



Evaluating the Effect of Discharge Planning on Glycosylated Hemoglobin Level in Type 2 Diabetic Patients Who Referred to the Vasei Hospital in Sabzevar, Iran: An Interventional Study

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Abstract

Background: Diabetes mellitus is one of the most common chronic diseases that causes various complications. Glycosylated hemoglobin is a reliable indicator of diabetes.

Objectives: The purpose of the present study was to assess the impact of discharge planning on improving glycosylated hemoglobin in patients with type 2 diabetes.

Methods: This is a quasi-experimental study which was conducted in Vasei Hospital, Sabzevar, in 2014. The subjects of this study included 70 patients with type 2 diabetes who were chosen non-randomly through convenience sampling. The subjects were divided into the intervention and control groups.

Results: The findings showed a significant difference between the control and intervention groups in terms of mean value of glycosylated hemoglobin obtained in the post-test (7.25 versus 8.16, $P < 0.001$). Controlling the effects of the pre-test, the authors observed similar results obtained via covariance analysis.

Keywords: Glycosylated Hemoglobin, Nurse, Type 2 Diabetes, Discharge Planning

1. Background

Diabetes is one of the most common general health issues in developed and developing societies (1). In terms of prevalence, it has experienced a great upsurge. Diabetes is becoming more and more common in Iran such that various studies have reported its incidence to be 7% to 8% in Tehran and Isfahan and 13% to 16% in the central and southern cities of this country (2). Diabetes leads to other multiple chronic complications that could affect the cardiovascular system, the kidneys, and the eyes (3). Inconsistency in blood glucose level, blood pressure, and lipid profile could be detrimental to diabetic patients. A systematic review shows that glucose mutability could be a predictive factor of diabetic retinopathy, cardiovascular events, and mortality rates in type 2 diabetic patients. These reports reaffirm the importance of prevention of serious changes in blood pressure and blood glucose level among diabetic patients (4). There is evidence that a 1% decrease in glycosylated hemoglobin leads to a 40% reduction in small-vessel complications, and controlling serum lipids can cause cardio-

vascular complications to mitigate by 20% to 50%. A better control of risk factors in diabetic patients can obviously lead to better outcomes (5). As a result, metabolic control in type 2 diabetic patients is of utmost importance, since it prevents severe and long-lasting complications of diabetes (6).

Controlling diabetes encompasses five factors: Controlling nutrition, exercise, measuring blood glucose level, pharmacological treatment, and training the patient (7). A crucial point regarding diabetic patients is that the patients' awareness and attitude toward the condition could play a significant role in controlling disease (8). Nurses have a very important role in caring for diabetic patients, as they are responsible in helping patients acquire the necessary knowledge and adopt the right attitude, thus, gaining independence (9).

Therefore, in order for a diabetic patient to be able to take good care of himself/herself, he/she must be provided with the required education to arrive at sufficient understanding and skills in relation to his/her condition (10). In other words, educating a patient is an efficient nurs-

ing care, which leads to cost reduction, shorter hospitalization, elimination of patients' anxieties, higher levels of patients' satisfaction with health care procedures, and improvements in the recovery process (11). The International Health Organization has established certain standards in relation to diabetic patients in order to support and encourage them to participate in decision-making and adopt self-management techniques to improve their blood glucose level, control their blood pressure, and enhance the management of other risk factors associated with diabetes (12). The findings of previous studies reveal the positive impact of self-care education in diabetic patients on their metabolic status and glycosylated hemoglobin index (3, 13). Discharge planning is a self-care program, which is designed for each patient based on his/her needs prior to getting released from the hospital (14). Based on the results of a systematic review of discharge planning, this program, alongside enhancing patients' satisfaction, causes the duration of hospitalization, treatment costs, and the rate of chronic patients' readmission to diminish (15).

2. Objectives

Since there has been little research on the effect of discharge planning in diabetic patients in Iran, and due to the fact that the indicators of physical health improvement such as glycosylated hemoglobin level have generally been ignored in discharge planning studies, the present research aims at evaluating the efficiency of discharge planning on the reduction of glycosylated hemoglobin in type 2 diabetic patients.

3. Methods

This is a quasi-experimental study conducted in Sabzevar in 2014. The participants were chosen among type 2 diabetic patients who had been hospitalized in the internal ward of Vasei Hospital in Sabzevar. The sample size was determined in accordance with the central limit theorem and with an average effect size of 0.5, based on Cohen's table and a power of 0.8. Thus, a total of 32 diabetic patients were chosen for each group. Considering the dropout rate of 10%, three people were added to each group, and a total of 70 patients (35 in each group) were chosen. Due to the fact that there was only one hospital with an internal ward in the city, given the possibility of patients' readmission, sampling was done non-randomly using convenience sampling to prevent bias. In this way, the participants were assigned to the control (n: 35) and intervention (n: 35) groups. The most important inclusion criteria were: Diagnosis with type 2 diabetes for at least 2 years, current receiving of glycemic medications, complete health with regard

to speaking and hearing, literacy, no simultaneous participation in any other educational program, and no kidney or liver failure throughout the study. On the other hand, the exclusion criteria were: Not completing the designed discharge plan or suffering from any serious and acute complication (hyperglycemic syndrome, non-capillary hyperosmolar, and hypoglycemia) at any point throughout the study.

This research was evaluated by the Ethical Committee of Tarbiat Modares University, Tehran, and was registered with the code D52/4974. In the beginning of the study, participants were individually interviewed by the researcher to check their qualification for entering the study.

The discharge plan was implemented in the intervention group. The first stage, carried out during patient's hospitalization, was to assess the subjects through the nursing process and by means of the forms, which had been prepared during the interviews. The patients' nursing care requirements were determined and diagnosed as well. Planning was also made to provide educational and therapeutic interventions. In the second stage, training and educational sessions were presented during hospitalization in the presence of one of the patient's relatives who provided most of the needed care. The sessions were held both individually and as a group. The composition of groups, the number of people in each group, and the number of educational sessions were determined based on need assessment and patients' opinions. The educational content was presented via a simple approach using common educational equipment (slideshow, board, movies, etc.). In the second phase on the discharge date, the educational content was reviewed once more in the presence of the patient and his/her family; moreover, an educational package was handed out to the participants. This package contained educational content related to nutrition, patient's activities, side effects of medications, and the complications of diabetes. Some checklists were also provided for the patients, along with the necessary explanations on how to fill them out. The self-report checklists included the type and volume of daily food consumption, the extent of daily activities, and the type of taking medications. The researcher's phone number was given to the participants. On the day of discharge, each patient's residence was visited and evaluated to fit the patient's requirements. They were given some advice on how to optimize their present living condition as well. In the third stage, a four month follow-up was conducted for each patient, and educational and therapeutic sessions were provided for the patients. These sessions were held (1) over the phone every week for the first two months and (2) in person every two weeks. Through the in-person sessions, the self-report checklists were gathered and new checklists were given to the subjects. In the sec-

and two month follow-up, the researcher did not make any contact or pay any visit to the patients; however, the subjects contacted the researcher if necessary, and they were provided with consulting services over the phone. At the end of the fourth month follow-up period, the glycosylated hemoglobin level was determined once more. Statistical analysis was conducted using SPSS 20. Descriptive statistical tests, independent *t*-test, and covariance analysis were also carried out. It should be added that the significance level was considered less than 0.05.

4. Results

A total of 70 participants went through the entire research process. Participants aging 55 to 60 years were the most frequent; the average age of the subjects was 52.72 years. Most of the participants were female (60%), married (71.45%), and a housewife (57.15%). Since one of the necessary qualifications to enter the study was the ability to read and write, the lowest level of education among the subjects was elementary school (94.3%). More than half of the study samples (74.25%) had less than eight hours of daily physical activity. The average number of times that the subjects were hospitalized due to diabetes was one to four in each group. On average, the subjects had been diagnosed with diabetes for 4.8 ± 2.01 years. In terms of insurance, most participants were supported by health insurance (62.85%), with almost all patients being insured by one of the various insurance companies in Iran. There was no significant difference between the intervention group and the control group in terms of personal and clinical characteristics.

The results of statistical analysis revealed a significant difference between the intervention and control groups in terms of mean values of glycosylated hemoglobin ($P < 0.001$), such that the mean was lower in the intervention group as compared to the control group (Table 1). This indicates that the intervention group is in a better condition and affirms the positive impact of the conducted discharge plan (Table 2). In addition, the results of covariance analysis demonstrated that there is a significant statistical difference between the control and intervention groups in terms of the mean level of glycosylated hemoglobin ($P < 0.001$), even though the pre-test effects are controlled.

5. Discussion

Glycosylated hemoglobin is a good indicator for evaluating the efficiency of therapeutic interventions and self-care in diabetic patients, since it provides the mean blood glucose level in the past three months and can, therefore, calculate the complications caused by diabetes. The discharge plan conducted in the present study has proven

effective in enhancing glycosylated hemoglobin index. A number of studies have addressed the effect of discharge planning, however, it might be mild on enhancing the quality of life in patients suffering from chronic diseases such as breast cancer and heart diseases (16, 17). Based on the findings of a review meta-analysis, which examined the impact of discharge planning in old people, this method is effective in reducing the readmission rate of the elderly in America (15). However, conducting this program in the case of diabetic patients and exploring its impact on indicators, such as HBA1C, have received less attention. Meanwhile, the findings of a focus-group study reflect the positive impact of discharge planning on enhancing care transfer process, improving health status, and reducing the rate of patients' readmission (14).

In addition, some studies in Iran have investigated the effects of interventions similar to discharge planning on HBA1C in diabetic patients. The results of these works are consistent with the present study. Accordingly, in a research conducted on diabetic patients in Rasht, performing discharge planning resulted in a reduction of HBA1C (4). In another research performed in Sirjan, applying the rehabilitation program improved this indicator in diabetic patients (18). Furthermore, similar findings were observed in another study concerning the positive impact of self-management and multimedia educational programs on achieving metabolic control in diabetic patients (19, 20). The results of a systematic review corroborated the positive influence of self-management education on improving the clinical status, (including glycosylated hemoglobin level, lifestyle, and psychological after effects) of diabetic patients (21).

5.1. Conclusions

Given the positive impact of discharge planning on improving the metabolic status of diabetic patients in the present study, it seems necessary to incorporate such interventions into care programs in order to enhance clinical nursing interventions. Since there has been little research in this field, it is highly recommended to conduct more studies into the effect of discharge planning on various health indicators in patients suffering from chronic diseases such as diabetes.

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Table 1. Comparison Mean of HbA1c in the Control and Intervention Group After Intervention in Patients with Diabetes

Variable	Control Group (Mean ± SD)		Intervention Group (Mean ± SD)		P Value
	Pre-test	Post-test	Pre-test	Post-test	
HbA1c	7.95 ± 0.68	7.96 ± 0.69	8.16 ± 0.64	7.25 ± 0.7	P < 0.001 ^a

^a t-test.**Table 2.** General Topics of the Discharge Plan Proposed for Diabetic Patients

Stage	Place of Conducting the Intervention	Topic
First stage	Hospital, during hospitalization	Patient's assessment, nursing diagnosis and determination of patient's nursing requirements, designing the educational plan, and conducting the educational intervention in the form of daily individual and group sessions based on patients' needs.
Second stage	Hospital, on the discharge date	Review of educational content, providing and delivering educational package and self-evaluation checklists, and giving the researcher's phone number to the patients.
Third stage	After discharge, in patient's residence	Four month follow-up, first two months: Weekly follow-up over the phone and an in-person follow-up every two weeks, second two months: Patient's contacting researcher if necessary, answering patients' questions.

Footnotes

Authors' Contribution: Alemeh Dehnabi: Project design, data collection, project implementation, and composing the article. Hassan Navipour: Project design, supervising project implementation, and statistical analysis. Hamid Radsepehr: Data collection, statistical analysis, and composing the article.

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Ethical Considerations: This research was evaluated by the Ethical Committee of Tarbiat Modares University, Tehran, and was registered with the code D52/4974.

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