

Glycemic control among diabetic patients

Ahmad S. Azab, Arab Board in Family Medicine.

ABSTRACT

Objective: This study was carried out to assess control of blood glucose among diabetic patients attending Primary Health Care Centers in Riyadh.

Methods: It is a retrospective study where fasting blood glucose reading for all diabetic patients attending 3 randomly selected Primary Health Care Centers in Riyadh was taken during the months of March and April 2000. The patients were divided into 3 categories: those with excellent, those with acceptable and those with poor glycemic control (Fasting blood sugar 4-7, 7-10 and more than 10 mmol/litres).

Results: A total of 991 diabetic patients were involved in the study (83% men and 62% women). Those with excellent glycemic control represent 21% of patients in the first reading and 25% of the patients in the second

readings, while those with poor control represent 49% and 44% of the patients in the two readings. The remaining are in the acceptable category.

Conclusion: Diabetes mellitus is poorly controlled in a large proportion of diabetic patients attending Primary Health Care Centers in Riyadh. Public education and awareness programs should be encouraged. Such programs must include the importance of appropriate life style changes and of self monitoring of blood glucose at home.

Keywords: Diabetes mellitus, glycemic control, primary health care.

Saudi Med J 2001; Vol. 22 (5): 407-409

D iabetes mellitus is a group of metabolic diseases characterized by a state of hyperglycemia. It is by far the most common endocrine disease. Although the disease is prevalent worldwide, there is a significant difference in frequency among countries.¹ The disease is considered more prevalent in our populations than in Europe and North America.^{2,3} In the Kingdom of Saudi Arabia, a number of studies have shown the high prevalence of the disease in both urban and rural areas⁴⁻⁸ eg. in one study, the prevalence in urban areas for men was found to be 11.7, and for rural areas it was found to be 6.8 and 13.8 in urban areas for women and 7.4 in rural areas.⁹ Management of diabetes mellitus requires a physician-coordinated team that provides patient education program, treatment and continuing

medical care. Such a team includes, but is not limited to, physicians, nurses, dietitians and others.¹⁰ In addition to the social impact of diabetes mellitus, there are also substantial economic costs. These include costs related to the health services, loss of school and work time and thus poor scholastic performance and decreased productivity, disease related morbidity and premature mortality, e.g. diabetes mellitus was estimated in America to account for \$45 billion in direct and \$47 billion in indirect costs. The average medical care cost in 1992 for a person with diabetes was \$11,157, compared with \$2,600 for a person without diabetes.¹¹ A large proportion of these costs are related to treating complications of diabetes.^{11,12} Control of blood glucose substantially decreases the risk of many of

From the Department of Primary Care, Ministry of Health, Riyadh, Kingdom of Saudi Arabia.

Received 8th July 2000. Accepted for publication in final form 5th November 2000.

Address correspondence and reprint request to: Dr. Ahmad S. Azab, Department of Primary Care, General Directorate of Health, PO Box 102457, Riyadh 11675, Kingdom of Saudi Arabia. Tel/Fax +966 (1) 450 2239.

these complications.¹³⁻¹⁸ The present study was planned to assess blood glucose control of diabetic patients attending Primary Health Care Centers (PHCC) in Riyadh, the Capital of the Kingdom of Saudi Arabia.

Methods. This is a retrospective study, conducted on May 2000. Three Primary Health Care Centers (PHCC) were selected using the simple random sampling technique. The medical records for all diabetic patients registered in these PHCC were reviewed. Diabetic patients visit the PHCC on a monthly regular follow up visit according to an appointment system where the level of their fasting blood sugar (FBS) is read. Fasting blood sugar readings during the months of March and April 2000 were recorded in this study to assess the level of glycemic control of the patients. In patients who missed visiting the center in one of these two months, FBS reading in their previous visit to the center was taken. Level of glycemic control was calculated using the criteria of The Scientific Committee of Quality Assurance in Primary Health Care.¹⁹ Patients were divided into three groups. Those with excellent, (FBS 4-7), those with acceptable (FBS 7-10) and those with poor glycemic control more than 10 mmol/Lit.).

Results. The total number of diabetic patients in this study is 991 (379 males and 612 females). Only 21% of the patients in the first reading and 25% of the patients in the second reading show an excellent control of their blood glucose level, while 49% of patients for the first reading and 44% of the patients fall in the poor glycemic control category. Glycemic level for the remaining patients (30% in the first reading and 31% in the second reading) is in the acceptable range. No significant difference between male and female patients was found in their glycemic control. Table 1 shows the level of glycemic control among diabetic patients during the months of March and April for the year 2000.

Discussion. Although diabetes mellitus is associated with a high incidence of complications, its control results in reduction of not only morbidity and mortality, but also economic burden of the disease. This control is considered as one of the standards of the outcome of diabetes mini clinics in PHCC.¹⁹ HbA1c, fasting and post prandial blood glucose levels are used to assess the level of glycemic control.²⁰⁻²³ Since HbA1c is not available in PHCC, FBS is used to assess level of glycemic control in this study. The study shows that the percentage of excellent glycemic control among diabetic patients under the study in the first reading is 21 and under the second reading is 25. It is much less than the national goals of diabetic control which consider more than 40% of diabetic patients to be in the excellent category. In this study we can also observe the high percentage of diabetic patients with poor glycemic control in both readings (49 in the first and 44 in the second). These figures should be less than 10% in the national goals of diabetic control. The poor glycemic control achieved in this study was also found in other local and international studies, e.g. a local study was conducted on diabetic patients at King Khalid University Hospital, Riyadh. It found that 77% of the patients had HbA1 values above normal range, and 16.5% had severe hyperglycemia (Blood sugar > 27.7 mmol/L).²⁴ Glycemic control was also found to be generally poor in diabetic patients in a typical English community.²⁵ For these and other reasons some authors believe that practical measures of achieving glycemic targets in diabetic patients is quite difficult.²⁶ Normalization of glucose values were not achieved as a group in the intensively treated patients involved in the Diabetes Control and Complication Trial (DCCT) due to mean glucose values being 40% above normal limits.²⁷ More local studies are needed to assess glycemic control among diabetic patients in the Kingdom. The relatively high prevalence of poor glycemic control achieved in this study, reflects the greater needs for more efforts to improve it. There is a pressing need for public education programs and

Table 1 - Level of glycemic control among diabetic patients during the months of March and April 2000.

Month	Sex	Level of glycemic control			Total
		Excellent No. of patients (%)	Acceptable No. of patients (%)	Poor No. of patients (%)	
March	Male	76 (20)	111 (29)	192 (51)	379
	Female	129 (21)	190 (31)	293 (48)	612
	Total	205 (21)	301 (30)	485 (49)	991
April	Male	96 (25)	118 (31)	165 (44)	379
	Female	152 (25)	191 (31)	269 (44)	612
	Total	248 (25)	309 (31)	434 (44)	991

for promoting public awareness. The Kingdom of Saudi Arabia has faced a rapid development program and socioeconomic transformation over the past few decades that resulted in changes in dietary habits and increased prevalence of obesity, associated with less physical activity. Awareness programs about the importance of appropriate life style changes (e.g. diet and exercise) are of paramount in controlling the disease. Patient and family education for self management should be encouraged. The self-monitoring of blood glucose (SMBG) by patients has been designed to improve glycemic control.²¹

References

1. King H, Rewers M. WHO Ad Hoc Diabetes Reporting Group. Global Estimates for Prevalence of Diabetes Mellitus and Impaired Glucose Tolerance in Adults. *Diabetes Care* 1993; 16: 157-177.
2. Alwan A. Non Communicable Diseases: A major Challenge to Public Health in The Region. *Eastern Mediterranean Health J* 1997; 3: 6-16.
3. The Expert Committee on the Diagnosis and Classification of Diabetes mellitus. Report of The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care* 1998; 21: S5-S19.
4. Bacchus RA, Bell JL, Madkour M, Kilshaw B. The Prevalence of Diabetes Mellitus in Male Saudi Arabs. *Diabetologia* 1982; 23: 330-332.
5. El-Hazmi MAF, Warsy AS, Al-Swailem AR, Al-Swailem AM, Sulaimani R, Al-Meshari A. Diabetes Mellitus and Impaired Glucose Tolerance in Saudi Arabia. *Annals of Saudi Medicine* 1996; 16: 381-385.
6. Abu-Zeid HAH, Al-Kassab AK. Prevalence and Health Care Features of Hyperglycaemia in Semi urban - Rural Communities in Southern Saudi Arabia. *Diabetes Care* 1992; 15: 484-489.
7. El-Hazmi MAF, Al-Swailem A, Warsy AS, Al-Sudairy F, Sulaimani R, Al-Swailem A et al. The Prevalence of Diabetes Mellitus and Impaired Glucose Tolerance in the Population of Riyadh. *Annals of Saudi Medicine* 1995; 15: 598-601.
8. Fatani HH, Mira SA, El-Zubier AG. Prevalence of diabetes Mellitus in Rural Saudi Arabia. *Diabetes Care* 1987; 10: 180-183.
9. Al-Nuaim A, Al-Rubean K, Al-Mazrou Y, Khoja T, Al-Attas O, Al-Daghari N. National Chronic Metabolic Diseases Survey 1995. Jointly Published by Ministry of Health and King Saud University. Kingdom of Saudi Arabia.
10. American Diabetes Association. Standards of Medical Care for Patients with Diabetes Mellitus. *Diabetes Care* 1998; 21: S23-S31.
11. Burton WN, Connerty CM. Work site - Based Patient Education Intervention Targeted at Employees With Diabetes Mellitus. *JOEM* 1998; 40: 702-706.
12. Selby JV, Zhang D, Ray GT, Colby CJ. Excess Cost of Medical Care for Patients With Diabetes in a Managed Care Population. *Diabetes Care* 1997; 20: 1396-1401.
13. Gaede P, Vedel P, Parving H, Pedersen O. Intensive Multifactorial Intervention in Patients With type 2 Diabetes Mellitus and Micro albumin uria: The Steno type 2 Randomised Study. *The Lancet* 1999; 353: 617-622.
14. The Diabetes Control and Complications Trial Research Group. The Effect of Intensive Treatment of Diabetes on The Development and Progression of Long-Term Complications in Insulin-Dependent Diabetes Mellitus. *N Eng J Med* 1993; 329: 977-986.
15. UK Prospective Diabetes Study (UKPDS) Group. Intensive Blood - Glucose Control With Sulphonyl ureas or Insulin Compared With Conventional Treatment and Risk of Complications in Patients With Type 2 Diabetes (UKPDS). *The Lancet* 1998; 352: 837-853.
16. Dahl-Jorgensen K, Brinchmann-Hansen O, Hanssen KF, Ganes T, Kierulf P, Smeland E et al. Effect of Normoglycaemia for Two Years on Progression of Early Diabetic Retinopathy, Nephropathy and Neuropathy: The Oslo Study. *BMJ* 1986; 293: 1195-1199.
17. Anderson DKG, Svardudd. Long-Term Glycemic Control Relates to Mortality in Type 2 Diabetes. *Diabetes Care* 1995; 18: 1534-1543.
18. Gerstein HC. Preventive Medicine in a Diabetes Clinic: An Opportunity to Make a difference. *The Lancet* 1999; 353: 606-609.
19. Al-Fares EA. Diabetes Mellitus. Quality Assurance in Primary Health Care Manual. Kingdom of Saudi Arabia: Dar Al-Hilal Printing Press; 1994; 197-223.
20. Balkau B, Eschwege E, Papoz L, Richard JL, Claude JR, Wernet JM et al. Risk Factors for Early Death in Non - insulin Dependent Diabetes and Men with Known Glucose Tolerance Status. *BMJ* 1993; 303: 295-299.
21. American Diabetes Association. Tests of Glycaemia in Diabetes. *Diabetes Care* 1997; 20: S18-S20 .
22. Al-Fares EA. Guidelines for the Management of Diabetic Patients in the Health Centres of Saudi Arabia. *Journal of Family and Community Medicine* 1997; 4: 12-23.
23. Dudbridge S. Oral Therapy and Glycaemic Control. *Diabetes Care Today*, Part 1 1993; 11-13.
24. Al-Jasser SJ, Famuyiwa OO, Sulaimani RA, Laajam M, Mekki MO. Diabetes Mellitus in Saudi Arabia-The Clinical Pattern and Complications in 1,000 Patients. *Diabetes* 1991; 5: 432A.
25. Dunn NR, Bough P. Standards of Care of Diabetic Patients in a Typical English Community. *British Journal of General Practice* 1996; July: 401-405.