-management, community-based, technology interventions, Asia

Introduction

Diabetes mellitus (DM) is one of the global health challenges that has increased in recent decades.

According to the 2025 International Diabetes Federation (IDF) Diabetes Atlas, the global prevalence of diabetes among adults aged 20–79 years has reached 11.1%, representing approximately 589 million individuals.[1] Notably, over

Received: 31 May 2025
Accepted: 23 July 2025
Published: 2 September 2025

40% of these individuals remain undiagnosed. This number is projected to increase substantially, with an estimated 853 million people expected to be living with diabetes by the year 2050.[1]

The increasing prevalence of DM occurs mainly in Asian countries, which are experiencing significant demographic and lifestyle changes.[2] A previous meta-analysis of data from 2012 to 2023 found the prevalence of diabetes in South Asia to be 8.56%, while pre-diabetes reached 18.99%.[3] Liu et al reported that the trend of DM incidence in the elderly in the world has increased over a period of more than two decades (1990–2017).[4] The elderly are known as the most vulnerable group to the negative impacts of this disease due to physiological changes, comorbidities, and limitations in access and continuity of care services.[5] In addition, elderly people with DM have greater risk than other elderly people for several common geriatric syndromes, such as polypharmacy, cognitive impairment, depression, urinary incontinence, falls causing injury, persistent pain, weakness.[4,5] In addition, diabetes-related complications are more dangerous than the disease itself, which emphasizes the pressing need to manage daily blood glucose and self-care activities effectively.[6,7]

There are several challenges and obstacles in managing diabetes among older adults.[6] These challenges can be grouped into three main categories: disease progression and complications, accompanying geriatric syndromes, and logistical constraints in long-term care.[8] In addition, compliance with diet and foot care was relatively lower.[9] Another study in older adults with diabetes revealed that medication adherence tended to be higher than adherence to exercise, diet, or blood glucose monitoring among self-care tasks.[10,11] These factors can contribute to each other, overlap each other, or have an impact individually or simultaneously, making diabetes management more complex.[12]

Continuity of care (CoC) is a key element in sustainable diabetes management.[13–15] COC refers to the degree to which a series of discrete healthcare is experienced as coherent, connected, and consistent with the patient's medical needs and personal context.[13–15] This concept includes longitudinal care, stable relationships between patients and health workers, and ongoing coordination of services.[16] The CoC components are predicted to increase compliance, self-management, control of results and satisfaction.[16–18] Unfortunately, many countries in Asia and developing countries still face challenges in implementing continuity of care effectively, especially in health care systems that tend to be fragmented.[12,19,20] In addition, other challenges such as fragmentation of health services, lack of integration of electronic information systems, and limited access to primary health facilities remain as major obstacles.[21,22] As a result, patients often experience difficulties in obtaining holistic and sustainable care, which results in low effectiveness of diabetes self-management.[21,22]

Several strategies have been developed to improve continuity of care in the management of diabetes in the elderly. Community-based approaches, telemedicine, and coordination between primary and specialist services are some of the solutions that have been implemented in various countries.[14,23–25] The method of involving visits by nurses and other health workers, coordination of care and systematic navigation reported significant results on elderly self-management.[26,27] Several studies in (list of cited countries here) have shown that continuity of care can improve compliance, self-management, control of blood sugar results, satisfaction and quality of life of elderly patients with diabetes.[13,14,23–25,28] In addition, the use of technology in diabetes management, such as blood glucose monitoring applications and digital medication reminders, has also been shown to help patients maintain adherence to their treatment.[29]

The effectiveness of continuity of care in enhancing diabetes self-management among older adults in low- and middle-income countries (LMICs) remains insufficiently explored. The diversity of health systems, the level of patient health literacy, and the availability of adequate health workers are factors that influence the success of implementing this strategy.[30] Therefore, a comprehensive evaluation of the effectiveness of the various strategies that have been implemented is needed to determine the best model that can be adapted to various countries in Asia.

Based on the results of the literature search, various studies have revealed important findings regarding continuity of care strategies for the elderly with diabetes in Asia countries. The management of diabetes in older adults warrants particular emphasis in Asian countries, primarily due to the region's accelerated demographic aging, increasing rates of urbanization, and substantial lifestyle transitions all of which contribute to a heightened burden of diabetes in this population.[31,32] In South Asia, dietary patterns are predominantly high in carbohydrates and often misaligned with nutritional recommendations for diabetes, posing significant challenges for older adults who may struggle to alter long-standing habits.[33–35] Moreover, the presence of the distinct "thin-fat" phenotype common in South Asian populations predisposes older individuals to diabetes at lower body mass index (BMI) thresholds.[33,35] These physiological and

behavioral factors, when combined with lower per capita income among the elderly and the rising costs of diabetes-related care, particularly within genetically susceptible ethnic groups, further compound the complexity of managing diabetes in this setting.[32] Accordingly, the identification and implementation of contextually appropriate continuity of care strategies is essential to address these multifaceted challenges and to promote sustainable self-management among older adults with diabetes in the region.

However, to our knowledge there has been no systematic review that specifically analyzes and summarizes these findings in depth. This study is the first systematic review to evaluate various continuity of care strategies for the elderly with diabetes in Asian countries. Previous reviews still show quite high heterogeneity, both in terms of age range (from middle age to elderly) and research settings and locations.[36–38] Therefore, this review aims to identify continuity of care strategies that support the improvement of self-management among older adults with diabetes, particularly within the Asian context. With this systematic review, it is hoped that the results of the study can provide insight for health workers, policy makers, and researchers in developing a more effective and efficient continuity of care model for the elderly with diabetes.

Materials and Methods

Design

This research utilized a systematic review approach, guided by the Cochrane Handbook for Systematic Reviews of Interventions and conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[39,40]

Eligibility Criteria

In this review, three reviewers independently (CWMS, HH, NJ) selected relevant articles based on the PRISMA guidelines and registered on PROSPERO with registration number CRD420251017515 (see Figure 1). The formulation

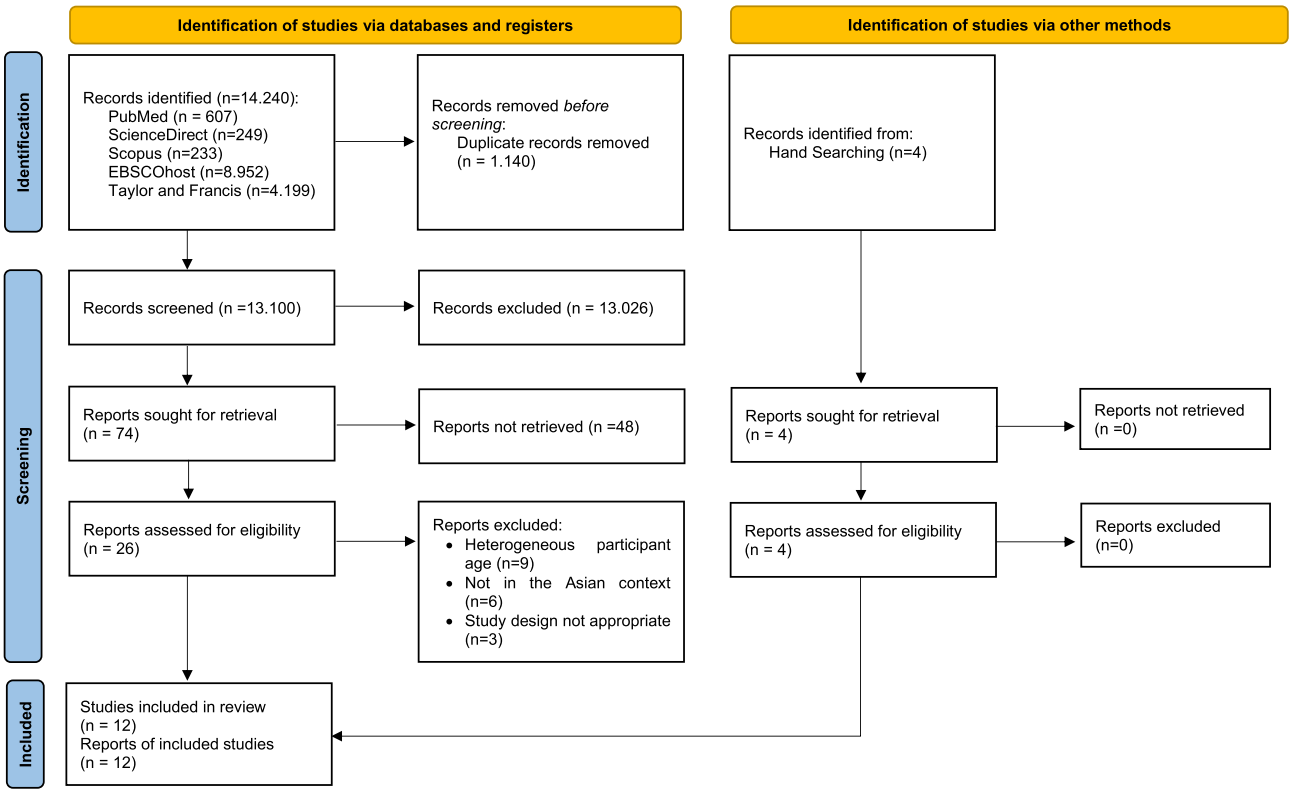

Figure 1 PRISMA Flow Diagram. Adapted from Page MJ, McKenzie JE, Bossuyt PM et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. Creative Commons.[39]

of research questions and eligibility criteria was guided by the PICOT framework. The population (P) targeted in this review was older adults with diabetes in Asian countries. The intervention (I) examined was continuity of care strategies, including follow-up care, care coordination, transitional care, and long-term management approaches. The comparator (C) was usual care, while the outcome (O) focused on improved diabetes self-management, such as better glycemic control, medication adherence, lifestyle modification, and etc. The type of study (T) included in this review was limited to randomized controlled trials (RCTs) and quasi-experimental studies.

Studies were included if they were full-text, published in English, and applied an experimental design evaluating the effectiveness of continuity of care strategies in improving diabetes self-management among older adults in Asian countries. Publications were excluded if the full text was inaccessible, the language was not English, or the study was secondary research. No restrictions were applied to the year of publication to ensure a comprehensive exploration of relevant studies.

Search Strategy

The literature search process was carried out by two authors (CWMS and HH). The identification of articles was conducted systematically through five main databases: CINAHL Plus with Full Text, Academic Search Complete, PubMed, ScienceDirect, Scopus, and Taylor and Francis. The search terms used in the search process included:

> diabetes mellitus OR DM AND older adults OR elderly OR aging population AND continuity of care OR care coordination OR follow-up care OR transitional care AND self-management OR self-care OR glycemic control OR medication adherence.

The Boolean operators "AND" and "OR" were utilized to refine or broaden the search results and to capture relevant literature across various databases effectively. In addition to database searching, hand searching was also conducted. Hand searching refers to the manual process of reviewing reference lists of relevant articles, journals, or conference proceedings to identify additional studies that may not have been retrieved through electronic databases. This approach was used to ensure a more comprehensive and thorough identification of eligible studies for inclusion in the review (Supplementary Table 1).

Study Selection and Quality Appraisal

Three authors (CWMS, HH, and NJ) independently screened studies based on the established eligibility criteria. In the initial selection phase, duplicates were identified and removed using the Mendeley reference manager. Following this, the titles, abstracts, and full texts of the articles were assessed for their relevance to the research topic, and the inclusion and exclusion criteria were applied. In the final stage, another authors (NJ, LA, and JFP) thoroughly reviewed each selected article using the Joanna Briggs Institute (JBI) critical appraisal checklist to assess the quality of the studies.[41]

For quality assessment, articles with a randomized controlled trial design were evaluated using 13 criteria, while those with a quasi-experimental design were assessed using 9 criteria. Each item provided four response options: Yes, No, Not Applicable, and Unclear. A score of 1 was assigned for each "Yes" response, while all other responses received a score of 0. Studies that obtained a JBI score below 75% were excluded from the review (See Table 1). Any discrepancies in the assessment results were discussed among the all authors. However, no disagreements occurred regarding the suitability of the selected studies for inclusion (Supplementary Table 2, Supplementary Table 3).

Assessment of Risk of Bias in Included Studies

The reviewers (CWMS, HH, NJ, and JFP) independently assessed the Risk of Bias (RoB) for RCT studies included in this review analysis using the Cochrane Risk of Bias (RoB) tool. RCT studies consist of five RoB domains, including (1) randomization process, (2) deviation from the intended intervention, (3) missing outcome data, (4) outcome measurement, and (5) selection of reported outcomes.[46] RoB is defined as "high", "low", or "some concern", or "no information" for each domain.

RoB assessment for quasi-experimental design used the Cochrane Review of Nonrandomized Intervention Studies (ROBINS-I).[47] ROBINS-I consists of 7 domains: Bias due to confounding, Bias in the selection of participants into the study, bias in classification of interventions, bias due to deviations from intended interventions, bias due to missing data,

Table 1 JBI Critical Appraisal Results

Study	Design	Critical Appraisal Score
Azadbakht et al, (2023)[24]	Quasi-experimental	8/9 (89%)
Chao et al, (2014)[14]	RCT	10/13 (77%)
Ghasemi et al, (201 9[25]	RCT	10/13 (77%)
Pitchalard et al, (2022)[23]	Quasi-experimental	9/9 (100%)
Sazlina et al, (2015)[42]	RCT	10/13 (77%)
Tanaka et al, (2021)[13]	RCT	10/13 (77%)
Chao et al, (2015)[28]	RCT	10/13 (77%)
Moriyama et al, (2009)[43]	RCT	10/13 (77%)
Park et al, (2024)[15]	RCT	10/13 (77%)
Saghaee et al, (2020)[44]	Pilot RCT	10/13 (77%)
Arovah et al, (2018)[45]	Pilot RCT	10/13 (77%)
Seah et al, (2022)[27]	RCT	11/13 (84.6%)

Bias in measurement of the outcome, and Bias in selection of the reported result. Discrepancies in the assessment results were then discussed, and review by the all authors determined the decision (Supplementary Risk of Bias Result).

Data Extraction and Analysis

In this review, data from the selected studies were extracted and analyzed using tables that summarized all findings relevant to the research topic. The extraction table included key study characteristics, such as the author, study design, country, sample size, intervention, comparator, and results. As all included studies were experimental in nature (RCTs and quasi-experiments), the data were analyzed thematically using an exploratory descriptive approach.

The extracted data were categorized into three tables for clarity. Table 2 presented the characteristics of the studies, including study, country, design, participants, measurement, intervention, control, and key findings. Table 3 focused on patient characteristics of the included studies, covering study, mean age, education, percentage of female participants, HbA1c (mmol/mol and %), BMI (kg/m²), and presence of complications. Table 4 detailed the characteristics of the interventions, including study, intervention, setting, intervention components, and method characteristics (follow-up and media used).

The analysis process began with organizing and presenting the extracted data in table format based on the reviewed articles. Each finding was then analyzed and described in detail according to the extracted information. To ensure accuracy and reduce the risk of errors during data extraction, the authors conducted a final review of all included studies.

Results

Study Selection

A systematic literature search was conducted through five databases, namely PubMed (n = 607), ScienceDirect (n = 249), Scopus (n = 233), EBSCOhost (n = 8,952), and Taylor & Francis (n = 4,199). From this search, a total of 14,240 articles were obtained. After the initial screening process, 1,140 articles were removed because they were duplicates, leaving 13,100 articles for screening. At the screening stage, 13,026 articles were excluded because they did not meet the inclusion criteria, leaving 74 articles to be further evaluated for full-text screening. Of these, 48 articles were excluded, leaving 26 articles to be assessed for eligibility.

At the eligibility assessment stage, 18 articles were excluded due to heterogeneous participant ages (n = 9), study contexts not in Asia (n = 6), and inappropriate study designs (n = 3). On the other hand, researchers conducted hand

https://doi.org/10.2147/JMDH.S536258

Table 2 Characteristics of Study

Study	Country	Design	Participant	Measurement	Intervention	Control	Key Findings
Azadbakht et al (2023)[24]	Iran	Quasi-experimental	92 older adults at least 60 years of age with T2DM	• Diabetes distress scale • Knowledge of diabetes questionnaire • Diabetes Empowerment Scale (DES-28) • Diabetes Attitude Scale (DAS-3)	Peer social support network	Routine primary health care	The mean change in HbA1C in the intervention and control groups at baseline and after a 6-month follow-up was −0.7 and 0.1, respectively, which was significant ($p<0.001$). Mean difference: IG (−0.80±0.5); CG (−0.15±0.5) The difference in the mean change in diabetes distress ($p=0.008$), self-efficacy ($p<0.001$), and attitude ($p<0.001$) was also significant.
Chao et al, (2014)[14]	China	RCT	100 elderly with T2DM at least age 60 and over	• Fasting blood glucose levels measured by glucose oxidase method • Questionnaire assessing health behaviors • Markov model simulating disease progression to complications or death over 13 years based on transition probabilities	Community-based health management (education, counseling, monitoring, etc).	Usual care	Health management significantly reduced complications and mortality over 13 years
Ghasemi et al, (2019[25]	Iran	RCT	44 elderly patients with diabetes, age >65 years	Diabetes Quality-of-Life (DQOL) Questionnaire	Peer-group education (8 sessions)	Researcher-led education	The results showed that the QOL score in the dimensions of worries about diabetes effects ($p=0.042$), impact of diabetes treatment, ($p=0.001$), and satisfaction with diabetes treatment ($p=0.001$).
Pitchalard et al, (2022)[23]	Thailand	Quasi-experimental	23 elderly ethnic minority patients with type 2 diabetes, age ≥60 years	• Diabetes Self-Management Questionnaire (T-DSMQ) • Client Satisfaction Questionnaire (CSQ) • Happiness Measure (HM) • Fasting Blood Sugar (FBS)	HOME Model (Home intervention, Online monitoring, Multidisciplinary approach, Equity & education)	No control group	Significant improvement in self-management, blood sugar levels, and satisfaction ($p<0,005$)
Sazlina et al, (2015)[42]	Malaysia	RCT	69 sedentary older Malays with type 2 diabetes, age ≥60 years	• Pedometer, Physical Activity Scale for Elderly (PASE) • HbA1c • BMI • 6-Min Walk Test • Self-Efficacy for Exercise Scale	Personalized feedback (PF) on physical activity alone or combined with peer support (PS)	Usual care	PF+PS improved physical activity, cardiorespiratory fitness, and social support from friends ($p<0.05$)
Tanaka et al, (2021)[13]	Japan	RCT	76 older adults with type 2 diabetes	• HbA1c • Diabetes Therapy-Related Quality of Life (DTR-QOL) • SMBG Questionnaire	Diabetes self-management education using JADEC Card System & SMBG Analyzer	Standard Diabetes self-management education (DSME)	HbA1c improved during the 6 months after randomization in group I (baseline, 8.0–0.9% and 6 M 7.7–0.9%; $p < 0.05$), no change in CG, better SMBG engagement

Chao et al, (2015)[28]	China	RCT	100 older adults with type 2 diabetes, age ≥60 years	• Health Knowledge Score • Self-Evaluated Psychological & Health Status • Diet Score • Waist-to-Hip Ratio • BP, Fasting Blood Sugar	Integrated Health Management Model (education, self-monitoring, psychological support)	Usual care	Significant improvement in self-management, psychological health, and reduced hospital admissions (p<0,05)
Moriyama et al, (2009)[43]	Japan	RCT	75 with type 2 diabetes	• Self-Efficacy Scale • Goal Attainment Score • BP, HbA1c, QOL	12-month structured self-management education program with monthly coaching and biweekly calls	Usual care	Improved HbA1c, self-efficacy, BP, total cholesterol, and QOL (p<0,05)
Park et al, (2024)[15]	South Korea	RCT	105 older adults with type 2 diabetes, age ≥65 years	• HbA1c • Diabetes Self-Care Activities (SDSCA) • Self-Efficacy Scale • Quality of Life (DQOL)	12-week digital self-care intervention using DiaNote app (self-monitoring, education, phone visits)	Traditional logbook for self-care	HbA1c reduction significant in DiaNote group (p=0.049) with IG (6.95±30.87 to 6.82 ±3 0.75) and CG (6.83± 0.85 6.92 ± 0.92) Self-care and quality of life improved in both groups.
Saghaee et al, (2020)[44]	Iran	Pilot RCT	34 older adults with type 2 diabetes, age ≥60 years	• Diabetes Management Self-Efficacy Scale (DMSES) • Diabetes Quality of Life (DQOL-BCI) • PHQ-9 (Depression) • Self-Management Scale (DSMS) • Social Loneliness Scale (SELSA-S)	Persian Diabetes Self-Management Education (PDSME) program (8 workshops over 4 weeks)	Routine education (2 non-interactive sessions)	Improved self-efficacy (p=0.02) and quality of life (p=0.04)
Arovah et al, (2018)[45]	Indonesia	Pilot RCT	43 participants with Type 2 Diabetes Mellitus (T2DM)	• Pedometer-measured daily steps (Yamax SW200) • Self-reported physical activity (7-day PAR) • Glycaemic parameters (HbA1c, FPG, 2h-PG) • Social Cognitive Theory (SCT) scales • Health-Related Quality of Life (HRQoL) scales	Group with pedometer plus support: Received pedometer, step logbooks, daily text message support, and educational materials based on social cognitive theory. The programme lasted 24 weeks (12 weeks intensive phase with support, followed by 12 weeks maintenance phase without support).	Group with pedometer only: Received pedometer and step logbooks only; no additional support or educational materials provided	Both groups showed increased physical activity and improved glycaemic parameters (p<0,05) Group with pedometer plus support had a significantly greater increase in daily step counts (2064 steps more at week 24 compared to control group) Improvement in social cognitive processes was observed only in the group with support
Seah et al, (2022)[27]	Singapore	Cluster randomized controlled trial (RCT)	257 community-dwelling older adults aged 55–99 with type 2 diabetes mellitus (T2DM)	• Diabetes knowledge: Revised Michigan • Diabetes Knowledge Questionnaire (RMDKQ) • Self-care behavior: Revised Summary of • Diabetes Self-Care Activities (RSDSCA) • Medication adherence: Medication Adherence Report Scale (MARS-5) • Glycemic control: A1C levels	Intervention Group 1: 12-week SCOPE-DM program focused on diabetes education, psychological techniques (eg, problem-solving, motivational interviewing). Intervention Group 2: SCOPE-DM program + free glucometer and accessories	Routine care by healthcare providers (regular follow-up, medications)	Intervention Group 2 showed significant improvements in medication adherence and self-monitoring of blood glucose (SMBG) at 3 months, and in diabetes knowledge and general diet control at 6 months.

Abbrevations: BP, Blood Pressure; BMI, Body Mass Index; CG, Control Group; DSME, Diabetes Self-Management Education; DQOL, Diabetes Quality of Life; DSI, Digital Self-Care Intervention; EME, Ethnic Minority Elderly; FBG, Fasting Blood Glucose; HbA1c, Hemoglobin A1c (glycated hemoglobin); HOME model, Home intervention, Online monitoring, Multidisciplinary approach, Equity and Education; ICT, Information and Communication Technology; mHealth, Mobile Health; OG, Observation Group; PDSME, Persian Diabetes Self-Management Education; PF, Personalized Feedback; PS, Peer Support; QOL, Quality of Life; RCT, Randomized Controlled Trial; SMBG, Self-Monitoring of Blood Glucose; T2DM, Type 2 Diabetes Mellitus.

Table 3 Patient Characteristics of the Included Studies

Study	Mean Age	Education	Woman	HbA1c mmol/mol (%)	BMI kg/m^2 (mean)	Complication
Education and social support-based interventions						
Azadbakht et al, (2023)[24]	64.2±3.3	Illiterate (79.3%)	66.3%	IG: 8.44±0.8 CG: 8.33±0.8	N/I	27.2% had diabetes-related complications
Ghasemi et al, (201 9[25]	N/I	Majority middle school or below	55%	N/I	N/I	N/I
Saghaee et al, (2020)[44]	66.3±6.4	Higher than secondary school (41.17%)	41.17%	N/I	N/I	67.7% had diabetes-related complications
Moriyama et al, (2009)[43]	66.4±9.2	N/I	53.8	7.5±1.5	Weight (60.0± 11.0)	N/I
Community-based and integrated care models						
Chao et al, (2014)[14]	68.5±6.0	Middle school (53%)	51%	N/I	N/I	Yes (63%)
Seah et al, (2022)[27]	71.6	No formal education/ primary level (51.4)	66,1and	IG 1: 7.84 ± 1,19 IG 2: 7.52 ± 1,27	N/I	N/I
Chao et al, (2015)[28]	68.5±6.0	Primary school (26%)	46%	N/I	N/I	Yes 64%
Technology-based and remote monitoring						
Tanaka et al, (2021)[13]	61±8.4	N/I	21%	7.9±0.8	25.2 ±3.0	N/I
Park et al, (2024)[15]	72.7±4.76	High school (34%)	45.3%	6.89±0.86	24.13±3.09	N/I
Pitchalard et al, (2022)[23]	67.87±5.44	Majority never attended school (89.96%)	69.57%	Reduced FBS from 130 to 113.86 mg/dL (p<0.001)	N/I	N/I
Sazlina et al, (2015)[42]	64±7	Secondary education (73.9%)	46.4%	8.10±1.90	26.8±5.5	N/I
Arovah et al, (2018)[45]	65.9 ± 6.5	Up to high school diploma (68.2%)	63.6%	7.75 (6.76–8.73)	24.6 ± 3.5	N/I

Table 4 Characteristic of Intervention

Study	Intervention	Setting	Components	Method Characteristics	
				Follow up	Media
Education and social support-based interventions					
Azadbakht et al, (2023)[24]	Peer social support network for 3 months (12 sessions)	Clinic (Health Center)	Group education, emotional support, sharing experiences, peer discussions on self-management and psychological coping	6 months	Face-to-face group meetings
Ghasemi et al, (201 9[25]	Peer education vs researcher-led; 8 sessions x 30–45 min	Clinic (Health Center)	Peer-led/self-care education (diet, exercise, skin care), quality of life improvement, group discussions, Q&A	1 months	Face-to-face sessions (lecture, discussion, Q&A)
Saghaee et al, (2020)[44]	Persian DSME (8 sessions in 4 weeks)	Clinic (Outpatient)	Group workshops (diet, exercise, monitoring, medication, coping), support network, education materials	4 weeks	In-person group workshops
Moriyama et al, (2009)[43]	Self-management education program for 12 months	Clinic (Outpatient)	Monthly interviews (<30 min), biweekly calls, goal setting, behavior change support, family involvement	12 months	In-person interviews, biweekly phone calls

(*Continued*)

Table 4 (Continued).

Study	Intervention	Setting	Components	Method Characteristics	
				Follow up	Media
Community-based and integrated care models					
Chao et al, (2014)[14]	Community-based health management for 18 months	Community	Health evaluation, tailored exercise, diet counseling, psychological support, education sessions, phone consultation, health material distribution	18 months	Face-to-face, phone, printed materials
Seah et al, (2022)[27]	Group 1: 12-session SCOPE-DM program (education, psychological behavior change strategies). Group 2: SCOPE-DM + free glucometer and accessories	Community-based sites	Diabetes education, Goal setting, Motivational interviewing, SMBG training, Guided autobiography, and Group discussion and peer support	3 and 6 months after baseline	Face-to-face group sessions with printed materials, glucometer for Group 2, motivational interviewing by nurse educators
Chao et al, (2015)[28]	Integrated health management model	Community	Health records, evaluation, self-management training, diet/exercise advice, psychological support, monitoring	18 months	In-person, health materials
Technology-based and remote monitoring					
Tanaka et al, (2021)[13]	DSME with Diabetes Education Card System + SMBG analyzer	Clinic (Outpatient)	Structured DSME, SMBG analysis, tailored guidance points, goal setting, monitoring, multidisciplinary team support	6 months	In-person clinic visits, SMBG device, education cards
Park et al, (2024)[15]	Digital self-care via DiaNote app + phone support	Home based	DiaNote app (diet, exercise, glucose tracking), diabetes education, phone support from nurse	12 weeks	Smartphone app (DiaNote), phone calls
Pitchalard et al, (2022)[23]	HOME model: Home-based care with online monitoring and education	Home based	Home visits, online monitoring, multidisciplinary support, health education, equity approach for ethnic minorities	12 weeks	Home visits, online tools (not specified), family involvement
Sazlina et al, (2015)[42]	Personalized feedback (PF) alone or with peer support (PS)	Community	PF: feedback on physical activity via pedometer; PS: peer mentor support, group meetings, calls; unsupervised walking	36 weeks	Written feedback, phone calls, group meetings
Arovah et al, (2018)[45]	Walking with Diabetes (pedometer + text support)	Community	Pedometer for step monitoring, SMS/text education and support (behavioral goal setting, motivation), education material	24 weeks	Pedometer, SMS/text messages, education leaflets

Abbreviations: BP, Blood Pressure; BMI, Body Mass Index; CG, Control Group; DSME, Diabetes Self-Management Education; DQOL, Diabetes Quality of Life; DSI, Digital Self-Care Intervention; EME, Ethnic Minority Elderly; FBG, Fasting Blood Glucose; HbA1c, Hemoglobin A1c (glycated hemoglobin); HOME model, Home intervention, Online monitoring, Multidisciplinary approach, Equity and Education; ICT, Information and Communication Technology; mHealth, Mobile Health; OG, Observation Group; PDSME, Persian Diabetes Self-Management Education; PF, Personalized Feedback; PS, Peer Support; QOL, Quality of Life; RCT, Randomized Controlled Trial; SMBG, Self-Monitoring of Blood Glucose; T2DM, Type 2 Diabetes Mellitus.

searching and found 4 additional articles that met the criteria for analysis. Thus, 12 articles from electronic databases met the criteria for inclusion in the systematic review (see Figure 1).

Quality Appraisal and Risk of Bias of Included Studies

The critical appraisal results of the nine RCT studies showed that all studies implemented proper randomization and ensured similarity of baseline characteristics between groups (See Table 1). However, none of the studies reported hidden allocation, and blinding was not applied to participants, intervention providers, or outcome assessors, which could potentially increase bias. Nevertheless, all studies used appropriate statistical analysis and met the intent-to-treat principle. The overall score obtained was 10/13 (77%).

Meanwhile, two quasi-experimental studies showed clear causal relationships and ensured similar treatment between groups. Only one study had a control group, but both conducted repeated measurements, proper statistical analysis, and good follow-up. The scores obtained were 89% and 100%. Overall, although the study methodology was quite strong,

weaknesses in blinding in RCTs and the absence of a control group in one of the quasi-experimental studies are still challenges that need to be improved.

Based on the results of the RoB analysis, 2 out of 10 RCT studies were included in the high risk category and 7 other studies were included in the some concern category (see Figures 2 and 3). Most RCT studies still do not inform and consider the aspect of bias due to deviations from intended intervention. Meanwhile, in the quasi-experimental study conducted by Azadbakht et al (2023) it is included in the serious risk category and Pitchalard et al (2022) is included in the moderate category with several aspects that are not informed, no control group, randomization process, and bias due to confounding factor (See Figures 4 and 5).

Study Characteristics

The studies included in Table 2 were from various countries in Asia, including Iran, China, Thailand, Malaysia, Japan, South Korea, Indonesia, and Singapore (See Table 2). The majority of study designs used were randomized controlled trials (RCTs), with a few studies using quasi-experimental and pilot RCT designs. Iran was the most diverse country in terms of study design, involving RCTs, quasi-experimental, and pilot RCTs. This diversity reflects Iran's efforts to explore different intervention approaches for older adults with type 2 diabetes (See Figure 6). Meanwhile, countries such as China, Japan, Malaysia, South Korea, and Singapore all conducted studies using RCT designs, indicating a strong focus on high-evidence experimental methods. Thailand only included studies using quasi-experimental designs, while Indonesia was recorded as conducting studies using pilot RCT designs.

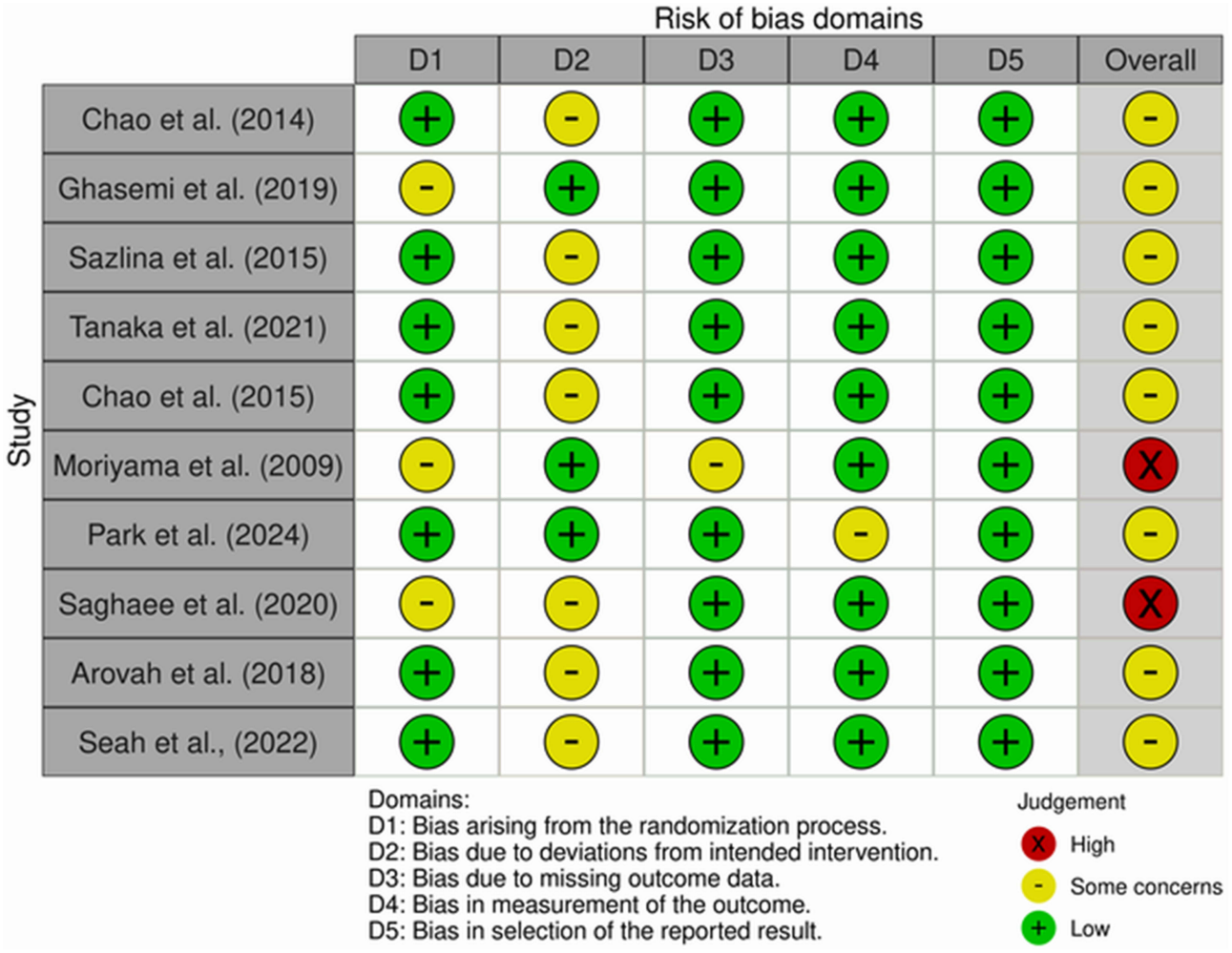

Figure 2 Risk of Bias Assessment of RCT Studies.[13–15,25,27,28,42–45]

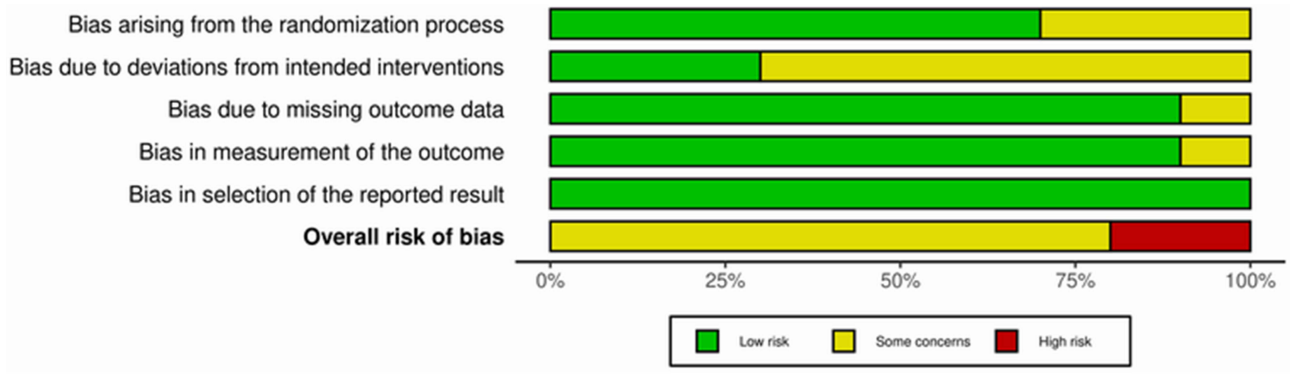

Figure 3 Summary Risk of Bias Assessment of RCT Studies.

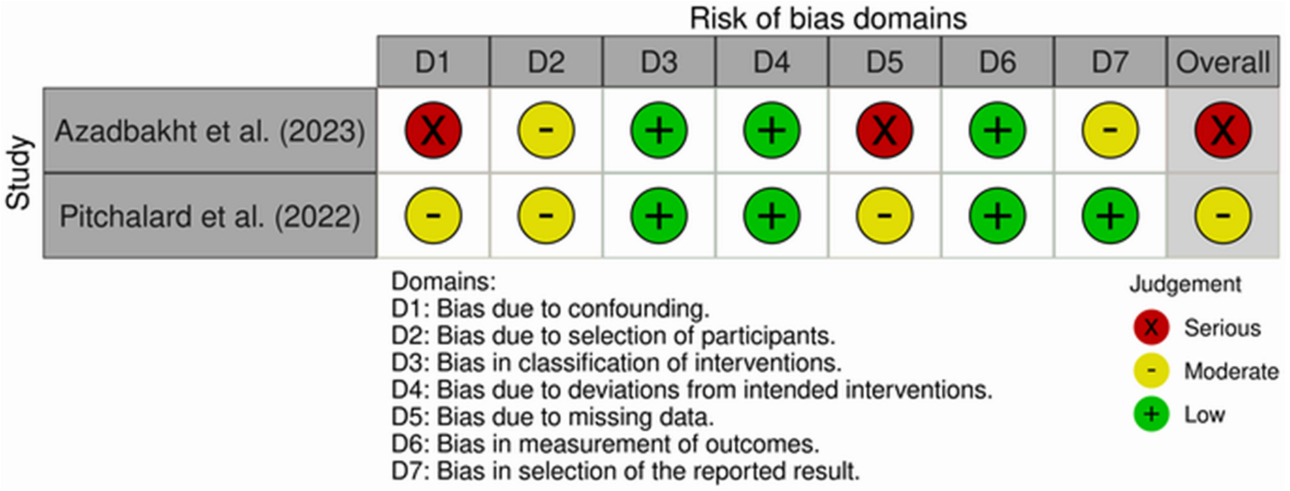

Figure 4 Risk of Bias Assessment of Quasi Experiment Studies.[23,24].

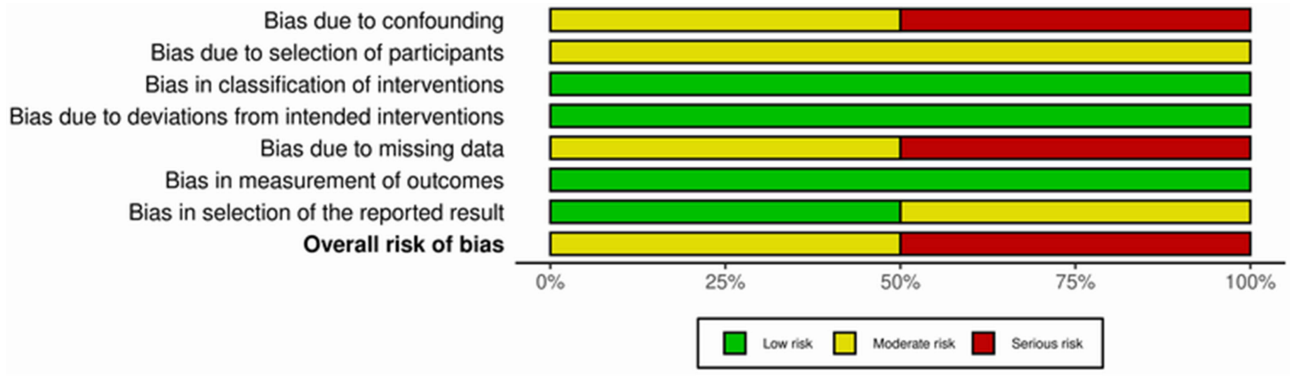

Figure 5 Summary Risk of Bias Assessment of Quasi Experiment Studies.

All participants were elderly aged 55 years and above with a diagnosis of diabetes mellitus. Several studies reported further demographic characteristics such as education level and gender, indicating that most participants had low education and were mostly female. In addition, the measurement methods in these studies included various clinical and psychosocial parameters, such as blood glucose levels (HbA1c and FBS), body mass index (BMI), diabetes stress

https://doi.org/10.2147/JMDH.S536258

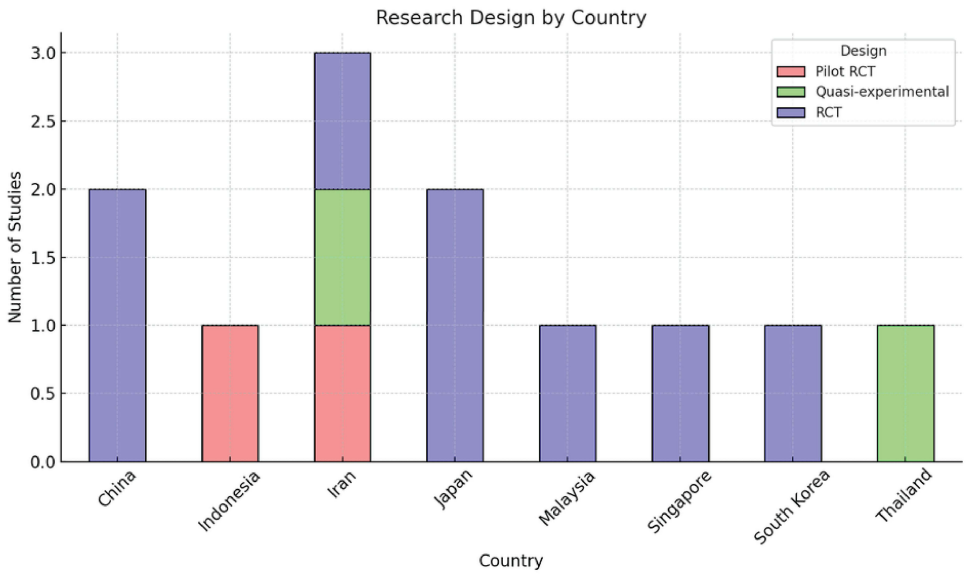

Figure 6 Number of Studies by Study Design and Country.

levels, diabetes knowledge, Medication Adherence Report Scale, self-care, self-efficacy, and quality of life. In addition, there were also studies that used tools such as pedometers and physical fitness tests to assess intervention outcomes.

Participants Characteristics

Table 3 presents patient characteristics from the reviewed studies. The mean age of patients in the studies ranged from 55 to 72 years (See Table 3). For example, Azadbakht et al (2023) reported a mean age of 64.2 years,[24] meanwhile Park et al (2024) noted an average age of 72.7 years.[15] The educational level of the participants varied greatly, ranging from the majority having never attended school,[23] to higher education than secondary school.[44] The percentage of female in the sample also varied, with the highest figure being 69.57%[23] and the lowest 21%.[13]

In terms of HbA1c levels, some studies reported results with values ranging from 6.89% to 8.44%, while other studies used fasting blood sugar (FBS) parameters such as Pitchalard et al (2022),[23] which showed a reduction in FBS from 130 to 113.86 mg/dL ($p<0.001$). Body mass index (BMI) data is only available in a few studies and generally falls in the range of 24 to 27 kg/m². Some studies also reported associated complications, such as Azadbakht et al (2023)[24] with 27.2% of patients experiencing complications, and Chao et al (2015)[28] recorded 64% of patients with complications.

Continuity of Care Strategies

In this review, continuity of care strategies in elderly patients with DM in Asia are divided into three categories. This category division is based on the methods and tools used in its implementation (See Table 4). The categorization of continuity of care (CoC) strategies in this review was based on the dominant mode of intervention delivery and the core focus of each approach. Interventions were grouped into three categories: those emphasizing education and social support, community-based and integrated health management, and technology-based strategies. This classification reflects how CoC is operationalized across different settings, particularly in Asia, where educational components are often delivered through community-based formats such as peer groups or health worker-led sessions, and technology is increasingly used to support self-monitoring. Grouping was determined by how each intervention was primarily structured and implemented, rather than by individual content elements.

Category I: Social Support and Education Based Interventions

Interventions in this category aim to improve patient self-management through education and social support. These approaches often involve peer groups, health care providers, or families as sources of support. Methods used include group education sessions, discussions, and emotional and motivational support-based strategies.

The Diabetes Self-Management Education Program developed by Moriyama et al (2009) lasted for 12 months, during which patients received monthly interviews of less than 30 minutes and biweekly telephone calls from a nurse educator. The program emphasized physiological monitoring, diet, physical activity, stress management, and daily care for the prevention of diabetes complications.[43] Patients are taught to analyze their own physiological data, understand their health condition, and use social and professional support in decision-making. In addition, educational approaches include cognitive behavioral therapy, social skills training, and cognitive reconstruction to increase patient involvement in managing their disease.[43]

In addition, Persian Diabetes Self-Management Education (PDSME) is a culture-based program.[44] The four-week program includes eight interactive educational sessions (2 hours each) led by a team of educators including occupational therapists, nurse educators, dietitians, and general practitioners. Each session combines discussion, self-monitoring, and SMART (Specific, Measurable, Achievable, Realistic, Time-bound) goal setting to increase patient engagement in their diabetes management. Topics covered include healthy eating, physical activity, blood glucose monitoring, adherence to medication, and strategies for adapting to changing health conditions.[44]

Another strategy is Peer Support Network (PSSN) which has also been implemented to help patients in managing their diabetes.[24] The intervention consisted of 12 sessions over three months, with each session designed to encourage emotional support, sharing experiences between patients, and improving diabetes management skills. This approach aimed to reduce psychological distress, increase positive attitudes towards diabetes management, and improve patient self-efficacy in carrying out self-care.[24]

Another study by Ghasemi et al (2018) examined the effectiveness of peer education in improving the quality of life and self-efficacy of diabetes patients.[25] In this study, two groups of patients received eight educational sessions (30–-45 minutes per session) that included information on self-care, diet, exercise, skin care, and management of diabetes complications. The intervention group received education from fellow patients who were more experienced, while the control group received education from researchers. The results showed that the group that received education from fellow patients experienced greater improvements in quality of life and self-efficacy than the control group.[25]

Category II: Community-Based Interventions and Integrated Health Management

Interventions in this category focus on community approaches and broader health management systems. The program aims to provide sustainable health services by involving various aspects of the community, such as medical personnel, families, and the surrounding environment. Methods used include routine health evaluations, self-management training, and long-term monitoring of patient conditions.

Community-based approaches and integrated health management have been applied in various studies to improve diabetes control in older adults. Chao et al (2014) evaluated the long-term impact of community-based health management on older adults with type 2 diabetes using Markov modeling.[14] The intervention program includes routine health evaluations (diet, physical activity, psychological aspects, adherence to treatment, and care of diabetes complications), education and training in self-management skills, telephone consultations, and regular monitoring of blood pressure and glucose levels. The intervention is carried out at least once a month by specially trained staff at community health service centers.[14]

In addition, Chao et al (2015) conducted another study evaluating the effectiveness of an integrated health management model in the elderly with diabetes through a randomized controlled trial.[28] The intervention group underwent an integrated health management model for 18 months, while the control group received only usual care. This model consists of several main components, namely (1) recording of health history, (2) health evaluation, and (3) health management, which includes education on healthy eating patterns, psychological aspects, customized exercise programs, self-management skills training, individual telephone consultations, group lectures on diabetes and its complications

(including diabetic nephropathy and cardiovascular disease), follow-up visits, and long-term monitoring of glucose levels and use of diabetes medication.[28] This intervention can improve psychological health, HbA1c, and reduced hospital admissions.[28]

Finally, the intervention was called the SCOPE-DM Program (Self-Care for Older People with Diabetes Mellitus), a structured 12-week community-based education program aimed at improving diabetes self-care among older adults with type 2 diabetes mellitus (T2DM).[27] It was delivered weekly by trained diabetes nurse educators through 2-hour group sessions at community sites in Singapore. Each session is designed to teach practical knowledge and skills in diabetes self-care with psychological techniques for behavior change. The program used motivational interviewing, goal setting, and guided autobiography to enhance participants' motivation and engagement. Topics covered include diabetes knowledge, healthy eating, physical activity, medication adherence, blood glucose monitoring (SMBG), managing complications, and communication with healthcare providers.[27]

Category III: Technology-Based Interventions and Health Monitoring

This category includes interventions that use technology to support patient self-management. Technologies such as digital apps, health monitoring devices, and SMS or phone-based communications are used to provide education, monitor patient conditions, and provide personalized feedback.

Pitchalard et al (2022) evaluated the HOME Model (Home intervention; Online monitoring; Multidisciplinary approach; and Equity and education) specifically designed for ethnic minority older adults in rural Thailand.[23] This program was developed based on the Innovative Care for Chronic Condition Framework (ICCCF) with an integrated approach involving families, health workers, and local communities to improve self-management of diabetes patients. This intervention lasted for 12 weeks, where patients received online monitoring through a messaging application, home-based self-education, and involvement of health workers and families. This intervention included home visits by health workers to teach diabetes management skills, regular blood sugar monitoring by community health workers, and support via phone calls or the LINE application for patients and families.[23]

In an effort to increase physical activity in elderly with type 2 diabetes, research by Sazlina et al (2015) evaluated the effectiveness of personalized feedback (PF) and peer support (PS) for 36 weeks.[42] Participants in the intervention group were encouraged to engage in physical activity independently using a pedometer to monitor their daily step count. Feedback was provided in the form of a written report that provided information on their physical activity achievements during the intervention period. The peer support group was also provided with peer mentor-led group sessions to increase motivation and engagement in physical activity. The results showed that participants in the PF+PS group experienced significant increases in daily step count, duration of physical activity, and cardiovascular fitness compared to the other groups.[42]

In a study by Tanaka et al (2021), a technology-based diabetes education program was developed using the JADEC Diabetes Education Card System Program and self-monitoring of blood glucose (SMBG) analyzer.[13] The intervention group received education using the JADEC Diabetes Education Card System, which consists of 71 key education points on diabetes management, as well as blood glucose monitoring with an SMBG analyzer that provides real-time graphical analysis. Patients in the intervention group were trained to use this monitoring device to record and analyze their blood sugar patterns daily. The results showed that participants who received this intervention experienced a significant decrease in HbA1c levels.[13]

Park et al (2024) developed DiaNote, a digital application for self-recording and monitoring of diabetes.[15] The study was conducted over 12 weeks in 105 Korean elderly people with type 2 diabetes. Participants in the intervention group used the DiaNote app to record their diet, physical activity, medication intake, and blood sugar levels. They also received five telephone consultations over 12 weeks by nurses.[15] Then, Arovah et al (2018) developed Walking with Diabetes (WW-DIAB), a pedometer-based walking program for diabetes patients in Indonesia.[45] The program lasted 24 weeks, during which participants who received pedometers and support via text messages experienced greater improvements in daily step count, physical activity, and glycemic parameters than the group that only received pedometers.[45] This study shows that technology-based approaches, both in the form of digital monitoring and distance education, can improve the effectiveness of diabetes management in the elderly.[45]

Discussion

This systematic review confirms that continuity of care is a crucial strategy in improving diabetes self-management among older adults in Asian countries. Three main categories of continuity of care strategies were identified, such as education and social support-based interventions, community-based interventions and integrated health management, and technology-based interventions and health monitoring. Most interventions combined multiple elements, such as structured diabetes education with peer support, or remote monitoring with follow-up visits. Intervention durations ranged from four weeks to six months, with frequency and intensity tailored to each study's context. Outcome measures commonly assessed included self-efficacy, glycemic control (HbA1c), medication adherence, physical activity, and quality of life.[13–15,23–25,28,42–45,48]

Continuity of care strategies are very important in the elderly with DM in the Asian context.[49–53] In general, elderly people with diabetes face various challenges, including limited access to health services, varying levels of health literacy, and obstacles in maintaining a healthy lifestyle.[54–57] The unique demographic and epidemiological landscape in Asia demands a continuum of care approach, integrating adaptive education, the use of innovative health technologies, and community empowerment so that older adults can optimally manage their diabetes in the long term.[58–60]

Education and social support-based interventions were the most commonly reported.[24,25,43,44] These programs primarily focused on enhancing patient knowledge, motivation, and behavior through structured diabetes self-management education (DSME), peer group support, and family involvement. Interventions such as the PDSME program and peer-led models demonstrated improvements in self-efficacy, medication adherence, and lifestyle changes, particularly among elderly participants with limited formal education or health literacy.[24,25,43,44]

Community-based and integrated care models often involved multidisciplinary collaboration, regular follow-up by community health workers, and individualized care planning.[14,27,28] These interventions emphasized management continuity by linking clinical care with local health services and social support networks. Programs such as SCOPE-DM and integrated health coaching models showed positive outcomes in glycemic control and patient engagement, especially when care was coordinated between primary care providers and trained lay health workers.[14,27,28]

Technology-based and remote monitoring approaches involving tools such as mobile applications, teleconsultation, and wearable devices.[13,15,23,42,45] These strategies facilitated regular self-monitoring, remote feedback, and digital health education. For example, mHealth interventions in India and Korea improved communication between patients and providers while supporting real-time tracking of blood glucose levels and medication schedules. Despite differences in technological infrastructure across settings, these interventions showed promise in enhancing adherence and self-care practices in older adults.[13,15,23,42,45]

These three categories of strategies, while they can stand alone, have great potential when combined into an integrated care model. The combination of community-based education, the use of technology for health monitoring, and closer coordination between primary and specialist services can result in a more effective and sustainable continuity of care approach.[42,61] For example, education programs can be strengthened by utilizing digital applications for self-monitoring, while community health workers can act as facilitators in supporting patient adherence to long-term care. By adopting a complementary multidisciplinary approach, continuity of care can be optimized to address systemic barriers to diabetes care in Asia.[61]

The results of this review emphasize that, although all three continuity of care methods have their own advantages, there are also some limitations that need to be considered. Education-based interventions and social support have the potential to improve patient understanding, but are less effective in maintaining long-term adherence without ongoing support.[24,36] Technology-based interventions offer convenience in patient monitoring and education, but limited access to digital devices and low technological literacy are significant challenges.[30] Meanwhile, community-based interventions and integrated health management can provide long-term benefits, but their implementation requires significant resources and complex cross-sector coordination.[14]

Furthermore, although continuity of care has been recognized as a key strategy in improving diabetes management, its implementation in Asia faces several systemic barriers. Fragmentation of health services, lack of coordination between primary and specialist services, and limited health resources remain major challenges.[21] However, several success factors have been identified, such as the use of technology for remote health monitoring, the integration of community health

workers into primary care systems, and the development of care models that are based on the culture and specific needs of local populations.[23,44]

To overcome these barriers, a holistic approach is needed that integrates the three continuity of care strategies into a more adaptive and flexible model. The combination of community-based education, the use of technology in health monitoring, and strengthening primary health services can create a system that is more responsive to the needs of older adults with diabetes.[42,61] In addition, developing policies that support continuity of care, increasing the capacity of health workers, and optimizing easily accessible technology can increase the effectiveness of continuity of care in the long term.[20] By integrating education, technology and community-based strategies, as well as overcoming implementation barriers through policy reform and an interdisciplinary approach, continuity of care can be a more adaptive and sustainable solution in improving the quality of life of elderly people with diabetes.

Implication for Practice

The findings of this study affirm that continuity of care plays a crucial role in enhancing diabetes self-management among older adults in Asia. However, its implementation remains hindered by fragmented healthcare systems, disparities in access, and low health literacy. To address these challenges, innovative approaches that integrate community-based care models with digital technology are essential. The expansion of diabetes monitoring applications and telemedicine should be prioritized while ensuring interoperability within health information systems to facilitate real-time patient monitoring and accelerate clinical interventions.

Additionally, community-based approaches must be further empowered by adapting educational strategies and social support programs that align with the cultural context and literacy levels of different Asian populations. Strengthening the role of engaging families and community health workers as active partners in care can significantly improve patient adherence to diabetes management. Furthermore, healthcare policy reforms in Asia should focus on developing a more integrated care system, emphasizing service continuity between primary care and specialized facilities while ensuring health insurance policies that support long-term care accessibility for older adults with diabetes. Implementing this model will not only enhance glycemic control and patient quality of life but also reduce the economic burden associated with diabetes complications in the long run.

Strengths and Limitations

This study provides a significant contribution by implementing a rigorous systematic review following PRISMA guidelines, successfully identifying various continuity of care strategies that have been tested in multiple countries. It also offers insights into the effectiveness of combining education, technology, and community-based approaches in improving treatment adherence, glycemic control, and the quality of life of older adults with diabetes. These findings are highly relevant for healthcare professionals and policymakers in developing more effective and sustainable care models in Asia.

This review presents several limitations that warrant consideration. A primary limitation concerns the methodological quality of the included studies. Approximately 70% of the randomized controlled trials were rated as having “some concerns” primarily due to the lack of blinding among participants and personnel. Moreover, most quasi-experimental studies demonstrated a “serious” risk of bias related to confounding factors. These issues may compromise the internal validity of the findings and should be taken into account when interpreting the effectiveness of the continuity of care strategies reviewed. Additionally, the inclusion of only English-language publications may have introduced language bias and resulted in the exclusion of potentially relevant studies from non-English-speaking Asian countries. Considerable heterogeneity in study designs, intervention approaches, and outcome measures also complicates cross-study comparisons and may limit the consistency of the results. Variations in the quality of intervention implementation and the lack of blinding among both participants and healthcare providers further contribute to potential bias. Furthermore, studies from South Asia remain notably scarce despite the region’s high diabetes prevalence and the similarity of its diabetes characteristics, which is particularly important for generalizing findings across Asia. Future research should include more diverse populations across Asia and employ longitudinal study designs to better evaluate the long-term impact of continuity of care on clinical outcomes.

Conclusions

This systematic review included 12 studies that examined the effectiveness of continuity of care strategies in supporting diabetes self-management among older adults in Asian countries. The interventions were grouped into three categories based on their core delivery approach: (1) education and social support-based interventions, (2) community-based interventions and integrated health management, and (3) technology-based interventions and health monitoring. These strategies were associated with improvements in various outcomes, including medication adherence, self-efficacy, glycemic control, physical activity, quality of life, and patient satisfaction. Despite variations in study design, duration, and outcome measures, the overall findings highlight the potential of CoC strategies to address the multifaceted challenges faced by older adults with diabetes in Asian healthcare contexts.

Further longitudinal and context-specific research is recommended to assess the sustainability and long-term impact of these interventions. Moreover, healthcare policy reforms in Asia should focus on developing more integrated care systems that strengthen service continuity between primary and specialized care, while ensuring health insurance schemes support long-term care accessibility for older adults. Some action steps that can be realized are strengthening referral and feedback mechanisms between primary, secondary and tertiary levels of care, task shifting of community nurses in the community by contracting out, and increasing empowerment of peer and patient support groups can be taken as a way to expand the delivery of continuity of care. If implemented effectively, such models have the potential not only to enhance glycemic control and quality of life, but also to reduce the long-term economic burden associated with diabetes-related complications. This study provides valuable insights for healthcare professionals, policymakers, and researchers in designing a more sustainable and evidence-based diabetes care model for older adults in Asia.

Acknowledgments

All authors thank to Universitas Padjadjaran, Bandung, West Java, Indonesia, who has facilitated the databases for us in this study.

Disclosure

The authors had no conflicts of interest in this research.

References

1. International Diabetes Federatio. *Facts & Figures About Diabetes*; 2025.
2. World Health Organization. Diabetes. 2024.
3. Ali M, Alam M, Sonjida MAR, Simi M, Sarwar S. Prevalence of diabetes and prediabetes in South Asian countries: a systematic review and meta - analysis. *Discov Public Heal*. 2025;22–39.
4. Liu J, Ren ZH, Qiang H, et al. Trends in the incidence of diabetes mellitus: results from the global burden of disease study 2017 and implications for diabetes mellitus prevention. *BMC Public Health*. 2020;20(1):1–12. doi:10.1186/s12889-020-09502-x
5. Chentli F, Azzoug S, Mahgoun S. Diabetes mellitus in elderly. *Indian J Endocrinol Metab*. 2015;19(6):744–752. doi:10.4103/2230-8210.167553
6. ElSayed NA, Aleppo G, Aroda VR, et al. 13. older adults: standards of care in diabetes-2023. *Diabetes Care*. 2023;46(Suppl 1):S216–29. doi:10.2337/dc23-S013
7. Barrio-Cortes J, Mateos-Carchenilla MP, Martínez-Cuevas M, et al. Comorbidities and use of health services in people with diabetes mellitus according to risk levels by adjusted morbidity groups. *BMC Endocr Disord*. 2024;24(1):115. doi:10.1186/s12902-024-01634-0
8. Pandya N, Hames E, Sandhu S. Challenges and strategies for managing diabetes in the elderly in long-term care settings. *Diabetes Spectr*. 2020;33 (3):236–245. doi:10.2337/ds20-0018
9. Paudel G, Vandelanotte C, Dahal PK, et al. Self-care behaviours among people with type 2 diabetes mellitus in South Asia: a systematic review and meta-analysis. *J Glob Health*. 2022;12:4056. doi:10.7189/jogh.12.04056
10. Weinger K, Beverly EA, Smaldone A. Diabetes self-care and the older adult. *West J Nurs Res*. 2014;36(9):1272–1298. doi:10.1177/ 0193945914521696
11. Lee LY, Tung HH, Tsay SL, Chen YC, Lee HH, Zeng YX. Predictors for self-management in older adults with type 2 diabetic nephropathy. *J Clin Nurs*. 2020;29(5–6):922–931. doi:10.1111/jocn.15154
12. Cheng SL, Zhao JZ, Bai J, Zang X. Continuity of care for older adults with chronic illness in china: an exploratory study. *Public Health Nurs*. 2015;32(4):298–306. doi:10.1111/phn.12163
13. Tanaka N, Yabe D, Murotani K, et al. Effects of physician's diabetes self-management education using Japan association of diabetes education and care diabetes education card system program and a self-monitoring of blood glucose readings analyzer in individuals with type 2 diabetes: an explor. *J Diabetes Investig*. 2021;12(12):2221–2231. doi:10.1111/jdi.13607
14. Chao J, Zong M, Xu H, et al. The long-term effect of community-based health management on the elderly with type 2 diabetes by the Markov modeling. *Arch Gerontol Geriatr*. 2014;59(2):353–359. doi:10.1016/j.archger.2014.05.006

15. Park S, Park JH. Effects of digital self-care intervention for Korean older adults with type 2 diabetes: a randomized controlled trial over 12 weeks. *Geriatr Nurs*. 2024;58:155–161. doi:10.1016/j.gerinurse.2024.05.019
16. Meiqari L, Al-Oudat T, Essink D, Scheele F, Wright P. How have researchers defined and used the concept of "continuity of care" for chronic conditions in the context of resource-constrained settings? A scoping review of existing literature and a proposed conceptual framework. *Health Res Policy Syst*. 2019;17(1):27. doi:10.1186/s12961-019-0426-1
17. Chen CC, Chiang YC, Lin YC, Cheng SH. Continuity of care and coordination of care: can they be differentiated? *Int J Integr Care*. 2023;23(1):10. doi:10.5334/ijic.6467
18. Salisbury C, Sampson F, Ridd M, Montgomery AA. How should continuity of care in primary health care be assessed? *Br J Gen Pract J R Coll Gen Pract*. 2009;59(561):e134–41. doi:10.3399/bjgp09X420257
19. Loh D, Plugge E, Van Hout M. Continuity of opioid substitution treatment between prison and community in Southeast Asia: a scoping review. *Int J Drug Policy*. 2023;112:103957. doi:10.1016/j.drugpo.2023.103957
20. Ahmed SM, Krishnan A, Karim O, et al. Delivering non-communicable disease services through primary health care in selected south Asian countries: are health systems prepared? *Lancet Glob Heal*. 2024;12.
21. Ghanbari-Jahromi M, Kharazmi E, Bastani P, Shams M, Marzaleh MA, Amin Bahrami M. Factors disrupting the continuity of care for patients with chronic disease during the pandemics: a systematic review. *Heal Sci Reports*. 2024;7(2):e1881. doi:10.1002/hsr2.1881
22. Dehghani Tafti A, Fatehpanah A, Salmani I, et al. COVID-19 pandemic has disrupted the continuity of care for chronic patients: evidence from a cross-sectional retrospective study in a developing country. *BMC Prim Care*. 2023;24(1):1–10. doi:10.1186/s12875-023-02086-6
23. Pitchalard K, Wimolphan P, Singkhorn O, Purkey E, Moonpanane K. Feasibility and Acceptability of the HOME model to promote self-management among ethnic minority elderly with type 2 diabetes mellitus in rural thailand: a pilot study. *Heal Equity*. 2022;6(1):629–637. doi:10.1089/heq.2021.0161
24. Azadbakht M, Tanjani PT, Fadayevatan R, Foroughan M, Zanjari N. The effect of a peer social support network intervention on self-management of the elderly with type 2 diabetes. *J Client-Centered Nurs Care*. 2023;9(1):57–68. doi:10.32598/JCCNC.9.1.472.1
25. Ghasemi M, Hosseini H, Sabouhi F. Effect of peer group education on the quality of life of elderly individuals with diabetes: a randomized clinical trial. *Iran J Nurs Midwifery Res*. 2019;24(1):44–49. doi:10.4103/ijnmr.IJNMR_39_17
26. Miklavcic JJ, Fraser KD, Ploeg J, et al. Effectiveness of a community program for older adults with type 2 diabetes and multimorbidity: a pragmatic randomized controlled trial. *BMC Geriatr*. 2020;20(1):174. doi:10.1186/s12877-020-01557-0
27. Seah SJ, Harding SC, Wang J, Aw S, Lam J, Lim RBT. Effectiveness of a cluster randomized controlled trial involving community-based intervention for older adults with type 2 diabetes mellitus in Singapore. *Sci Diabetes Self Manag Care*. 2022;48(6):505–521. doi:10.1177/26350106221125695
28. Chao J, Yang L, Xu H, Yu Q, Jiang L, Zong M. The effect of integrated health management model on the health of older adults with diabetes in a randomized controlled trial. *Arch Gerontol Geriatr*. 2015;60(1):82–88. doi:10.1016/j.archger.2014.10.006
29. Gardner DSL, Saboo B, Kesavadev J, et al. Digital health technology in diabetes management in the Asia-Pacific Region: a narrative review of the current scenario and future outlook. *Diabetes Ther Res Treat Educ Diabetes Relat Disord*. 2025;16(3):349–369.
30. Butayeva J, Ratan ZA, Downie S, Hosseinzadeh H. The impact of health literacy interventions on glycemic control and self-management outcomes among type 2 diabetes mellitus: a systematic review. *J Diabetes*. 2023;15(9):724–735. doi:10.1111/1753-0407.13436
31. Hossain MJ, Al-Mamun M, Islam MR. Diabetes mellitus, the fastest growing global public health concern: early detection should be focused. *Heal Sci Reports*. 2024;7(3):e2004. doi:10.1002/hsr2.2004
32. Kalra S, Dhar M, Afsana F, et al. Asian Best Practices for Care of Diabetes in Elderly (ABCDE). *Rev Diabet Stud*. 2022;18(2):100–134. doi:10.1900/RDS.2022.18.100
33. Kapoor N, Furler J, Paul TV, Thomas N, Oldenburg B. Normal weight obesity: an underrecognized problem in individuals of south asian descent. *Clin Ther*. 2019;41(8):1638–1642. doi:10.1016/j.clinthera.2019.05.016
34. Sathish T, Kapoor N, Cao Y, Tapp RJ, Zimmet P. Proportion of newly diagnosed diabetes in COVID-19 patients: a systematic review and meta-analysis. Vol. 23, Diabetes, obesity & metabolism. *England*. 2021;870–874.
35. Kapoor N. *Thin Fat Obesity: The Tropical Phenotype of Obesity*. Feingold KR, Ahmed SF, Anawalt B, et al.editors.;South Dartmouth (MA);2000.
36. Mohamed A, Staite E, Ismail K, Winkley K. A systematic review of diabetes self-management education interventions for people with type 2 diabetes mellitus in the Asian Western Pacific (AWP) region. *Nurs Open*. 2019;6(4):1424–1437. doi:10.1002/nop2.340
37. Bhurji N, Javer J, Gasevic D, Khan NA. BMJ open improving management of type 2 diabetes in South Asian patients: a systematic review of intervention studies. *BMJ Open*. 2016;6(4):e008986. doi:10.1136/bmjopen-2015-008986
38. Camargo-Plazas P, Robertson M, Alvarado B, Paré GC, Costa IG, Duhn L. Diabetes self-management education (DSME) for older persons in Western countries: a scoping review. *PLoS One*. 2023;1–37.
39. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:1–11.
40. Riley RD, Moons KGM, Snell KIE, et al. A guide to systematic review and meta-analysis of prognostic factor studies. *BMJ*. 2019;364. doi:10.1136/bmj.k4597
41. Joanna Briggs Institute (JBI). JBI's critical appraisal tools [Internet]. Joanna Briggs Institute. 2022. Available from: https://jbi.global/critical-appraisal-tools. Accessed January 1, 2023.
42. Sazlina SG, Browning CJ, Yasin S. Effectiveness of personalized feedback alone or combined with peer support to improve physical activity in sedentary older Malays with type 2 diabetes: a randomized controlled trial. *Front Public Health*. 2015;3(JUL):1–11.
43. Moriyama M, Nakano M, Kuroe Y, Nin K, Niitani M, Nakaya T. Efficacy of a self-management education program for people with type 2 diabetes: results of a 12 month trial. *Japan J Nurs Sci*. 2009;6(1):51–63. doi:10.1111/j.1742-7924.2009.00120.x
44. Saghaee A, Ghahari S, Nasli-Esfahani E, Sharifi F, Alizadeh-Khoei M, Rezaee M. Evaluation of the effectiveness of Persian diabetes self-management education in older adults with type 2 diabetes at a diabetes outpatient clinic in Tehran: a pilot randomized control trial. *J Diabetes Metab Disord*. 2020;19(2):1491–1504. doi:10.1007/s40200-020-00684-0
45. Arovah NI, Kushartanti BMW, Washington TL, Heesch KC. Walking with Diabetes (WW-DIAB) programme a walking programme for Indonesian type 2 diabetes mellitus patients: a pilot randomised controlled trial. *SAGE Open Med*. 2018;6.
46. Strene JAC, Jsmrge P, Blencowe NS, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. *BMJ*. 2019;366:1–8.

47. Sterne JA, Hernán MA, McAleenan A, Reeves BC, Higgins JP. Chapter 25: assessing risk of bias in a non-randomized study. In: Cochrane Handbook for Systematic Reviews of Interventions version 64. Cochrane; 2023. Available from: https://training.cochrane.org/handbook/current/chapter-25. Accessed August 23, 2025.
48. Tan SHX, Bin AS, Tan NC, et al. Cost-effectiveness of a home telemonitoring system for asian adults with type 2 diabetes mellitus. *Telemed e-Health*. 2024;30(8):2353–2362. doi:10.1089/tmj.2024.0143
49. Chan KS, Wan EYF, Chin WY, et al. Effects of continuity of care on health outcomes among patients with diabetes mellitus and/or hypertension: a systematic review. *BMC Fam Pract*. 2021;22(1):145. doi:10.1186/s12875-021-01493-x
50. Hsieh PL, Yang FC, Hu YF, et al. Continuity of care and the quality of life among patients with type 2 diabetes mellitus: a cross-sectional study in taiwan. healthc. 2020;8(4). doi:10.3390/healthcare8040486
51. Li YC. Continuity of care for newly diagnosed diabetic patients: a population-based study. *PLoS One*. 2019;14.
52. Misra A, Sattar N, Tandon N, et al. Clinical management of type 2 diabetes in south Asia. *Lancet Diabetes Endocrinol*. 2018;6(12):979–991. doi:10.1016/S2213-8587(18)30199-2
53. Jung HW, Lee WR. Association between initial continuity of care status and diabetes-related health outcomes in older patients with type 2 diabetes mellitus: a nationwide retrospective cohort study in South Korea. *Prim Care Diabetes*. 2023;17:600–606. doi:10.1016/j.pcd.2023.10.006
54. Northwood M, Shah AQ, Abeygunawardena C, Garnett A, Schumacher C. Care coordination of older adults with diabetes: a scoping review. *Can J Diabetes*. 2023;47(3):272–286. doi:10.1016/j.jcjd.2022.11.004
55. Bazzano AN, Wharton MK, Monnette A, et al. Barriers and facilitators in implementing non-face-to-face chronic care management in an elderly population with diabetes: a qualitative study of physician and health system perspectives. *J Clin Med*. 2018;7(11):1–12. doi:10.3390/jcm7110451
56. Zarora R, Jani R, Macmillan F, Pham A, Dench A, Simmons D. Challenges to introducing integrated diabetes care to an inner-regional area in South Western Sydney, Australia. *Int J Integr Care*. 2020;20(2):1–12. doi:10.5334/ijic.4692
57. Shin J, Kim HJ, Cho B, Yang Y, Yun J. Analysis of continuity of care and its related factors in diabetic patients: a cross-sectional study. *Korean J Fam Med*. 2022;43:246–253. doi:10.4082/kjfm.21.0145
58. Lall D, Engel N, Srinivasan P, Devadasan N, Horstman K, Criel B. Improving primary care for diabetes and hypertension: findings from implementation research in rural South India. *BMJ Open*. 2020;10:e040271. doi:10.1136/bmjopen-2020-040271
59. Wei X, Barnsley J, Zakus D, Cockerill R, Glazier R, Sun X. Evaluation of a diabetes management program in China demonstrated association of improved continuity of care with clinical outcomes. *J Clin Epidemiol*. 2008;61(9):932–939. doi:10.1016/j.jclinepi.2007.12.013
60. Tu Q, Xiao L, Ullah S, Fuller J, Du H. A transitional care intervention for hypertension control for older people with diabetes: a cluster randomized controlled trial. *J Adv Nurs*. 2020;76:2696–2708. doi:10.1111/jan.14466
61. Zhuang Y, Ye H, Yang X, et al. The effect of multidisciplinary team and experience-based co-design on the care of older adult patients with type 2 diabetes: a randomized controlled trial. *Diabet Res Clin Pract*. 2025;221:112028. doi:10.1016/j.diabres.2025.112028