

Overall Impact of Nursing Interventions on Glucose Control among Type-2diabetic Patients; Systematic Review

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Abstract

Study aim: This study set out to conduct a thorough literature analysis in order to pinpoint practical self-management techniques role in glucose control in patients with diabetes.

Method: The PRISMA statement was followed in the conduct of this systematic review. Patients with diabetes made up the population of included publications, nurse interventions for self-management were the intervention. We looked through three electronic databases to find publications that were released between 2003 and 2013. We conducted our search without regard to linguistic barriers. Among the search phrases are (diabetes, blood sugar, glucose, diabetic patient, nurse intervention).

Results and conclusion: This systematic review included five publications. The study design consisted of three RCTs and two quasi-experimental investigations. The many nurse interventions that were conducted included home visits, educational programs, and group and individual diabetes education. In terms of treatment design, 10 studies had intervention sessions longer than six, two studies had operational durations longer than an hour, and two studies had intervention lengths greater than twelve weeks. The interventional group of diabetes individuals who received counseling and teaching exhibited improvements in their metabolic management. Obstacles, self-care agency, and flexibility all predicted the degree of HbA1c and self-care indicators.

Keywords: Diabetes mellitus, glucose, blood sugar, control, interventions, nursing

Introduction

The rate of increase in diabetes prevalence has been higher in low- income and middle-income nations than in high-income nations (1). Public health systems are being strained by the worldwide challenge of the rapidly rising population of diabetics. Because there are major repercussions from inadequate blood glucose control, diabetes self-management is crucial. Diabetes can be prevented or its effects postponed with ongoing care and adaptation, which includes frequent screenings for complications, physical exercise, medication, and food modification (1).

Self-management is a process that calls for a whole lifestyle adjustment and involves people actively managing a chronic condition (2). It involves managing day-to-day affairs by choosing wisely in terms of

one's health and way of living. For successful self-management, medical experts' advice and counsel are beneficial. Furthermore, three kinds of self-management processes were discovered in a research of qualitative study on the self-management of individuals with chronic illnesses (2). Their life is significantly impacted by the chronic illness, which needs to be handled on its own. Therefore, rather than concentrating on implementing the intervention itself, it should be aimed at the individual with the chronic illness, including assisting them manage themselves via the intervention.

As a result, among many other diabetes intervention components, it is vital to consider the therapies that might enhance self-management. Techniques that promote effective self-management may employ one intervention or a mix of treatments to get the intended result. Various interventional aspects include goal-setting, self-monitoring, nutrition, exercise, and medication in addition to suggestive, chain-like behavioral abilities that link new habits to established behaviors (3). Apart from the many therapies, there are variations in the length of the intervention or session, the assessment period, and the research setting.

The purpose of this study was to perform a comprehensive literature review in order to identify effective self-management strategies.

Method

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement(4). Patients with diabetes made up the population of included articles, nursing interventions for self-management were the intervention, patients receiving conventional care made up the comparison group, glucose or HbA1c was the outcome, and only quasi-experimental and RCTs studies could be included in the study design. Studies with two groups compared as the outcome and intervention studies with nurses acting as intervention facilitators were among the specific inclusion criteria.

We searched 3 electronic databases for articles published in the period from 2003 to 2013. Our search was performed without language restriction. Search terms include (diabetes, diabetic patient, nursing intervention, glucose, blood sugar).

Data was extracted by all authors in a predesigned form which include the study aim, method, intervention, citation population characteristics, sample size and main findings.

Results and Discussion

Five papers were incorporated into this systematic review (Fig 1). Two quasi-experimental studies and three RCTs made up the study design. Home visits, educational programs (5,6), and group and individualized diabetes education (7) were the different forms of nurse interventions that were carried out. Regarding the design of the treatments, two studies (5,6) had an intervention length of more than 12 weeks, ten studies (6) had intervention sessions longer than six, and two studies (5) had operating durations longer than an hour.

The adoption of a controlled therapy focused on education and counseling helped the Gallegos et al. trial achieve its goal of improving metabolic control in ambulatory care people with DMT2. Since the complete sample's genetic homogeneity was established, environmental factors may be to blame for the outcomes. If not, altering these variables should enhance the likelihood of getting favorable outcomes in the metabolic management of adults with DMT2(6).The study conducted by Gallegos et al. aligns with prior research findings, as evidenced by the high proportion of obesity and lack of metabolic control in both groups before the start of therapy(8,9).

Gallegos et al.'s study found that whereas the control group's level of glycosylated hemoglobin did not drop, the experimental group's level did beginning with the 3-month assessment. The findings of Aubert et al.(10)and Norris et al. (9)are in agreement with these results. They reported improvements in HbA1c readings, although with shorter treatments. The lowering of HbA1c mean values confirms the efficacy of the

combined learning technique employed in the Gallegos et al. trial, since the experimental group's favorable difference persisted for 12 months following the start of the intervention. In line with these results, researchers like Rickheim et al. (11) have discovered that the best way to succeed in sustaining the desired behavior is to combine group instructional tactics with individual effort.

The beneficial effects of nurse follow-up groups for elderly diabetic patients were confirmed by the Chan et al. trial. In order to maintain glycaemic control, their study examined the benefits of regular care and diabetic nurse follow-up by including patients in high-quality healthcare. The results indicate that over time, the HbA1c and blood pressure of the control group and the nurse follow-up group, both showed improvements. After 12 weeks, the nurse follow-up group's HbA1c improved more than that of the control group(7). Other studies corroborate the impact of nurse follow-up on glycaemic management, as seen in the Chan et al. experiment. A study by Wong et al. (12) comparing normal treatment with the diabetic nurse specialist shown a noteworthy improvement in HbA1c. According to Aubert et al. (10), a diabetes care program run by nurses resulted in a mean 1.7% difference in HbA1c between the intervention group and the control group. A considerable reduction in the incidence of any diabetes sequelae, namely microvascular illness, was linked to a 1% drop in HbA1c(13). An essential clinical sign of a patient's glycaemic management throughout the previous six to eight weeks is the HbA1c. HbA1c typically ranges from 4.6 to 6.4%.

Although neither group showed a statistically significant outcome in the Chan et al. experiment, a progressive decrease in HbA1c over a 12-week period demonstrated the efficacy of the nurse clinic in helping patients attain improved glycaemic control. When comparing the change in SBP from baseline to follow-up readings, a significant decline was observed in the control group compared to the nurse follow-up group. Vrijhoef et al. (14), who demonstrated that there was a substantial drop in systolic blood pressure in the control group but not in the intervention group, corroborated the findings. The diabetic nurse counsels patients on changing their lifestyle to passively regulate their blood pressure, which includes cutting back on salt and quitting smoking.

By implementing a targeted education program, persons with type 2 diabetes were able to improve their metabolic control(15). Education is essential for attaining adequate metabolic regulation since it gives the patient the information and abilities to do self-care on a regular basis (16). To achieve optimal metabolic management, education is essential. It gives the patient the information and abilities necessary for regular self-care (17). According to studies by Abdulgadir et al. (2006)(18) and Milenkovic et al. (2004)(19), education can affect behavior, which in turn can modify metabolic control and affect changes in glycol-hemoglobin, blood pressure, lipid profile, physical activity, weight, information level, lifestyle, and self-monitoring skills.

The HbA1c number is thought to be a more objective criterion for evaluating metabolic management since it is unaffected by brief changes in food, exercise, medication, or stress level (20). In Mollaoğlu et al. study, a teaching-learning approach was used to empower participants to take charge of their own well-being by giving them the necessary skills for controlling their food and exercise patterns as well as for recognizing and interpreting symptoms. In Mollaoğlu et al. study the interventional group's level of glycosylated hemoglobin dropped, whereas the control group's level did not. These findings concurred with those of Aubert et al. (10). HbA1c readings have improved, but with shorter treatments, according to their reports. Furthermore, Vero et al. (21) found that the diabetic nutrition education improved body weight and BMI from baseline to six weeks, as well as HbA1c and lipid levels from baseline to five to six months.

Fig 1: PRISMA consort chart of selection process

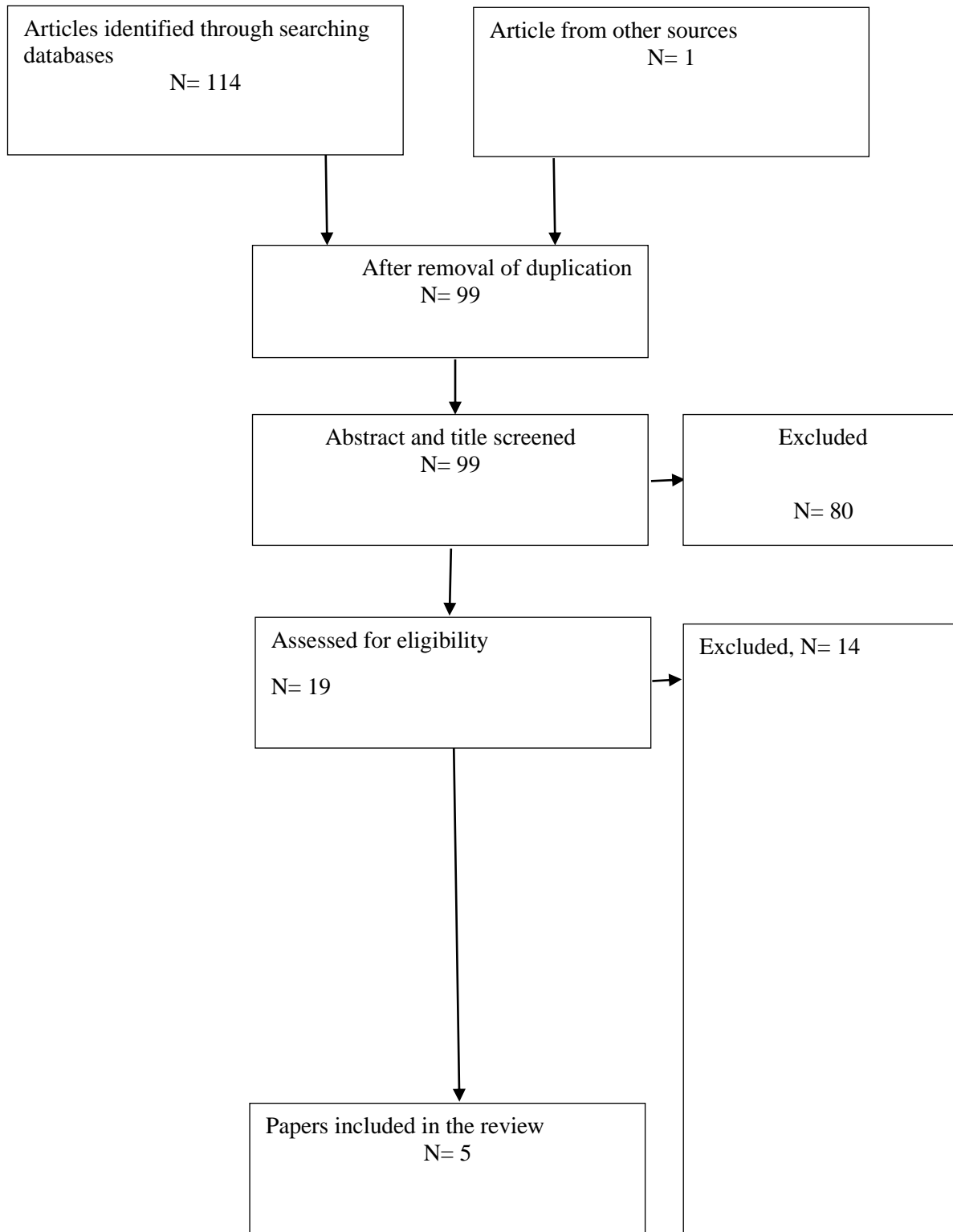


Table1: characteristics of the included studies

Citation	Country	Participants	Sample size	Characteristics of Participants
Ko 2004 (5)	Korea	T2DM	31 Intervention 17 Control 14	Completed diabetes education and 20 to 70 years age
Hyun 2009 (22)	Korea	T2DM	60 Intervention 30 Control 30	Adults with uncontrolled diabetes
Gallegos 2006 (6)	Mexico	T2DM	45 Intervention 25 Control 20	Mean age > 40, Creatinine level less than 1.5 ml/dl
Chan 2006 (7)	Hong Kong (China)	T2DM	150 Intervention 75 Control 75	Elderly more than 65
Mollaoğlu 2009 (15)	Turkey	T2DM	50 Intervention 25 Control 25	Mean age less than 50

Table 2: included studies main findings

Citation	Main findings
Ko 2004(5)	The experimental and control groups' levels of self-efficacy were significantly different from one another. Behavior related to self-care differed significantly across the experimental and control groups. The experimental and control groups' approaches to handling the problem differed significantly from one another. According to the experimental phases and the interaction between schooling and the stages of the experiment, there was a substantial difference. The experimental and control groups' glycemic control differed significantly from one another.
Hyun 2009 (22)	There were no discernible variations between the two groups' postprandial (PP2hrs) glucose and HbA1c readings. Comparing the self-glucose test, insulin injection management, and lifestyle modification, participants in the experiment group demonstrated statistically significant changes from those in the control group. The findings show that individualized instruction on insulin therapy improves insulin injection management, insulin self-testing, and lifestyle. As a result, it is proposed that customized instruction be used in diabetes education to enhance self-management.
Gallegos 2006 (6)	The experimental group's HbA1c significantly decreased, and the HbA1c levels and the self-care action ratings were positively impacted by self-care agency, adaptability, and treatment obstacles (plus one interaction), according to the results. The diabetic patients in the experimental group saw improvements in their metabolic control thanks to the counseling and instructional approach used in the intervention. The degree of HbA1c and self-care indicators were predicted by self-care agency, adaptability, and obstacles.
Chan 2006(7)	The study's findings demonstrate how well the diabetes nurse clinic treats type 2 diabetic patients by providing them with information and counsel. Patients in the nurse follow-up group had lower healthcare usage, improved systolic blood pressure, and an improvement in HbA1c. The

	study offered proof to back up the diabetic nurse clinic's treatment of elderly diabetes patients. The diabetic nurse now feels more confident in treating elderly, unstable diabetes patients because to this study.
Mollaoğlu 2009 (15)	Prior to the educational session, there was no statistically significant difference between the E group's and the C group's metabolic control parameters. Following the third education program, statistically significant differences were discovered in the means of the E and C groups for fasting blood sugar, urine glucose, postprandial blood sugar, hemoglobin A1c, total cholesterol, triglyceride, and low-density lipoprotein cholesterol. According to the study, the nurses' consistent and repeated instruction improved the metabolic parameters of the DM patients.

Conclusion

Customized instruction on insulin therapy improves insulin injection management, insulin self-testing, and lifestyle for diabetic patients. The diabetic patients in the counseling and instructional approach interventional group saw improvements in their metabolic control. The degree of HbA1c and self-care indicators were predicted by self-care agency, adaptability, and obstacles. In order to ensure that their clients may get rehabilitation that is centered on self-care, nurses must aggressively advocate for the growth of home-based intervention. More follow-up after release and improved inpatient planning for metabolic management and community reintegration should also be implemented.

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