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The effect of peer support on self-management in type 2 diabetic patients

A literature review

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Abstract

Background: With the improvement of living standards and the change of people's eating habits, the incidence of diabetes is gradually increasing. Self-management plays a key role in diabetes management. Peer support, to a large extent, can greatly improve patients' self-management ability.

Aim: To describe the effect of peer support on self-management of patients with type 2 diabetes.

Design: a descriptive literature review

Method: This is a descriptive literature review. A total of 10 eligible articles were retrieved and screened in PubMed and Cinahl databases, including 10 quantitative articles.

Results: Through the summary and analysis of ten articles, the author found that peer support is effective for self-management of patients with type 2 diabetes. Peer support can help patients better control their blood glucose, actively face the disease, reduce the difficulties of patients with diabetes, alleviate their negative emotions, control diet, exercise properly, etc. Through this series, patients with type 2 diabetes can better manage their diseases and improve their quality of life.

Conclusions: Peer support has a positive effect on self-management of patients with type 2 diabetes. Through peer support, patients with type 2 diabetes can better manage their own diseases. Therefore, peer support is one of the effective strategies for self-management of patients with type 2 diabetes.

Keywords: Peer support, Type 2 diabetes, Self-management.

摘要

背景：随着生活水平的提高，人们饮食习惯的改变，糖尿病的发病率正在逐渐增加。自我管理对糖尿病治疗起着关键作用。而同伴支持在很大程度上可以极大地提高患者的自我管理能力，以此提高糖尿病患者的生活质量。

目的：探讨同伴支持对 2 型糖尿病患者自我管理的影响。

方法：这是一个描述性的文献综述。在 PubMed 和 Cinahl 数据库中检索和筛选符合条件的文章共 10 篇，定量 10 篇。

结果：通过对十篇文章的总结和分析，作者发现同伴支持对于二型糖尿病患者的自我管理是有效的。同伴支持可以让患者自己更好的控制血糖，积极的去面对疾病，减轻患者的糖尿病困难，缓解他们的消极情绪，控制饮食，适当运动等。通过这一系列，二型糖尿病患者能更好的对疾病进行自我管理，并改善他们的生活质量。

结论：同伴支持对 2 型糖尿病患者的自我管理有积极的影响。通过同伴支持这一手段，2 型糖尿病患者可以更好对疾病进行自我管理。因此，同伴支持是 2 型糖尿病患者自我管理的有效策略之一。

关键词：同伴支持，2 型糖尿病，自我管理。

Table of contents

1. Introduction	1
1.1 Background	1
1.2 Definition	1
1.2.1 Diabetes and Type2 diabetes	1
1.2.2 Self-management	1
1.2.3 Peer support	1
1.3 The nurse's role	2
1.4 Nursing theory - Orem theory	2
1.5 Literature review on related area	3
1.6 Problem description	3
1.7 Aim and research questions.....	4
2. Method	4
2.1 Design.....	4
2.2 Search strategy.....	4
2.3 Selection criteria	7
2.4 Selection process and outcome of potential area	7
2.5 Data analysis	8
2.6 Ethical consideration.....	8
2.7 The importance of the degree project.....	8
3 .Result	9
4 .Discussion	17
4.1 Main result	17
4.2 Result discussion	17
4.3 Method discussion	18
4.4 Clinical implications for nursing.....	18
4.5 Future research prospects	19
5 .Conclusion	20
Reference	21
APPENDIX 1	25
APPENDIX 2	30

1. Introduction

1.1 Background

With the improvement of living standards, people's dietary habits are changing, and at the same time the incidence of diabetes is increasing (Zheng, Ley & Hu, 2018). People with diabetes can develop a variety of complications, including heart disease, stroke, retinopathy, kidney failure, and amputation, that can seriously affect their health and quality of life (Van Smoorenburg, Hertroijs, Dekkers, Elisen & Melles, 2019). Studies have shown that strengthening self-management ability can improve patients compliance behavior, condition monitoring, and so on, which will effectively prevent the occurrence of complications and ameliorate the quality of life of patients. Therefore, how to improve patients self-management ability is the focus of the current research. In response, some studies have already shown that peer support can greatly improve patients self-management ability in a great deal (Robertson, 2012). Therefore, the main purpose of this study is to further explore the essence of the relationship between peer support and self-management ability of diabetic patients and to provide the scientific basis for improving the quality of life of diabetic patients.

1.2 Definition

1.2.1 Diabetes and Type2 diabetes

Diabetes is a general term for heterogeneous disturbances of metabolism as well as a chronic hyperglycemia characterized by high blood sugar (Kerner & Brückel, 2014). The cause of this disease is either impaired insulin secretion or impaired insulin action or both (Kerner & Brückel, 2014). In the classification of diabetes, type 2 diabetes is caused by a relative lack of insulin, mainly insulin resistance, or by impaired insulin secretion, mainly with or without insulin resistance (Kerner & Brückel, 2014).

1.2.2 Self-management

Self-management plays a key role in disease care and tend to be a daily activity of personal health management (Luo, Liu, Yuan, Ge, Yang, Li & Sun, 2015). The aim of self -management is to help patients and their families better manage the health of chronic diseases and prevent disease progression (Luo et al., 2015).

1.2.3 Peer support

The Mental Health Commission of Canada defines “peer support” as a “supportive relationship between people who have shared life experiences concerning a mental

health problem or physical illness” (Sunderland, 2013). Peer support refers to the support provided by people who are similarly affected by chronic disease and can share their own experience of chronic diseases with patients (Kong, Hu, Yang & Cui, 2019).

1.3 The nurse’s role

Type 2 diabetes mellitus (T2D) is a chronic progressive disease that has a high morbidity and mortality rate (Robertson, 2012). Effective management of diabetes is essential to prevent long-term complications of the disease and improve patients’ health (Robertson, 2012). Treatment is complex and needs to be frequently adjusted to take into account the patient’s blood glucose control level, as well as complications such as hypertension and dyslipidemia (Robertson, 2012). Diabetes patients need frequent monitoring, especially in the early phase of acute and long-term complications with many different aspects of the whole treatment being integrated (Robertson, 2012). The current study highlights the significance of a comprehensive approach to T2D treatment by the healthcare team, as well as diabetes self-management education (Robertson, 2012). The role of nurse practitioner (NPS) is at the heart of the care, the delivery of the diabetes self-management education, physical health assessment, medical and psychosocial issues, as well as, at goal setting, and the implementation and coordination of treatment plans (Robertson, 2012). For patients with T2D, the nurse plays a critical part in providing patient education, explaining treatment strategies, supporting lifestyle changes, and maintaining self-management (Robertson, 2012). Because the health condition of patients changes constantly through the disease continuum, as new therapies continue to enter the market, each transition to a new treatment or regimen requires new education and different methods of support (Robertson, 2012).

1.4 Nursing theory - Orem theory

Orem’s self-care theory (SCT) mainly consists of three parts, namely self-care theory, self-care deficit theory, and nursing system theory (Alligood & Tomey, 2014), which state that “People are the object of care”, “Nursing is an activity centered on human health”, “Environment refers to all the factors (such as physiology, psychology, society, etc.) that can affect people’s self-care ability except people” respectively. Health in general refers to physical, psychological and socio-cultural health, rather than just “the absence of physical illness” (Alligood & Tomey, 2014). Self-care is a human regulatory

function, by which individuals must perform their duties prudently for themselves, to maintain life, health, development, and well-being (Alligood & Tomey, 2014). However, self-care should be learned and carried out consciously, consistently, and on time in accordance with the individual's management requirements (Alligood & Tomey, 2014). This theory is not only applicable to patients but also fit for nurses who both caregivers and mentors or educators who can provide education, support, and guidance to patients and help them improve their self-management skills (Alligood & Tomey, 2014).

1.5 Literature review on related area

In global, the incidence of type 2 diabetes (T2D) is on the rise, when the self-management of diabetics becomes particularly vital (Pamungkas, Chamroonsawasdi & Vatanasomboon, 2017). With the description and promotion of peer support, its value in improving clinical and behavioral outcomes has been brought out, leading to the control and improvement of patient condition of type 2 diabetes (Pamungkas et al., 2017). Relevant studies show that in peer support, patients with type 2 diabetes can better self-management, control the progress of the disease, and help patients with type 2 diabetes to live a better life (Liang, Jia, Zhou, Lu, Wu, Yu, Wang, Huang, Guo & Chen, 2021). However, the existing studies did not describe the effects of peer support on self-management in patients with type 2 diabetes, and lacked a systematic review to synthesize empirical evidence. Therefore, there is a need for further studies to synthesize the recent articles on the effects of peer support on type 2 diabetes and self-management efficacy in patients with diabetes.

1.6 Problem description

Type 2 diabetes has become a serious health problem in many countries in recent years, with the number of people with type 2 diabetes increasing rapidly and further influencing the fatality rate. As a chronic disease, type 2 diabetes can lead to serious complications, including heart disease, stroke, retinopathy, kidney failure, and limb amputation. Considering self-management of patients with type 2 diabetes is relatively complex, it is vital to explore the influence of peer support on the self-management of patients with type 2 diabetes. However, few studies have systematically reviewed the efficacy of peer support on self-management in patients with type 2 diabetes. Although some studies have found that some clinics attach great importance to this study, there is a lack of literature data to support it and experience in applying the results to clinical

practice. In a nutshell the purpose of this study is to explore the effects of peer support on self-management in patients with type 2 diabetes patients.

1.7 Aim and research questions

The literature review aims to describe the effect of peer support on the self-management of patients with type 2 diabetes.

What is the effect of peer support on self-management in patients with type 2 diabetes?

2. Method

2.1 Design

The authors conducted a descriptive literature review (Polit & Beck, 2017).

2.2 Search strategy

Articles were be searched in PubMed and CINAHL, but with restrictions (see Table 1). Search terms, which were picked up from Mesh AND Cinahl headings. included “type 2 diabetes”, “self-management”, “peer support”, “peer coaching”. These search terms were searched in different combinations from the Boolean operators by using the linking words “And” (Polit & Beck, 2017). During the preliminary searching process (see Table 1), a total of 251 articles were reviewed, of which 30 were deemed suitable for the study (see Table 1).

Table 1. Result of preliminary databases searches.

Database	Limits and search date	Search term	Number of hits	Possible articles (excluding doubles)
Medline via PubMed	10 years, English, Full text 2021.5	“Type 2 diabetes” (MeSH)	107415	
Medline via PubMed	10 years, English, Full text 2021.5	“Self-management” (MeSH)	53071	
Medline via PubMed	10 years, English, Full text 2021.5	“Peer support OR peer coaching” (free text)	29937	

Medline via PubMed	10 years, English, Full text 2021.5	“Type 2 diabetes” (MeSH) AND “Self-management” AND “Peer support OR Peer coaching” (free text)	146	15
Cinahl	10 years, English, Full text 2021.5	“Type 2 diabetes” (headings)	44340	
Cinahl	10 years, English, Full text 2021.5	“Type 2 diabetes” AND “Self- management”	2697	
Cinahl	10 years, English, Full text 2021.5	“Type 2 diabetes” AND “Self- management” AND “Peer support OR peer coaching”	105	5
				Total:20

2.3 Selection criteria

Inclusion criteria for articles are as followed

- (a) Articles related to the purpose of this literature review (the effect of peer support on self-management of type 2 diabetic patients);
- (b) The scientific articles using quantitative methods;
- (c) Articles in English published in the last ten years.

Exclusion criteria for articles are as followed

- (a) Review, qualitative, and non-English language articles.
- (b) Articles about type 1 diabetes.

2.4 Selection process and outcome of potential area

First, the researchers browsed the title and abstract of the articles to judge whether the articles may be useful to answer the research questions of the review. These selected articles will then be examined more meticulously to determine whether they are relevant to the review. The authors will elaborate on each step of the selection process in the following flow chart (see Figure 1).

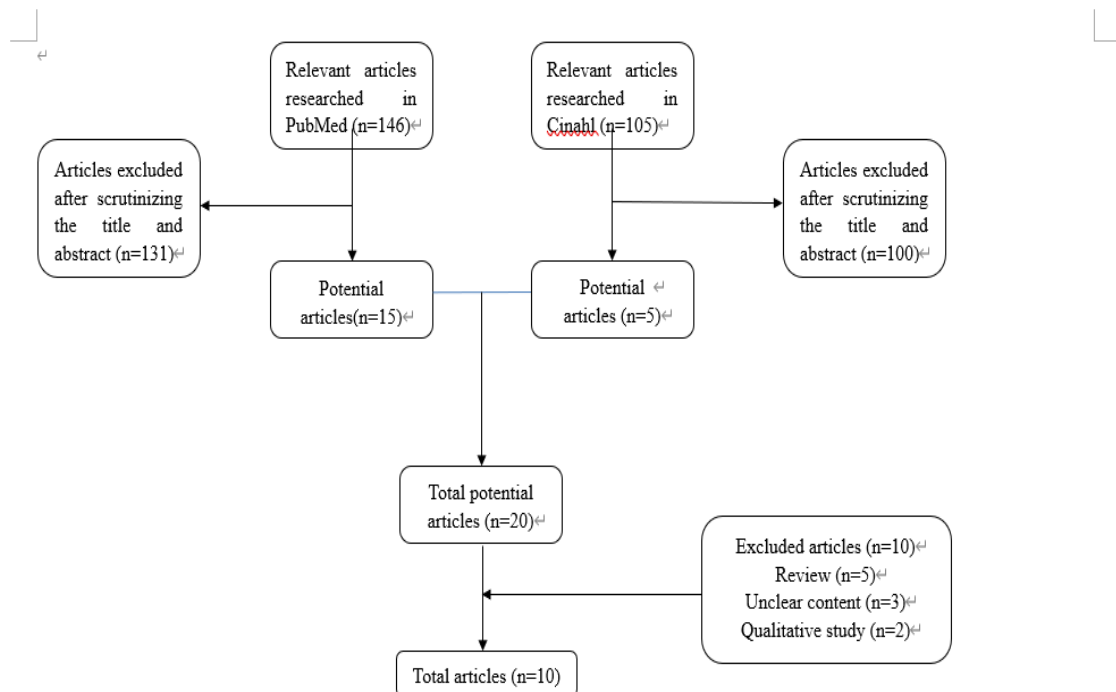


Figure 1. Selection process and the outcome of potential articles

2.5 Data analysis

Articles selected in this program will be processed with the assistance of two templates, known as matrices. According to Polit and Beck (2017), using matrices is an efficient way to organize information. In one of the Appendixes, the authors summarize the title, design, participants, data collection and data analysis methods. The authors also used another method to summarize the purpose and results by reading the results carefully to discuss and summarize the effects of peer support on the self-management of type 2 diabetes. If there is a difference in analyzing the effects, the author will confirm, analyze and make a judgment in the article accordingly. The results will be organized according to the categories in which they appear and will be presented under the respective categories.

2.6 Ethical consideration

This review will be published under the premise of morality and ethics. Each article used in the review will be carefully read and fully comprehended. The viewpoints of the selected articles will be objectively and accurately described without being influenced by the personal views and attitudes of the authors, and the original content will not be tampered with. Last but not least, there is no plagiarism in this review. (Polit & Beck, 2017).

2.7 The importance of the degree project

As a chronic non-communicable disease, T2D is prevalent at present with its incidence on the rise. Diabetes brings great harm to the body and mind of patients, reduces the quality of life of patients and causes a lot of complications. In daily life, the treatment of diabetes requires not only the disease management of the patients themselves but also the support of their peers. This article will lead us to further understand the role of peer support in the self-management of patients with type 2 diabetes, which is of great significance for improving the quality of life of patients and alleviating the deterioration of type 2 diabetes.

3 .Result

Our results were derived from 10 articles describing self-management with the help of peer support in type 2 diabetes, 10 of which were quantitative. All 10 papers were published within a decade, and the researchers were from the United States, China, Canada and other countries. In the 10 quantitative articles, the selected persons included men and women, ranging in age from 18 to 75, with sample sizes ranging from 8 to 299. The data were collected using questionnaires, scales and instruments. Including Depression Anxiety and Stress Scale (DASS)、 EuroQol-5D (EQ5D)、 Patient Health Questionnaire (PHQ)、 General Health Questionnaire (GHQ)、 Summary of Diabetes Self Care Activities (SDSCA)、 Diabetes Distress Scale、 Diabetes Support Scale. Diabetes Knowledge Test (DKT)、 Diabetes Knowledge Questionnaire (DKQ-24)、 Understanding Management Practice (UMP)、 Active Listening Observation Scale (ALOS)、 8-item survey adapted from Heisler and Piette 4-item Perceived Diabetes Self-Management Scale、 4-item Morisky Medication Adherence scale、 Diabetes Dependent Quality of Life Audit (ADDQoL)、 Bayer Now+ test kit、 Welch Allyn Speidel & Keller sphygmomanometer and so on.

The authors took General Health Questionnaire (GHQ) and Summary of Diabetes Self Care Activities (SDSCA) found that peer support group had higher SDSCA scores in glucose monitoring and medication compliance than control group. After 6 months, hba1C in the control group increased from $7.1\pm 0.3\%$ to $7.3\pm 1.1\%$ ($P=0.19$), while that in the peer support group remained unchanged ($7.1\pm 0.3\%$ to $7.1\pm 1.1\%$, $P=0.81$; $P = 0.02$ between populations) (Yin, Wong, Au, Chung, Lau, Lin, Tsang, Lau, Ozaki, So, Ko, Luk, Yeung & Chan, 2015). Deng *et al.* (2016) used questionnaires and a glycoprotein analyzer (Arkray Medical) to collect data. At 7 months, the mean glycosylated hemoglobin (HbA1c) in the control group was 8.43% at baseline and 8.11% after 7 months of training, with no significant difference ($P>0.05$). In contrast, patients in the peer support group had a significant reduction in mean hba1c from 8.45% at baseline to 7.85% at 7 months (a 0.60% decrease) ($P<0.05$). Hba1c is measured in a central laboratory at San Francisco General Hospital. Data were collected by assays of 4-item Morisky Medication Adherence Scale and 4-item Morisky Medication Adherence scale. The peer support group had the greatest benefit for patients with low self-management ability and poor adherence to baseline medication, with participants with "low" self-management having a slight increase in Hba1c in the control group

(0.3%) and a decrease in Hba1C in the peer support group (-0.9%) (Moskowitz, Thom, Hessler, Ghorob & Bodenheimer, 2013). The authors collected hba1c values using a questionnaire and mini-sample collection kit and found that the peer support group had slightly lower Hba1C than the control group (Nelson, Drain, Robinson, Kapp, Hebert, Taylor, Silverman, Kiefer, Lessler & Krieger, 2014). Thom *et al.* (2013) applied a questionnaire on demographic characteristics, hba1c levels were found to be 1.07% lower in the peer support group than 0.3% in the control group, a difference of 0.77% ($P = 0.1$). Therefore, peer support can better help patients with type 2 diabetes to better control their hba1C, so that they can better self-manage the disease.

Yin *et al.* (2015) used data collected from the 14-item Diabetes Self-Care Assessment Summary (SDSCA), found that total cholesterol in the peer support group ranged from 180 ± 30 mg/dL to 170 ± 39 mg/dL [4.7 ± 0.9 mmol/L to 4.3 ± 1.0 mmol/L], $P=0.01$), low density lipoprotein cholesterol (LDL-C) (100 ± 27 mg/dL to 93 ± 31 mg/dL, $P=0.03$), which was not present in the control group. Tang *et al.* (2015) using data collected from Diabetes Distress Scale and Diabetes Support Scale. With peer support, the mean low density lipoprotein cholesterol (LDL-C) was significantly higher in the control group at 3 months (15.5 mg/dL, $P < 0.001$), 9 months (16.5 mg/d, $P < 0.001$) and at 15 months (16.6 mg/dL, $P=0.002$). Significant differences between groups at 3, 9 and 15 months, respectively. The same peer support group at 3 months (5.8 mg/dL, $P < 0.001$) mean high density cholesterol (HDL-C) levels improved significantly at 9 months (13.6 mg/dL, $P < 0.001$) and at 15 months (14.1 mg/dL, $P < 0.001$) Continuous improvement. The control group had no improvement in HDL-C levels at 3 months, but improved at 9 months (14.3 mg/dL, $P < 0.001$) and 15 months (13.3 mg/dL, $P < 0.001$), the difference was significant only at 3 months in the intervention group (5.1 mg/dL, $P=0.005$). Nelson *et al.* (2016) collected data by Interview questionnaire survey, Electronic system for remote Data Collection and other methods. Participants in the peer support group had an average of 94.7 mg/ dL of low-density lipid cholesterol (LDL), which was slightly higher in the control group than in the peer support group.

Presley *et al.* (2020) used the interviewer-administered questionnaire, the 17-item Diabetes Distress Scale (DDS), the Center for Epidemiologic Studies Depression scale (CES-D) to collect data to assess diabetes distress. Changes in diabetes distress were significantly greater in the peer support group than in the control group, 2.7 ($P=1.2$) to 2.1 ($P=1.0$) and 2.6 ($P=1.1$) to 2.3 ($P=1.0$) ($P= 0.041$), respectively. Tang *et al.* (2015) used the 17-item Diabetes Distress Scale (DDS) to assess emotional distress and

functioning in patients with diabetes. At 3 months, there was a significant increase in the proportion of individuals in each group reporting little or no diabetes distress (58.1% at baseline of peer support vs. 74.4% at 3 months, $P=0.01$; Control group 63.5% vs 90.2%, $P=0.01$). Spencer et al. (2018) assessed depressive symptoms using patient health Questionnaire-9(27) to collect data. The authors found that compared with the control group, CHW+ peer support group also had significantly fewer depressive symptoms at 18 months ($P<0.05$). The related results showed that with peer support, the participants' psychological factors such as anxiety, depression and distress would be reduced, more diabetes knowledge could be obtained, and their self-management ability and quality of life would be improved. Through peer support, patients with type 2 diabetes can have less pain and depression, which can help them have more confidence to face the disease and actively manage their disease. (Liu, Han, Shi, Li, Li, Jin, Gu & Guo, 2015; Presley et al.,2020; Tang et al.,2015; Spencer et al.,2018; Tang, Funnell, Gillard, Nwankwo & Heisler, 2011).

Deng *et al.* (2016) collected data through questionnaires. The peer support group compared to the control group, at 7 months used insulin in the relevant knowledge of the project ("sterilization items regularly source", "goods of disinfection validity check", "at the injection site selection and rotate right", "before each injection to replace the needle", "identification of different types of insulin", "the proper use of different types of insulin", "the correct use of insulin pen", "disinfection before every injection" and "sterile correctly operation", "correct insulin injection"), peer support group improved more significantly ($P<0.05$). At the same time, in terms of "regular and quantitative diet", "reasonable mold", "reasonable exercise", "enough exercise time" and "regular self-monitoring of blood glucose", the improvement degree of patients in the peer support group was significantly higher than that in the control group at 7 months ($P<0.05$). It is very important for self-management of type 2 diabetes patients to control diet reasonably, exercise appropriately and fully master diabetes-related knowledge.

Tang *et al.* (2015) found that the mean BMI of the peer support group decreased from baseline, with a continuous decrease of 1.0 kg/m² at 15 months ($P < 0.001$), compared with the mean decrease of 0.8 kg/m² in the control group ($P=0.03$). And the level of social support in the peer support group increased from baseline to 3 months (0.5, $P=0.02$). Deng *et al.* (2016) found after 7 months of treatment, BMI and TC in the peer support group were significantly lower than those in the control group ($P < 0.05$). Nelson *et al.* (2014) found that the average body mass index (BMI), blood pressure and

so on were slightly higher in the control group than in the peer support group. With the help of peer support, BMI, TC, blood pressure, etc. of patients with type 2 diabetes can be improved to some extent, which for patients can make their body healthier as well.

Table 2. The summary of the effectiveness of peer support on improving self-care in patients with type 2 diabetes.

Authors	Variables	Peer support Group		Control Group		Effectiveness Score (P value)	Data collection method
		Mean	SD	Mean	SD		
Yin et al. (2015)	General diet at 6 months	5.57	1.32	4.62	1.88	0.01	14-item Summary of Diabetes Self Care Assessment (SDSCA).
	Special diet at 6 months	5.32	1.3	4.46	1.5	0.008	
	Exercise at 6 months	4.63	2.07	3.65	2.07	0.07	
	Glucose monitoring at 6 months	2.89	1.77	2.52	2.21	0.47	
	Foot care at 6 months	5.66	1.44	4.27	1.95	0.001	
	Medication adherence at 6 months	6.59	1.41	6.3	1.6	0.75	
	HbA1c at 6 months	7.1	1.1	7.3	1.1	0.02	
Moskowitz et al. (2013)	Medication adherence	6.78	0.10	6.83	0.09	0.70	4-item Morisky Medication Adherence scale. PHQ-8. Diabetes Support Scale. A scale developed and validated by Chew and colleagues. 4-item Perceived Diabetes Self Management Scale.
	Self-management	2.59	0.47	2.58	0.44	0.89	
	Depression	8.07	5.43	6.83	5.30	0.05	
	Health literacy	3.66	1.12	3.57	1.20	0.48	
	Social support	3.87	1.01	4.09	0.99	0.05	
	HbA1c	10.1	2.0	9.8	2.0	0.20	

	Body mass index	35.0	8.30	32.5	8.48	< 0.01		
Deng et al. (2016)	Diabetes time (months)	18.24	4.65	16.45	8.47	>0.05	The diabetic questionnaire.	
	Insulin usage time (months)	3.01	1.95	3.89	2.87	>0.05		
	HbA1c	Pre-education	8.45	0.39	8.43	0.47		>0.05
		Post-education	7.85	0.41	8.11	0.51		>0.05
Complications related to diabetes	/	/	/	/	/	>0.05		
Tang et al. (2015)	HbA1c	7.8	2.1	8.0	1.6	0.53	Health o meter Pro Series spring scale.	
Nelson et al. (2016)	HbA1C Initial clinic value	10.2	1.8	10.1	1.9	0.81	Interview questionnaire survey. Electronic system for remote data collection.	
	HbA1C Baseline study enrollment value	9.0	1.6	8.9	1.9	0.77		
	Systolic blood pressure	130.5	20.6	127.5	21.1	0.22		
	Diastolic blood pressure	82.2	11,1	80.5	11.7	0.21		
	Self-care activities for diabetes follow a healthy eating plan	4.0	2.7	3.8	2.7	0.6		
	BMI	32.5	8.3	34.7	9.4	0.04		
Liu et al. (2015)	HbA1c	7.34	1.15	7.39	1.07	> 0.05	Interview questionnaire survey. DKT, DSCS, Simple Diabetes Related Depression Scale (DDS) and Diabetes Dependent Quality	
	BMI	24.5	2.72	24.7	2.69	> 0.05		
	Cholesterol	5.01	1.01	5.03	0.82	> 0.05		
	SBP	137	15.8	133	12.2	> 0.05		
	DBP	80	8.78	79	6.52	> 0.05		

								of Life Audit (ADDQoL)
Tang et al. (2018)	Age		48.2	10.7	48.5	10.0	0.488	Interview questionnaire survey.
	Female		54	60.7	49	67.1	0.269	
	High school graduate		17	28.3	32	43.8	0.008	
	HbA1c		7.7	1.7	7.7	1.8	0.136	
Spencer et al. (2018)	HbA1C		8.2	2.2	7.7	1.8	0.136	the Tech-Med model (cat. no. 4414) measuring tape. Diabetes Distress Scale, a 17-item instrument. Diabetes Support Scale, a six-item instrument. Diabetes Care Profile. Patient Health Questionnaire-9.
	BMI		33.1	7.6	32.3	5.4	0.299	
	Waist circumference		41.8	6.3	39.5	5.4	0.071	
	DDS		2.0	1.0	2.0	1.0	0.657	
	DSS		4.0	1.2	4.0	1.1	0.098	
	PHQ		6.5	6.1	4.8	4.3	0.187	
	DCP		2.9	0.8	2.8	0.9	0.673	
Presley et al. (2020)	A1C	Baseline	10.1	1.7	9.8	1.7	P(group*time)=0.75	Interview questionnaire survey. Blood glucose was assessed using instant testing with the Bayer Now+ test kit. 17 item Diabetes Depression Scale (DDS) Depression Scale
		6 months	9.6	1.9	9.1	1.9		
	Depressive symptom	Baseline	10.2	6.2	9.7	5.8	P(group*time)=0.48	
		6 months	10.5	6.3	10.8	6.8		
	Diabetes distress	Baseline	2.7	1.2	2.6	1.1	P(group*time)=0.041	
		6 months	2.1	1.0	2.3	1.0		
	Quality of life	Baseline	60.5	19.9	58.5	21.1	P(group*time)=0.81	
		6 months	63.4	22.9	62.6	17.0		

								(CES-D) EuroQol Visual Simulation Scale (EQ-VAS) 8 item Diabetes Self- Management Scale (PDSMS) 5 points Likert Scale
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4 .Discussion

4.1 Main result

By summarizing and discussing the results, peer support has a positive effect on self-management of type 2 diabetes patients. The 10 articles also collected and analyzed relevant data through questionnaires, scales and other tools. Compared with the control group, peer support had a positive feedback effect on hBA1c, cholesterol, BMI, diabetes distress, depression and other aspects, indicating that peer support can promote self-management of patients in some aspects.

4.2 Result discussion

Through the analysis of the results, the self-management of type 2 diabetes patients can be divided into psychological and physiological aspects. Physiologically, the patient's self-management mainly includes the control of diet, glycosylated hemoglobin, cholesterol, BMI, blood pressure and other aspects. Relevant data also show that with peer support, the patient can reduce blood glucose fluctuation, have a reasonable diet, take medicine on time, and do some exercise to control BMI. Psychologically, patients with type 2 diabetes will face depression, confusion and other problems in the face of the disease, but with peer support, they can face the disease with a more positive attitude, control their negative emotions, actively seek treatment, and learn to better self-management.

The results of the review indicated that peer support was effective in the self-management of patients with type 2 diabetes compared to the control group. Zhao *et al.* (2019) also described the same results, pointing out that peer support improved blood glucose and lipid levels in patients with type 2 diabetes, which was helpful for self-management of patients. The same result was also described by Debussche *et al.* (2018), which pointed out the peer support interventions in poorly controlled type 2 diabetes resulted in substantial improvements in glycemic control and anthropometric parameters. The main results of the study showed that peer support interventions lasting 8 weeks improved self-care behavior and fasting glucose levels. Self-management behavior is an important aspect of diabetes treatment. Self-management is the long-term management of diabetes patients. It includes diet control, physical exercise, blood sugar checks, and medication. Stabilization of blood sugar levels is key to successful treatment of the disease. The results of this study were consistent with those of this review. In addition, the study found that people with type 2 diabetes improved their self-management based

on community and peer support. (Samudera, Efendi & Indarwati, 2021). The study also pointed out that healthy lifestyle programs based on peer support and community may be a promising intervention strategy for improving self-management and fasting glucose in patients with type 2 diabetes. This study could also serve as an important reference for improving self-management and fasting glucose in patients with type 2 diabetes (Samudera et al., 2021).

The articles used in the discussion also showed that the self-control level of the patients in the peer support group was improved compared with the control group. Psychologically, they can control their negative emotions, actively seek solutions, take the initiative to seek help from others, overcome psychological barriers, and face the disease with a positive attitude. In terms of victory, patients' self-management is mainly reflected in blood glucose, diet control, complications and other aspects. Patients can control the deterioration of their disease by detecting daily changes in blood glucose and independently adjusting their diet. In conclusion, most patients have improved self-management with peer support, but we do not exclude some special patients with low self-management ability.

4.3 Method discussion

This is a review of the effects of peer support on self-management in patients with type 2 diabetes. The author searched PubMed and CINAHL databases for reference. The source of the adopted articles is reliable and so do the results. The authors conducted a used precise search in CINAHL and PubMed using self-management, type 2 diabetes, peer support, and other search terms to obtain more results relevant to the purpose of this study. Despite of the gained results, this study has the following limitations. 1. Most o participants in the articles were selected from resource-deficient or low-income areas, so the overall study has certain limitations. 2. The sample sizes in some articles were small, and the findings were not generalizable. 3. There was some variation in the intervention methods, intervention duration, follow-up time, and sample size for peer support.

4.4 Clinical implications for nursing

For clinicians, nurses can through the application of the theory of orem and understanding, related applications and data analysis, the nurse can increase the degree of understanding of type 2 diabetes, improve nursing skills in practice, to provide quality care for patients, improve the quality of life of patients with diabetes, help patients manage themselves better. For patients, through peer support, they can have a

deeper understanding of the disease, better self-management of the disease, better control of cholesterol, glycosylated hemoglobin and other factors, improve the quality of life, and help patients improve the efficiency of self-management.

4.5 Future research prospects

As a chronic disease, the treatment of type 2 diabetes is crucial for patients' self-control and management, while peer support for patients helps patients improve their self-management efficiency and quality of life. Therefore, in the future in-depth study of diabetes, we can also use the corresponding scale and measurement tools to analyze relevant data, evaluate the changes in patients' self-management level with peer support, and conduct comparative analysis. At the same time, variables such as age, education level and underlying diseases of the people included in the study should also be controlled for the convenience of later data analysis. Peer support, as a new way, is beneficial to patients' self-management. We can further study the factors related to peer support, expand the scope of peer support, continue to promote and apply this model, and integrate patient-hospital-community-peer support management.

5 .Conclusion

Peer support has a positive effect on self-management in patients with type 2 diabetes. Through peer support, patients with type 2 diabetes can better understand the knowledge of diabetes, have a more positive attitude towards the disease, actively take medication, exercise regularly, monitor blood sugar and control blood sugar well, etc. This is very beneficial for the self-management of patients with type 2 diabetes. Therefore, peer support is one of the effective strategies for self-management in patients with type 2 diabetes.

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APPENDIX 1

Table 3. Overview of selected articles

A total of 10 included studies were cited	Title	Design (possible approach)	Participants	Data collection method(s)	Data analysis method(s)	Code
Yin, J., Wong, R., Au, S., Chung, H., Lau, M., Lin, L., Tsang, C., Lau, K., Ozaki, R., So, W., Ko, G., Luk, A., Yeung, R., & Chan, J. C., +2015, Hong Kong.	Effects of Providing Peer Support on Diabetes Management in People With Type 2 Diabetes	A randomized controlled trial. A quantitative approach.	Number: 79. Age: 18 to 75 years. HbA1c: <8.	Depression Anxiety and Stress Scale (DASS). EuroQol-5D (EQ5D). Patient Health Questionnaire (PHQ). General Health Questionnaire (GHQ). Summary of Diabetes Self Care Activities (SDSCA). Hong Kong Hospital Authority Clinical Management System.	McNemar tests. Paired t-tests. Chi-square tests. Covariance analysis.	A
Tang, T. S., Funnell, M. M., Sinco, B., Spencer, M. S., & Heisler, M., +2015, United States.	Peer-Led, Empowerment-Based Approach to Self-Management Efforts in Diabetes (PLEASED): A	A randomized controlled trial. A quantitative approach.	Number: 106 community-dwelling African American adults who have a regular health care provider. Age: at least 21 years old.	Diabetes Distress Scale. Diabetes Support Scale.	Longitudinal analysis with a linear mixed model . Log-rank test. Fisher's exact test. Pearson's χ^2 test for all other categorical variables. A generalized estimating equation (GEE).	B

	Randomized Controlled Trial in an African American Community		Self-identify: African American.		A linear mixed model (LMM).	
Tang, T. S., Funnell, M. M., Gillard, M., Nwankwo, R., & Heisler, M., +2011, United States.	Training peers to provide ongoing diabetes self-management support (DSMS): Results from a pilot study	A randomized controlled trial. A quantitative approach.	Number: 8. Age: 48 and 72 years with a mean of 63 years. Gender: female (n=6) and male (n=2). Location: living in the greater Ann Arbor/Ypsilanti, MI community.	Diabetes Knowledge Test (DKT). Diabetes Knowledge Questionnaire (DKQ-24). Understanding Management Practice (UMP). Active Listening Observation Scale (ALOS). An 8-item survey adapted from Heisler and Piette.	Descriptive statistics.	C
Deng, K., Ren, Y., Luo, Z., Du, K., Zhang, X., & Zhang, Q., +2016, China.	Peer Support Training Improved the Glycemic Control, Insulin Management, and Diabetic Behaviors of Patients with Type 2 Diabetes	A randomized controlled trial. A quantitative approach.	Number: 208. Age: no limitation. Location: rural communities in China. 2-h postprandial blood glucose (2h-PG): <15 mmol/L. Blood glucose control: received	A Biochemical Analyzer (Olympus, Tokyo, Japan). A trained member of the Diabetes Health Training Group. A Glycohemoglobin Analyzer (Arkay Medical Electronics Co. Ltd., Kyoto, Japan).	The unpaired T-test. The paired T-test. The Chi-square test.	D

	in Rural Communities of Central China: A Randomized Controlled Trial		insulin treatment in endocrinology Department of Jingzhou First Hospital.			
Moskowitz, D., Thom, D. H., Hessler, D., Ghorob, A., & Bodenheimer, T., +2013, United States.	Peer Coaching to Improve Diabetes Self-Management: Which Patients Benefit Most?	A randomized controlled trial. A quantitative approach.	Number: 299. Age: no limitation. Language: Spanish or English. hemoglobin A1c: ≥8.0 % (six months before training).	PHQ-8. Diabetes Support Scale. A scale developed and validated by Chew and colleagues. 4-item Perceived Diabetes Self-Management Scale. 4-item Morisky Medication Adherence scale.	Student's t-test. Fischer's exact test. For categorical variables, used F-tests.	E
Nelson, K. , Drain, N. , Robinson, J. , Kapp, J. , Hebert, P. , & Taylor, L, +2016, United States.	Peer Support for Achieving Independence in Diabetes (Peer-AID): Design, methods and baseline characteristics of a randomized controlled trial of community health worker assisted diabetes	A randomized controlled trial. A quantitative approach.	Number: 287 (Have type 2 diabetes and a household income below the federal average) Age: from 30-70 years old (The average age is 52) . Gender: 140 women and 147 men	Interview questionnaire survey. CHW conducted baseline assessments at the respondents' homes. Electronic system for remote data collection.	Randomization (intervention group, control group) The linear model and logical model were used to analyze the difference of participant data Data collected from the SF-12 were converted into a health Utility Index III to assess participants' quality of life	F

	self-management support					
Liu, Y. , Han, Y. , Shi, J. , Li, R. , Li, S & Jin, N , +2015, China.	Effect of peer education on self-management and psychological status in type 2 diabetes patients with emotional disorders	A randomized controlled trial. A quantitative approach.	Number: 127 patients participated in the study and 20 peer leaders participated as peer education volunteers Age: from 57-63 years old Gender:63 men and 64 women	Interview questionnaire survey. DKT, DSCS, Simple Diabetes Related Depression Scale (DDS) and Diabetes Dependent Quality of Life Audit (ADDQoL)	Comparative analysis of experimental data, the study design was a two-factor repeated measurement design. Baseline characteristics and diabetes knowledge, self-management, and psychological data were collected statistically, with bar charts showing comparisons to baseline	G
Spencer, M. S., Kieffer, E. C., Sinco, B., Piatt, G., Palmisano, G., Hawkins, J., Lebron, A., Espitia, N., Tang, T., Funnell, M., & Heisler, M. +2018, United States.	Outcomes at 18 Months From a Community Health Worker and Peer Leader Diabetes Self-Management Program for Latino Adults	A randomized controlled trial. A quantitative approach.	Number:222 There is no gender difference or race difference. Age: At least 21 years old.	EverWeigh lithium digital scale. Umbilical waist using the Tech-Med model (cat. no. 4414). Diabetes Distress Scale, a 17-item Instrument. Diabetes Support Scale, a six-item instrument. Patient Health Questionnaire-9 (27). 16 questions from the Diabetes Care Profile.	the Fisher F test for one-way ANOVA. log-rank test. Pearson x2 test. linear mixed models (LMMs).	H

				Cholestech LDX (Cholestech, Hayward, CA) point-of-care machine. a Welch Allyn Speidel & Keller sphygmomanometer.		
Thom, D. H., Ghorob, A., Hessler, D., De Vore, D., Chen, E., & Bodenheimer, T. A. +2013, United States.	Impact of Peer Health Coaching on Glycemic Control in Low- Income Patients With Diabetes: A Randomized Controlled Trial	A randomized controlled trial. A quantitative approach.	Number: 23(who can speak English or Spanish) Age: no limitation Gender: no limitation	Questionnaire survey. All LDL-C and HbA1c levels were measured at the Central Laboratory of San Francisco General Hospital using the Bio-RAD Variant II Turbo (NSGP Certified) system (Bio-RAD Laboratories, Inc).	A linear mixed model of continuous results and logistic regression of classified results were used to compare changes in primary and secondary outcomes between study groups.	I
Presley, C. , Agne, A. , Shelton, T. , Oster, R. , & Cherrington, A. . +2020, United States.	Mobile- Enhanced Peer Support for African Americans with Type 2 Diabetes: a Randomized Controlled Trial	A randomized controlled trial. A quantitative approach.	Number: 97(African American, had uncontrolled type 2 diabetes, and was treated at CGMHS) Age: over 19 years old Gender:28 men and 69 women	Interview questionnaire survey. Blood glucose was assessed using instant testing with the Bayer Now+ test kit. 17 item Diabetes Depression Scale (DDS) Depression Scale (CES- D) EuroQol Visual Simulation Scale (EQ-	Descriptive statistics were performed for all collected total samples and branches, and all data were analyzed on the basis of intention-to- treat. Evaluate the normality of continuous variables using block diagrams, stem and leaf plots, and normal probability plots, and determine that these	J

				VAS) 8 item Diabetes Self-Management Scale (PDSMS) 5 points Likert Scale	variables are at least close to the normally distributed contribution.	
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APPENDIX 2

Table 4. Overview of selected articles' aims and main results

Author(s)	Aim	Results	Code
Yin, J., Wong, R., Au, S., Chung, H., Lau, M., Lin, L., Tsang, C., Lau, K., Ozaki, R., So, W., Ko, G., Luk, A., Yeung, R., & Chan, J. C.	To explore the effects of participating in a “train-the-trainer” program and being a peer supporter on metabolic and cognitive/psychological/ behavioral parameters in Chinese patients with type 2 diabetes.	HbA1c did not change at 6 months ($7.1 \pm 0.3\%$ at baseline; $7.1 \pm 1.1\%$ at 6 months), but increased in the control group ($7.1 \pm 0.5\%$ at baseline; $7.3 \pm 1.1\%$ at 6 months. Inter group comparison $P = 0.02$). Participants' self-reported self-care activities (including diet adherence and foot care) improved, but the control group did not. After 4 years, HbA1c remained stable ($7.0 \pm 0.2\%$ at baseline and $7.2 \pm 0.6\%$ at 4 years) compared with rejected trainees ($7.1 \pm 0.4\%$ at baseline and $7.1 \pm 0.8\%$ at 4 years) and the control group ($7.1 \pm 0.5\%$ at baseline and $8.1 \pm 0.6\%$ at 4 years, $P = 0.001$).	A
Tang, T. S., Funnell, M. M., Sinco, B., Spencer, M. S., & Heisler, M	To explore the effects of a 12-month peer support intervention and a 3-month diabetes self-management education program on initial and sustained improvement in glycosylated	At 15 months, key CVD risk factors in the peer support group either continued to improve or remained the same, while those in the control group deteriorated. At 15 months, low density	B

	hemoglobin (HbA1c).	lipoprotein cholesterol (-15 mg/dL, P =0.03), systolic blood pressure (-10 mm Hg, P =0.01), diastolic blood pressure (-8.3 mm Hg, P =0.001), and body mass index (-0.8 kg/m ² , P =0.032) were significantly lower than those in DME alone group.	
Tang, T. S., Funnell, M. M., Gillard, M., Nwankwo, R., & Heisler, M.	To investigate the feasibility of training adult diabetics for diabetes self-management support (DSM) intervention.	In the first attempt, 75%, 75%, 63% and 75% passed diabetes knowledge, empowerment promotion, active listening and self efficacy respectively. Those who failed in the first attempt passed in the second attempt. Participants were very satisfied with the balance between course length, content and skill development and the preparation of leadership support activities.	C
Deng, K., Ren, Y., Luo, Z., Du, K., Zhang, X., & Zhang, Q.	To observe the effects of a peer support program on the outcomes of patients with type 2 diabetes who received community-based insulin therapy in rural communities of central China.	Compared with the control group, hba1c level decreased more significantly (P<0.05), knowledge related to insulin use increased, and self-management ability of diabetes mellitus improved in the same group (P<0.05). Peer support intervention can effectively improve the prognosis of patients with type 2 diabetes in central rural communities.	D
Moskowitz, D., Thom, D. H., Hessler, D., Ghorob, A., & Bodenheimer, T.	To examine whether the effect of peer health coaching on hemoglobin A1c (A1c) is modified by characteristics that are known to be associated with diabetes control.	The effect of modified guidance on A1c based on patients' self-management level and medication compliance level (P = 0.02 and P = 0.03 in the adjustment model). For participants with "low" self-management (one standard deviation below the mean score), A1c increased slightly (0.3%) in the usual care group and decreased (-0.9%) in the health guidance group. For participants with "high" self-management (one standard deviation above	E

		average score), there was a similar decrease in A1c levels in both groups (usual care group: -1.0%; Health coaching group: -1.1%). In the usual care group, A1c levels increased (0.5%) in participants with "low" medication adherence and decreased (-0.8%) in the health guidance group. Participants with "high" medication adherence experienced a similar decline (usual care group: -1.1%; Health coaching group : -1.3%).	
Nelson, K. , Drain, N. , Robinson, J. , Kapp, J. , Hebert, P. , & Taylor, L.	To test the effectiveness of peer assistance and evaluate the cost-effectiveness of home-based CHW interventions to improve health outcomes in low-income patients with poorly controlled type 2 diabetes receiving care in three different health systems.	At baseline, 445 patients were screened and 287 patients were randomly assigned. All participants were not significantly sociodemographic, were low-income, and came from different racial and ethnic backgrounds. The mean A1c was 8.9%, the mean BMI was above the obesity range, and the proportion of non-adherence to diabetes medication was high. Participants had high rates of comorbidities, more than half had low self-reported health status, a quarter of participants were classified as moderately to toxic depression, and a third had no health insurance.	F
Liu, Y. , Han, Y. , Shi, J. , Li, R. , Li, S. , & Jin, N .	To assess the effect of peer education in type 2 diabetes patients with emotional disorders on the metabolic index and psychological status.	127 patients participated in the study and 20 peer leaders participated as peer education volunteers. All participants completed the study and completed the scale. In the peer education group, anxiety (49.0-9.65 vs 54.0-8.48), depression (51.3-7.97 vs 55.8-7.52), diabetes knowledge (18.8-2.46 vs16.3-2.08), pain (2.67-0.55 vs 3.02-0.56), anxiety (49.0-9.65 vs 54.0-8.48), depression (51.3-7.97 vs 55.8-7.52), diabetes knowledge (18.8-2.46 vs16.3-2.08),	G

		<p>pain (2.67-0.55 vs 3.02-0.56), There were differences in self-management (66.5 -- 4.26 vs. 3.02 -- 0.56) 62.4 -- 5.88) and quality of life (-1.98 -- 0.82 vs. -2.50 -- 0.71), but no significant differences in metabolic index.</p>	
<p>Spencer, M. S., Kieffer, E. C., Sinco, B., Piatt, G., Palmisano, G., Hawkins, J., Lebron, A., Espitia, N., Tang, T., Funnell, M., & Heisler, M.</p>	<p>To evaluate the effectiveness of a Community Health Worker (CHW) Diabetes Self-management Education (DSME) program.</p>	<p>At 6 months follow-up, participants in the CHW intervention had a greater reduction in hba1c (20.45% [95% CI 20.87, 20.03]; P < 0.05) and diabetes distress (20.3 points [95% CI 20.6, 20.03]; P < 0.05). Patients in the CHW+PL group maintained improvement in hba1c levels at 12 and 18 months, whereas patients in the CHW group alone maintained improvement in diabetes symptoms at 12 and 18 months. The CHW+PL group also had significantly fewer depressive symptoms at 18 months compared with the EUC group (22.2 points [95% CI 24.1, 20.3]; P < 0.05). At 6 months, CHW-led DSME participants showed significant improvements in social support for diabetes and understanding of diabetes self-management compared with EUC.</p>	<p>H</p>
<p>Thom, D. H., Ghorob, A., Hessler, D., De Vore, D., Chen, E., & Bodenheimer, T. A.</p>	<p>To test whether clinically-based peer health coaching improves glycemic control in low-income diabetics compared with routine care.</p>	<p>At 6 months, hba1c levels were 1.07% lower in the training group and 0.3% lower in the usual care group, with a difference of 0.77% in the training group (P =0.01, adjusted). 49.6% of treated patients had a 1.0% or more reduction in their Hba1c levels, compared with 31.5% (P =0.001, adjusted) for a 7.5% reduction at 6 months in patients with usual care. The treated patients had a 22.0% reduction in hba1c levels at 6 months,</p>	<p>I</p>

		compared with a 14.9% reduction at 6 months in patients with general care (P =0.04, after correction).	
Presley, C. , Agne, A. , Shelton, T. , Oster, R. , & Cherrington, A.	To compare the effects of community-based diabetes self-management education (DSME) plus mHealth -- intensive peer support intervention versus community-based diabetes self-management education (DSME) on poorly controlled African American adults with type 2 diabetes.	Of the 120 participants, 97 completed the study. Participants in the intervention and control groups experienced a reduction in the clinical significance of A1C, 10.1 (sd 1.7) to 9.6 (SD 1.9) and 9.8 (SD 1.7) to 9.1 (SD 1.9), respectively, p=0.004. Compared with the control group, subjects in the intervention group experienced significantly greater reductions in diabetes distress, 2.7 (sd 1.2) to 2.1 (1.0) and 2.6 (SD 1.1) to 2.3 (SD 1.0), respectively, P=0.041.	J