


REVIEW

Effectiveness of self-management programmes in diabetes management: A systematic review

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Abstract

Background: Diabetes is a major noncommunicable disease, which is increasing, and approximately 415 million people are affected around the globe. Since diabetes is a lifelong disease, patients require better understanding and knowledge of the condition to become self-reliant in making diabetes-related decisions.

Aims: This systematic review was performed to assess the effectiveness of diabetes self-management programs in people with type 2 diabetes.

Methods: A comprehensive literature search was undertaken to identify all published English language articles through EBSCO discovery services in the following electronic database: Science Direct, CINAHL Plus with Full Text, MEDLINE, and Access Medicine. Studies were published from January 2000 to October 2015. The initial search retrieved 37 566 studies and based on the inclusion criteria, 14 studies were selected for review.

Results: Of 14 studies, most findings favoured diabetes self-management. But the overall effectiveness of individual interventions was not conclusive. A wide variety of interventions was used including diabetes education as a major component in self-management programs.

Conclusion: Interventions used varied strategies in differing composition, and further work is needed to find out the effectiveness of individual interventions.

KEYWORDS

self-care, self-management, type 2 diabetes

SUMMARY STATEMENT

What is already known about this topic?

- Self-management programs with different combinations of interventions are in use to increase diabetes self-management skills in people with type 2 diabetes.

What this paper adds?

- This systematic review indicates that self-management programs can be effective for management of diabetes, which is evident in improvements in HbA1C, diabetes knowledge, and self-care practices with short-term to long-term follow-up.

The implications of this paper

- Future research is required to explore the possibilities to minimize hospital visits, contact sessions with health care personnel, and short duration of self-management programs.

- Training health care professionals in delivering self-care management programs may hold the key to success.

1 | INTRODUCTION

Diabetes is highly prevalent; 8.8% of the global population is affected by diabetes, and for every 11 adults, one has diabetes. Approximately 415 million individuals are affected across the world, and this burden may rise to 642 million by the year 2040 (IDF, 2015). Since diabetes is a chronic lifelong illness, people with diabetes require regular monitoring and evaluation throughout their life to stay healthy. Lack of understanding of the disease and its self-management often dooms therapies to failure. Patients must attain the knowledge and skills required and develop favourable attitudes essential for diabetes control. This will help to lower their stress owing to illness and its

treatment (Kumar, 2003). Diabetes education requires use of multifaceted programmes incorporating behavioural or psychological learning as well as diabetes knowledge and skills to maintain their blood glucose control and enhance their quality of life. It is said that the most effective behavioural intervention is to evolve a patient-centred approach, whereby patients are themselves responsible for their own management, helping them solve their own health problems, and plan actions for their selected goals for glycaemic control with self-confidence (Bodenheimer, 2002). Self-management therefore can bring about improved health care management, lower costs, and improve quality of life.

2 | NEED FOR SELF-MANAGEMENT

Today's care concepts focus on self-management, which implies that patients need to take responsibility for taking care of their own health problems and adapt to the changing needs or demands placed on them to gain adequate metabolic control and prevent development of early complications (Ståhl et al., 2001). Self-care includes blood glucose monitoring at home, correct food adjustment especially carbohydrates, daily physical activity, foot care, and medications (ADA, 2016). The current review covers the topic of self-management programmes systematically.

3 | METHODS

3.1 | Aim and objectives

This systematic review was performed to assess the effectiveness of diabetes self-management programmes delivered to people living with type 2 diabetes.

Objectives:

- To identify methods used in improving self-management skills among people with type 2 diabetes
- To assess the efficacy of self-management programmes for diabetes

3.2 | Search strategy methods

A systematic literature search was performed to identify all published articles in the English language from January 2000 to October 2015. The search was conducted through EBSCO discovery services using the following electronic databases: Science Direct, CINAHL Plus with Full Text, MEDLINE, and Access Medicine. Keywords used for searching included self-management, self-care, type 2 diabetes, self-efficacy, and quality of life. The following inclusion criteria were applied.

3.2.1 | Types of interventions

There were no restrictions placed on types of interventions.

3.2.2 | Types of studies

- Randomized controlled trials
- Nonrandomized controlled trials
- Community-based trials
- Correlational longitudinal studies
- Before-after intervention trials
- Prospective comparative studies.

3.2.3 | Types of participants

People (adults) with type 2 diabetes above the age of 30 years; no upper age limit was fixed.

3.2.4 | Setting

- Hospital, nursing homes, and the community

3.2.5 | Delivery of interventions

There was no restriction placed regarding delivery of interventions. These may include researchers, physicians, nurses, pharmacists, nutrition/diet professionals, physical activity professionals, health promotion agencies, allied health professionals, etc.

3.2.6 | Types of outcome measure

The outcome measures assessed were body mass index (BMI), HbA1c, lipid profile, diabetes knowledge, quality of life, self-management-self-efficacy, and social support. Decline in HbA1c levels of 0.5% to 1% are clinically significant and can reduce the development of complications related to diabetes. (Johnson, Ruisinger, Vink, & Barnes, 2014; McEwen, Pasvogel, Gallegos, & Barrera, 2010)

3.2.7 | Quality assessment of included studies

The methodological quality of the included studies (Table 1) was assessed with Delphi list criteria (Table 2) by 2 independent authors. The possible score range was 0 to 9.

4 | RESULTS

This systematic review was conducted as per the guidelines explained in the Preferred Reporting Items for Systematic Reviews and Meta-analyses. Electronic database search retrieved 37 566 studies. Seventy-two full-text studies were downloaded, and 56 studies remained as 16 studies found irrelevant to the topic and excluded them from the review. Further, 42 studies have been excluded from the review due to lack of details regarding research design (5 studies), sampling method (8 studies), setting (7 studies), results (3 studies), duration of intervention (9 studies), duration of study (4 studies), and inclusion and exclusion criteria (6 studies). Fourteen studies were retained for inclusion in the review (Figure 1).

None of the included studies scored the maximum quality score of 9 points. Among the 14 reviewed studies, one (Trief et al., 2013) had a methodological quality score of 8, one (Wattana, Srisuphan, Pothiban,

TABLE 1 Methodological quality assessment of included studies

Study	Study Randomization	Allocation Concealment	Groups Similar at Baseline	Inclusion and Exclusion Criteria	Outcome Assessor Blinded	Care Provided Blinded	Patient Blinded	Point Estimates	Intention to Treat Analysis	Total Score
Wu et al., 2013	No	No	Y	Y	No	No	No	No	No	2
Johnson et al., 2014	No	No	Unclear	Yes	No	No	No	No	No	1
Atak, 2008	Yes	Yes	Yes	Yes	No	No	Yes	No	Unclear	5
Hawkins, 2010	Yes	Yes	Yes	Yes	No	No	Yes	No	Unclear	5
McEwen et al., 2010	No	No	-	Yes	No	No	No	No	Unclear	1
Wu et al., 2011	No	Yes	Yes	Yes	No	Yes	Yes	No	Unclear	5
Siminerio et al., 2008	No	No	Yes	Yes	No	No	No	No	Unclear	2
Wattana et al., 2007	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Unclear	6
Clarke, 2009	No	No	Unclear	Yes	No	No	No	No	Unclear	1
Moriyama et al., 2009	Yes	Yes	Yes	Yes	No	Yes	No	No	Unclear	5
Landim et al., 2011	No	No	No	Yes	No	No	No	No	Unclear	1
Trief et al., 2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	8
Ve'g et al., 2006	No	No	No	Yes	No	No	No	No	Unclear	1
Karakurt & Kas,ıkçı, 2012	No	No	-	Yes	No	No	No	No	U	1

Key: Yes = 1, No = 0, Unclear = 0

TABLE 2 Delphi list criteria for assessing methodological qualities

Item no.	Quality	Assessment Criteria
1	Randomization	Was a method of randomization done?
2	Allocation concealment	Was the study performed concealment of treatment allocation?
3	Groups comparable at baseline	Were the groups comparable at baseline regarding the most important prognostic indicators?
4	Inclusion and exclusion criteria	Did the study mention both inclusion and exclusion criteria?
5	Outcome assessor blinded	Was the outcome assessor blinded?
6	Care provided blinded	Was the care provider blinded?
7	Patient blinded	Was the patient blinded?
8	Point estimates	Were point estimates and measures of variability for the primary outcomes measured?
9	Intention to treat analysis	Did the analysis include an intention to treat analysis?

& Upchurch, 2007) had a score of 6, four (Atak, 2008; Hawkins, 2010; Moriyama et al., 2009; Wu et al., 2011) had 5, two (Siminerio, Ruppert, Emerson, Solano, & Piatt, 2008; Wu, Liang, Lee, Yu, & Kao, 2013) had 2, and the remaining 6 studies (Clarke, 2009; Johnson et al., 2014; Karakurt & Kas,ıkçı, 2012; Landim, Zanetti, Santos, Andrade, & Teixeira, 2011; McEwen et al., 2010; Ve'g, Rosenqvist, & Sarkadi, 2006) had a quality score of 1 (Table 1).

4.1 | Aim 1: the diabetes self-management interventions (Table 3)

A wide range of interventions used in improving self-management skills among people with type 2 diabetes. Diabetes self-management programmes of reviewed studies had patient education delivered in individual and group sessions (Clarke, 2009; Karakurt & Kas,ıkçı, 2012; Landim et al., 2011; McEwen et al., 2010; Siminerio et al., 2008; Wattana et al., 2007) on diabetes self-care (Wu et al., 2013), pathology, healthy lifestyle habits, medication use and adherence (Johnson et al., 2014), self-management behaviour, diet, exercise, complications of weight control, and foot care (Atak, 2008).

Mode of delivering intervention was through face-to-face visits (Johnson et al., 2014), telephone follow-up (Moriyama et al., 2009; Wu et al., 2011; Wu et al., 2013), videophone calls (Hawkins, 2010), home visit (Wattana et al., 2007), and tele-visits (Trief et al., 2013).

Materials used in delivering intervention includes handouts (Hawkins, 2010), videos, DVD, education manual (Karakurt & Kas,ıkçı, 2012; Wattana et al., 2007), booklet (Wu et al., 2011), and handbook (Wu et al., 2013) on various aspects of diabetes self-management.

Interventions were delivered by a wide range of personnel including physicians, nurses, dietitians, nurse case and managers (Trief et al., 2013), pharmacists, diabetes specialist nurse (Ve'g et al., 2006), and village leaders.

4.2 | Aim 2: effects of intervention (Table 2)

- BMI—Of 14 studies, 2 studies assessed BMI, and both showed significant improvements in BMI at posttest (Clarke, 2009; Wu et al., 2013).

- HbA1c–Nine studies examined changes in HbA1c at 6, 9, 12, and 24 months. Eight studies found varying improvements in HbA1c levels, ranging from 0.7% to 1.7% (Hawkins, 2010; Johnson et al., 2014; Karakurt & Kas,ıkçı, 2012; Moriyama et al., 2009; Siminerio et al., 2008; Trief et al., 2013; Ve'g et al., 2006; Wu et al., 2013).
- Lipid profile–Four studies assessed lipid values. Of these 4 studies, 3 showed statistically significant reductions in lipid values (Johnson et al., 2014; Karakurt & Kas,ıkçı, 2012; Moriyama et al., 2009; Siminerio et al., 2008).
- Diabetes knowledge–Three studies assessed knowledge among a combined sample of 167 people with diabetes. Diabetes knowledge improved significantly in all 3 studies (Atak, 2008; Hawkins, 2010; McEwen et al., 2010).
- Quality of life–Three studies measured quality of life at 6 and 12 months. At posttest, quality of life scores were increased significantly (Moriyama et al., 2009; Wattana et al., 2007; Wu et al., 2011).
- Self-management–self-efficacy–Of 14 studies, 7 studies assessed self-management–self-efficacy. Results of these studies suggested that self-care behaviours were improved with the intervention over the assessed periods (Atak, 2008; Clarke, 2009; Hawkins, 2010; Moriyama et al., 2009; Trief et al., 2013; Ve'g et al., 2006; Wu et al., 2011).
- Social support–Only 2 studies assessed social support, and 1 study reported that intervention was effective in improving social support in the posttest measurement (Clarke, 2009; Wu et al., 2011).

Research studies with self-management–based interventions for the management of diabetes demonstrated effectiveness in varying degrees. The interventions involved in these self-management–based

programmes were multidimensional (Atak, 2008; Hawkins, 2010; Johnson et al., 2014; McEwen et al., 2010; Moriyama et al., 2009; Siminerio et al., 2008; Wattana et al., 2007; Wu et al., 2011; Wu et al., 2013). However, the effectiveness of individual interventions was not conclusive. Self-efficacy of type 2 diabetes patients can be enhanced by making effective use of self-management skills. Active involvement of trained diabetes care professionals is necessary for effective implementation of self-management programmes (Wu et al., 2013).

4.3 | Summary of findings

A total of 14 studies was assessed. Each study varied in patient demography and self-management techniques, duration, and type of procedures used in their intervention. A total of 8514 participants was included in the sample from the 14 studies; the smallest study had 21 participants, and largest study included 5344 participants. People with type 2 diabetes who participated in these self-management studies had shown improvement in blood glucose control and knowledge of diabetes. The studies also show improvements in reduction in body weight, reduced blood pressure, low-density lipoprotein cholesterol, and mean arterial pressure; in symptoms of anxiety and depression, decreased distress related to diabetes, and sedentary behaviours; in enhanced quality of life with increased self-efficacy and self-care levels, self-management skills, and treatment satisfaction. However, to confirm these findings, further research is needed, as few studies focused on these outcomes.

5 | DISCUSSION

Self-management programmes in type 2 diabetes were shown to be effective when the primary focus was on partnering with patients in the self-care process to equip them to meet the challenges of caring

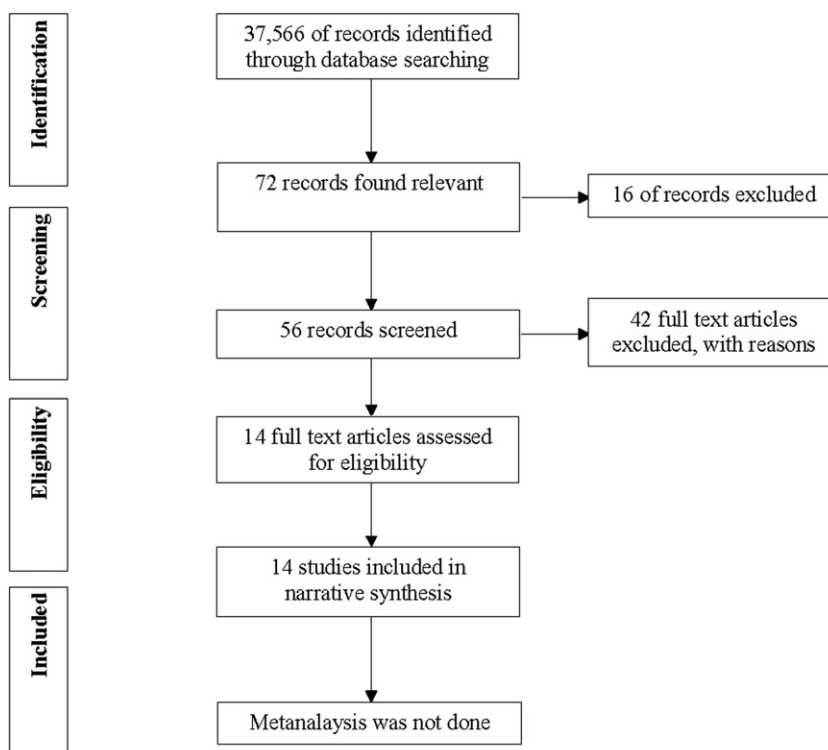


FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-analyses flow chart

TABLE 3 Methodological description of included studies

Author and Year	Quality Score	Country	Variables	Sample Size	Design	Intervention	Duration	Findings	Conclusion
Wu et al., 2013	2	Taiwan	BMI, waist-line circumference, HbA1c, anxiety depression self-efficacy, and self-care	228	Quasi-experimental design	Diabetes self-management programme	4 weeks	Improvements in HbA1c, waistline circumference, body mass index, level of anxiety, and depression.	Self-management programme on diabetes can improve self-efficacy of individuals with diabetes if it is systematically implemented.
Johnson et al., 2014	1	United States	Mean arterial blood pressure, low-density lipoprotein cholesterol, and HbA1c	183	Retrospective pre-post analysis	Face-to-face visits, patient-specific education regarding pathology, healthy lifestyle habits, medication use, and adherence	1 year	Study has shown significant reductions in mean arterial blood pressure LDL-C and HbA1c	Pharmacist led diabetes self-management programme shown to be effective at 1 year duration
Atak, 2008	5	Turkey	Knowledge and self-reported self-management behaviours	80	Randomized single blind controlled study	Education programme consisted information about self-management behaviour, diet, exercise, complications of weight control, and foot care	2 weeks	Regular walk, recognizing nutrients, blood glucose level regulation, and diabetes self-efficacy were improved	Patient education improved self-management behaviours and knowledge to a limited extent but a self-efficacy in patients with type 2 diabetes improved significantly.
Hawkins, 2010	5	-	HbA1c, diabetes knowledge, and self-efficacy for diabetes self-management	66	Randomized clinical trial	Handouts on disease process, nutrition, physical activity, medications, blood glucose monitoring, complications, problem-solving, and psychosocial adjustment. Videophone calls.	6 months	Mean HbA1c values decreased noticeably from baseline to 6 months in the experimental group.	Alternative approaches to traditional office visits must be developed and tested so that acceptable and effective health care can be extended to older adult patients with diabetes.
McEwen et al., 2010	1	Arizona-Sonora, Mexico	Diabetes knowledge	21	Single group pretest	Group sessions and 3	6 months	Intervention was effective in increasing diabetes knowledge and self-management activities	Culturally tailored diabetes self-management social support intervention

(Continues)

TABLE 3 (Continued)

Author and Year	Quality Score	Country	Variables	Sample Size	Design	Intervention	Duration	Findings	Conclusion
Wu et al., 2011	5	Taipei	Social support, health related quality of life, and depression	145	Quasi-experimental design and posttest design	individually tailored sessions DVD, booklet on diabetes, counselling sessions, and follow-up through telephone	6 months	The intervention was effective in improving social support scores, but quality of life and depression scores were not significantly improved.	positively affected diabetes self-management behaviours Social support scores were improved significantly among participants with the diabetic self-management programme.
Siminerio et al., 2008	2	USA	Low-density lipoprotein cholesterol and HbA1c	5344	Two group pretest posttest design	Point of service diabetes education	4 years	HbA1c and LDL-C levels were decreased significantly. But there was no significant difference between-group in HbA1c	Further research is suggested to evaluate different methodologies for increasing access to DSME.
Wattana et al., 2007	6	Thailand	HbA1c, CHD risk, and quality of life	147	Randomized controlled trial	Diabetes education class, group discussions, home visit, and education manual for patient	6 months	HbA1c and risk of CHD were decreased significantly in experimental group	The intervention was effective in improving metabolic control and the QOL.
Clarke, 2009	1	Ireland	Diabetes self-management behaviour, diabetes attitude, perceived nutrition, exercise self-efficacy, and social support	168	Correlational longitudinal study	Educational sessions	6 months	Newly examined men with recent diagnosis of diabetes had a more positive diabetes attitude and social support compared to women.	Continuous assessment will be helpful in diabetes self-management behaviour maintenance to achieve desired results.
Moriyama et al., 2009	5	Japan	HbA1c, body weight, quality of life, self-efficacy, dietary and exercise stages, and total cholesterol	65	Randomized controlled trial	Monthly interviews and biweekly telephone calls	12 months	All the study variables had significant changes including HbA1c and quality of life	Self-management education found to be effective regarding behaviour modification skills of patients, goal attainment, and self-efficacy
Landim et al., 2011	1	Brazil in 2009	Physical competence and	43	Prospective, comparative study	Educational sessions	4 months	Changes in physical competence found no statistical significance. But	Adding of positive self-care actions was favoured by the intervention

(Continues)

TABLE 3 (Continued)

Author and Year	Quality Score	Country	Variables	Sample Size	Design	Intervention	Duration	Findings	Conclusion
Trief et al., 2013	8	USA	cognitive, emotional, and motivational competencies HbA1c and self-reported adherence	1665	RCT	Tele-visits with dietitians nurse case managers	5 years	emotional, cognitive, and motivational competencies were significant Self-reported adherence shows improvements in the experimental group. Adherence has significant effect on HbA1c	implemented in the study with improvements in emotional, cognitive, and motivational competencies Telemedicine intervention achieved improved goal.
Ve'g et al., 2006	1	Sweden	HbA1c, self-management profiles	259	RCT	Pharmacist led monthly group meeting with the assistance of diabetes specialist nurse	2 years	Good glycaemic control was achieved and successful in maintaining the reduced blood glucose for a longer duration.	Self-management education can be individualized with the use of the open-ended questions
Karakurt & Kas, Ikc, 2012	1	Turkey	HbA1c, blood pressure, lipid values, body mass index, and waist circumference	100	One group pretest posttest experimental design	Education sessions and patient education manual	9 months	Improvements found in the scores of diabetes self-care were statistically significant.	Metabolic control and self-care of patients is improved by the diabetes education

for their disease condition (Johnson et al., 2014; Moriyama et al., 2009). Short-term interventions were effective when they were culturally tailored (McEwen et al., 2010) and developed according to patient needs and limitations to manage their condition and support needed to be provided for patients on a long-term basis (Atak, 2008).

5.1 | Limitations

Our search was limited to few databases, which might have missed relevant studies published in other databases. Research studies published in English language only considered for this systematic review. Another concern is that included studies varied by sample size and quality, and there was heterogeneity in interventions.

6 | CONCLUSION

This systematic review supports the self-management programmes in effective management of diabetes, which is evident in improvements in HbA1C, diabetes knowledge, and self-care practices with short-term to long-term follow-ups. Training of the health care professional in delivering self-care management programmes may hold the key to success.

Nurse's role is highly prominent in diabetes care as they involve in creating awareness, managing diabetes, and educating about diabetes self-management. Future research can explore the role of nurse in implementing diabetes self-management possibilities to minimize the hospital visits, contact sessions with health care personnel, and short duration of self-management programmes.

In a nutshell, this review shows that diabetes self-management can be improved through various intervention strategies. Good quality of research is needed to test the potential of each strategy in different conditions. Clarity in the nurse's role at various levels of intervention is also needed to strengthen the implementation of self-management programmes. Since self-management programmes are patient-centred, patient's active involvement in planning phase of disease management has been encouraged and constant monitoring of the self-care skills needs to be done.

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