

FREQUENCY OF SELF-MONITORING OF BLOOD GLUCOSE AMONG CASES OF TYPE II DIABETES MELLITUS

Javaria Ashraf,¹ Tahreem Anwar,¹ Muhammad Imran Bashir¹

ABSTRACT

Background: Diabetes mellitus (DM) is a common and a high burden health issue. It can lead to various organ damages due to wide range of pathophysiological mechanisms. Good glycemic control is the best choice and self-monitoring of blood glucose (SMBG) seems an important step. **Objective:** To determine the frequency of patients doing self monitoring of blood glucose (SMBG) in cases with type II diabetes mellitus. **Methodology:** This cross sectional study was conducted from 1st June to 31st December 2016. There were total 100 cases of type II DM enrolled in this study. The SMBG was labeled on basis of documentation of fasting and postprandial blood glucose values with date and time of blood glucose testing and any action taken if needed (e.g. increase in dose of oral hypoglycemic agents, change in oral hypoglycemic agents), after seeing the blood glucose values, for at least once per day over the last 6 weeks. The data was entered and analyzed by using SPSS version 20. **Results:** In this study there were total 100 cases out of which 55 (55%) were females and 45 (45%) males. The mean age of study subjects and duration of type II DM were 45.31±7.13 year and 6.14±3 years respectively. The SMBG was done by 68 (68%) of cases. In this study, 29 (64.44%) out of 45 and 39 (70.91%) out of 55 females did SMBG with p= 0.74. There was significant association in terms of both residential status and education level with SMBG with p values of 0.01 and 0.001 respectively. **Conclusion:** Self monitoring of blood glucose was carried out in almost every 2/3rd of patients with type II diabetes mellitus and it is significantly higher in cases from that are urban area and having education level more than graduation.

Key words: Diabetes Mellitus, Self monitor, Blood glucose.

INTRODUCTION

Type 2 Diabetes Mellitus is an emerging global health issue and it consists of characteristic array of signs and symptoms that are characterized by features of hyperglycemia and features of decreased insulin functioning.¹ This decrease in insulin functioning can be resulted from either the insulin resistance, inadequate secretion of insulin, or a combination of both. Further factors that can contribute include excessive or inappropriate glucagon secretion. The etiology of type 2 diabetes mellitus appears to involve complex interactions between environmental and genetic factors. Presumably, the disease develops when a diabetogenic lifestyle.^{1,2} Uncontrolled DM can result in various poor outcomes due to their micro vascular, macro vascular complications and these changes are usually irreversible except for few with earlier phase of the disease.³

The cases with type II DM are usually treated with oral hypoglycemic agents. Biguanide, sulfonylureas are the most commonly used along with the other ones. However, many patients with type 2 diabetes are also initially and then ultimately treated with insulin. Because they retain the ability to secrete some endogenous insulin, they are considered to require insulin, but do not depend upon this.^{4,5}

Uncontrolled DM can have detrimental effects and hence require multi disciplinary approach to avoid this. Strict blood glucose monitoring is the mainstay of the treatment.⁶ Self monitoring of the blood glucose (SMBG) and hence the appropriate steps taken to avoid further development of the complications is the focus of the treatment in recent times. The data has shown that this has led to better glycemic control. The factors associated to influence are; the residential status, educational level, socioeconomic status, family history of DM, social and psychological factors as well as the support and have positive effects of SMBG and then ultimately on outcome in the form of good glycemic control.^{5,7} The objective of this study was to determine the frequency of patients doing self-monitoring of blood glucose (SMBG) in cases with type II Diabetes Mellitus.

METHODOLOGY

Study Design: Cross sectional study. **Settings:** Department of Medicine, Sheikh Zayed Medical College, Hospital, Rahim Yar Khan. **Duration of Study:** 1st January to 31st December 2016. **Sample technique:** Non probability consecutive sampling. **Inclusion Criteria:** Both Sexes and between 30-70 years known cases of DM for at least last 1 year. **Exclusion Criteria:** Cases with type I DM and cases that are mentally handicapped.

1. Department of Medicine, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, University of Health Sciences Lahore, Pakistan.

Correspondence: Dr. Muhammad Imran Bashir, Department of Medicine, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, Pakistan.

E-mail: drimran907@gmail.com

Received: 30-05-2017

Accepted: 08-08-2017

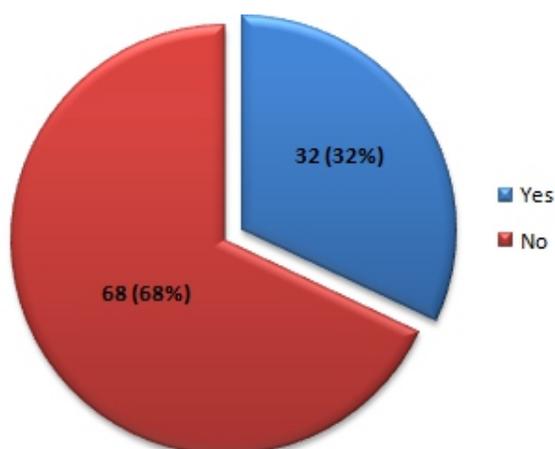
In this study there were total 100 cases of type 2 Diabetes Mellitus as per inclusion criteria. Detailed socio demographic data like age, gender was taken and other clinical information like duration of Type II DM, residential status as urban or rural, educational status was also noted. The SMBG was labeled as on basis of documentation of fasting and postprandial blood glucose values with date and time of blood glucose testing and any action taken if needed (e.g. increase in dose of oral hypoglycemic agents, change in oral hypoglycemic agents), after seeing the blood glucose values, for at least once per day over the last 6 weeks.

The data was assessed analyzed with the help of SPSS version 20. Quantitative variables were presented in terms of mean \pm SD (Standard Deviation). Frequency & percentages were calculated for categorical data. Effect modifiers were controlled to look for the significance and chi-square test was applied taking p-value \leq 0.05 as significant.

RESULTS

In this study there were total 100 cases of type 2 diabetes mellitus out of which 55 (55%) were females and 45 (45%) males. The mean age and duration of type II DM were 45.31 ± 7.13 year and 6.14 ± 3 . years respectively. There were 69 (69%) cases from urban also, while 65 (65%) had education level of graduation or more. The SMBG was carried out by 68 (68%) of cases. In this study 29 (64.44%) out of 45 and 39 (70.91%) out of 55 females did SMBG with $p=0.74$. (Table I)

Figure I: Frequency of self monitoring of blood glucose in type II DM (n = 100)



There was no significant difference in terms of age groups with $p=0.94$. There was significant association in terms of both residential status and education level where SMBG was more carried out among urban population and those with education level of more than graduation with p values of 0.01 and 0.001 respectively. (Table I)

Table I: Self monitoring of blood glucose (SMBG) with respect to study variables (n= 100)

Variables		SMBG		P value
		Yes	No	
Gender	Male	29 (64.44%)	16 (35.56%)	0.74
	Female	39 (70.91%)	16 (29.09%)	
Age Groups (Yrs)	30-49	33 (68.75%)	15 (31.25%)	0.94
	50-70	35 (67.31%)	17 (32.69%)	
Residential Status	Rural	14 (45.16%)	17 (54.86%)	0.01
	Urban	54 (78.26%)	15 (21.74%)	
Educational Status	Graduate	54 (83.08%)	11 (16.92%)	0.001
	Undergraduate	14 (40%)	21 (60%)	

DISCUSSION

Diabetes mellitus (DM) is a common chronic and costly condition associated with serious comorbidities. By 2030, the number of adults with diabetes is expected to rise to 552 million. Oral hypoglycemic are thought to be the mainstay of the treatment; though insulin is ultimately added to the regimen to get the good control of it. Uncontrolled DM can end up in catastrophic multi-organ damage. Strict glycemic control has been shown to reduce the risk of various micro- and macro vascular complications of this disease. Structured and personalized self-monitoring of blood glucose (SMBG) is a systematic approach to glucose monitoring throughout the day. SMBG has been demonstrated to be a beneficial approach for the achievement of long-term glycemic control in patients with T2DM.

In this study self-monitoring of blood glucose (SMBG) was done by 61 (64.89%) cases with type 2 diabetes mellitus. The results of this study were similar to studies done by McIntosh B et al and SMBG International Working Group who also found these results from 58 to 65%.^{7,8} However the results in the studies done by Ezenwaka CE et al, Poolsup N et al and Malanda UL et al had relatively lower number as compared to our study.^{9,10,11} Why these numbers were higher in our study? This might be because firstly this study was done in one of the

largest cities of Pakistan where literacy is good and patients' affording capabilities are also much higher. Secondly the other studies were in the form of meta-analysis, which included all the cases from poor to rich which ended up in a relatively lower number. Moreover the study done by Ezenwaka CE et al was conducted in the islands of West Indies which is relatively a resource deprived country that's why the number using SMBG was slightly at lower side in their studies.⁹ Significant numbers were seen in cases with higher educational status and urban residence in terms of SMBG with p value of 0.0001 & 0.0001 respectively. This was also observed by many studies that self-monitoring is mostly done in the urban settings and in cases that had a higher degree of education.^{12,13} Both these entities seem to share the one or more of the same mechanisms. First of all the cases residing in urban population has better resources to health care and also the cost is not a big issue for monitoring of these glucose levels. Secondly, the urban population is also more literate; hence has better understanding of the disease and its feared complications, that's why they use more of this entity.

CONCLUSION

Self monitoring of blood glucose was carried out by two third of patients having type 2 diabetes mellitus and it is significantly higher in cases from urban area and have education level more than graduation.

Conflict of interest

There is no conflict of interest among all authors.

REFERENCES

1. Report of the expert committee on the diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2003 Jan. 26 Suppl 1:S5-20.
2. Unger RH, Orci L. Paracrinology of islets and the paracrinopathy of diabetes. *Proc Natl Acad Sci U S A*. 2010 Sep 14. 107(37):16009-12.
3. Philippe MF, Benabadji S, Barbot-Trystam L, Vadrot D, Boitard C, Larger E. Pancreatic volume and endocrine and exocrine functions in patients with diabetes. *Pancreas*. 2011 Apr. 40(3):359-63.
4. Bacha F, Lee S, Gungor N, Arslanian SA. From pre-diabetes to type 2 diabetes in obese youth: pathophysiological characteristics along the spectrum of glucose dysregulation. *Diabetes Care*. 2010 Oct. 33(10):2225-31.
5. Hansen KB, Vilsboll T, Bagger JI, Holst JJ, Knop FK. Increased postprandial GIP and glucagon responses, but unaltered GLP-1 response after intervention with steroid hormone, relative physical inactivity, and high-calorie diet in healthy subjects. *J Clin Endocrinol Metab*. 2011 Feb. 96(2):447-53.
6. Wheeler E, Barroso I. Genome-wide association studies and type 2 diabetes. *Brief Funct Genomics*. 2011 Mar. 10(2):52-60.
7. McIntosh B, Yu C, Lal A, Chelak K, Cameron C, Singh SR, Dahl M. Efficacy of self-monitoring of blood glucose in patients with type 2 diabetes mellitus managed without insulin: a systematic review and meta-analysis. *Open Med*. 2010;4(2):e102-13.
8. The SMBG International Working Group. Self-monitoring of blood glucose in type 2 diabetes: An inter-country comparison. *Diabetes Res Clinic Pract*. December 2008; 82(3):e15-18
9. Ezenwaka CE, Dimgba A, Okali F, Skinner T, Extavour R, Rodriguez M et al. Self-monitoring of blood glucose improved glycemic control and the 10-year coronary heart disease risk profile of female type 2 diabetes patients in Trinidad and Tobago. *Niger J Clin Pract*. 2011;14(1):1-5.
10. Poolsup N, Suksomboon N, Rattanasookchit S. Meta-analysis of the benefits of self-monitoring of blood glucose on glycemic control in type 2 diabetes patients: an update. *Diabetes Technol Ther*. 2009;11(12):775-84.
11. Malanda UL, Welschen LM, Riphagen II, Dekker JM, Nijpels G, Bot SD. Self-monitoring of blood glucose in patients with type 2 diabetes mellitus who are not using insulin. *Cochrane Database Syst Rev*. 2012;1:CD005060.
12. Silva DD, Bosco AA. An educational program for insulin self-adjustment associated with structured self-monitoring of blood glucose significantly improves glycemic control in patients with type 2 diabetes mellitus after 12 weeks: a randomized, controlled pilot study. *Diabetol Metab Syndr*. 2015;7:2-6.
13. Aghili R, Khamseh ME, Malek M, Yarahmadi S, Farshchi A. Structured self monitoring of blood glucose in Iranian people with type 2 diabetes; A cost consequence analysis. *Daru*. 2012;20(1):32-7.

Article Citation: Ashraf J, Anwar T, Bashir MI. Frequency of self-monitoring of blood glucose among cases of type ii diabetes mellitus. *JSZMC* 2017;8(3): 1205-1207