SELF CARE IN TYPE I DIABETES WITH CONTINUOUS GLUCOSE MONITORING

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Abstract

Introduction: Number of diabetic patients are increasing. If the blood glucose not controlled in diabetics, patients will face with complications. Self-care is important to control the blood glucose of diabetic patients and prevention of complications such as neurological complications, heart, eye disease, amputations and so on. Therefore the aim of this study is to identify the effects of Continuous Glucose Monitoring (CGM) on the blood glucose control in type I diabetes.

Material and Methods: The study was done on 20 patients chosen from an online data set available in http://www.jaeb-diabetes.net/. These patients used CGM to test blood glucose and the result of three month test was measured. To analyze the data, the software SPSS 21, independent Mann-Whitney test was used.

Results: The results showed that blood glucose in patients of the experimental group reduced significantly rather than patient of the control group in the second and third month. Also, HbA1C of the patients has reduced.

Conclusion: The CGM has an effective role in controlling blood glucose and prevention of complications. Therefore it is recommended that educational programs on the use of monitoring blood glucose, such as CGM as a requirement to be developed.

Keywords: Self-care, Type I diabetes, Continuous Glucose Monitoring

INTRODUCTION

Diabetes is a chronic immedicable but controllable, and is known as the most important epidemic of country and future disease [1]. It's the fifth cause of death [2]. According to the last statistics, 387 Millions are diabetics (patients) in the world [3]. Every year about 5 Million die because of the diabetes in the world. The prevention and treatment cost of diabetes and its complication, is more over than 376 billion dollars over the world and related costs and its Complication is different from 2.5 to 15 percent of the world yearly healthy budget. Diabetes is known the most expensive glandular disease in the world [4]. Pancreas of these patients, don't secrete insulin hormone to consume the existent glucose in the food by the cells [5]. This circumstance causes patient blood glucose increase [6]. Therefore, these patients by receiving continuous insulin must put the blood glucose in a normal range and for continuous blood glucose stability and prevention of its numerous complication like kidney, neural, heart disease, eye complication and amputation, they can use of devices such as Glucometer and Continuous Glucose monitoring (CGM) [7-9]. On the basis of the evaluation, the most important factor causes death in patients is no carrying out the self-care [10]. Self-care is a process that a patient should do daily to control the disease adequately. Suitable diet, following the medicinal treatment, Blood glucose control, activity level and feet observation treatment, are the most important self-care activities of the diabetic patient self-care can be effective in evaluating the clinical Cases in the hospitals and improvement of life [6, 11-13]. Among the useful devices is CGM use for continuous blood glucose stability that is known as
CGMS or continuous Glucose Monitoring system in Iran and its power to blood glucose stability has been approved in the scientific contexts [7-9]. The results of this research can be used as a base for later researches such as evaluating the usage level of different instruction programs for diabetes patient self-care in using of controlling devices. So, considering the importance of diabetes patient self-care, this study was done with the purpose of identifying effect of using the CGM to control the blood glucose in existent patients in online data bases.

**MATERIAL AND METHODS**

Research community in this study included choosing 20 existent patients among 491 one type diabetes in the age range of 8-50 of the data base who recorded their blood glucose in questionnaires designed for this purpose, via CGM for 26 weeks and results of one-two and three months was considered for the present study. Among the existent patients, HbA1C lower than one considered as the control group and ten people were chosen with the same situation of age and gender from both of the groups. The used database contains data that resulted from an accidental clinical test to evaluate the usage of CGM for disease stability and children diabetes management and this data is available in http://www.jaeb-diabetes.net/. Evaluation and validation of the questionnaire content and structure also its reliability, is approved by Juvenile Diabetes Research Foundation of America. To analysis the data, software SPSS21 and Mann- Whitney test (with respect of non-normality of data in two group) is used.

**RESULTS**

The groups of experimental and control was chosen of the same genders and ages. Table 1 shows the information related to self-care about measuring blood glucose among two considered groups.

<table>
<thead>
<tr>
<th>Blood Glucose</th>
<th>Experiment and control after one month</th>
<th>Experiment and control after two month</th>
<th>Experiment and control after three month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average (mg/dL)</td>
<td>79.981</td>
<td>59.208</td>
<td>70.792</td>
</tr>
<tr>
<td>Standard deviation (mg/dL)</td>
<td>80.573</td>
<td>57.282</td>
<td>57.674</td>
</tr>
</tbody>
</table>

According to the Table 1, there weren't any significant differences between experimental and control group at the first month, but when comparing the averages of these groups in the second and third month, there was a remarkable difference. Therefore the control process from the first month is done well. It seems that such improvement is because of adjustment and learning by CGM in blood glucose control.

**DISCUSSION**

The purpose of this study was the difference evaluation in self-care condition of patients who used CGM to control the blood glucose. Then results obtained from the evaluation in the group of experimental and control was compared statistically. The results showed that blood glucose in the group of experimental reduced in the second and third month of evaluation rather than group of control and it showed a significant differences. This difference was as a result of continuous blood glucose monitoring by CGM, that...
in this device when blood glucose is high, an alarm is gave and it makes patient able to manage the disease continuously. The present study is coordinated with similar studies, hence that it makes the patient able to manage the blood glucose control, after using CGM for a long time and The Hba1C of the patient is decreased. Present study evaluated two group as control group and experimental group with Hba1C higher and lower than 7 percent, that both of them were using CGM and it’s done with the purpose of evaluating the self-care ability of patient. To evaluate the self-care by using of CGM in different month and not only after months of doing the experiment. For example, in the study that was done by Longendometal, about 2883 one type diabetes for 3 to 18 months Among the patients who used glumometer or CGM to control the blood glucose, there was a better improvement in group CGM rather than group of Glucometer [14] Also, in the study that was done by chase et al. in 2010 about 80 patients, in the age range of 8-17 and lasted for 12 months, patients used CGM to control their blood glucose and as a result of using CGM they observed some improvement in Hba1C level and blood glucose reduction [14]. Also, in the study done by Battelino et al in 2011, the effect of CGM on reduction of blood glucose and Hba1C reduction of 120 patients (type I diabetes) evaluated and approved [14]. Also, based on the study which has been done in 2009, about 83 patients with the ages more than 25 and suffering from one type diabetes and the study lasted for 6 month, a remarkable improvement in Hba1C resulted from using CGM. In the other study in 2004 about 124 patients suffering from one type diabetes, Hba1C of the patient that used CGM to control the blood glucose got better [14]. Also, in a study that was done by Teenage diabetes association, 322 patients who used CGM and Glucometer to manage their illness, were evaluated, that it showed a significant differences in the age groups of more than 25 years old. [15] Present study isn’t inconsistent to none of other similar studies, in addition an evaluation has been done separately, which lasted for 3 month. Therefore, it’s necessary that providers, by providing needed instructions, help to patients for self-care and prevent from numerous complications. The results of the study that was done by Solhi and co-workers, were positive about the effective role of performing instruction program on increasing the of performing instruction program on increasing the self-care level in patients, and it seems that performing such programs can be effective in treatment and prevention of diabetes complications [16-18].

CONCLUSION
Necessary instructions about doing self-care activities specially by the nurses and nutrition experts and observation providers, is the most important elements of optimized from of self-care process, and in the other hand, success in the self-care programs needs to increase the knowledge of the patients and their families about controlling the illness and using the devices such as CGM. These factors facilitate the self-care process [19].

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AUTHOR’S CONTRIBUTION

All the authors approved the final version of the manuscript.

CONFLICTS OF INTEREST
The authors declare no conflicts of interest regarding the publication of this study.

FINANCIAL DISCLOSURE
No financial interests related to the material of this manuscript have been declared.

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