

Self blood glucose monitoring among diabetic patients in Port Harcourt, Nigeria

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Abstract

Self blood glucose monitoring (SBGM) is important in the management of people living with diabetes. This study set out to evaluate the knowledge and practice of SBGM in diabetic patients at our clinic in Port Harcourt, Nigeria. Ninety (90) diabetic patients attending the clinic were assessed with self-administered questionnaires. There were 36 (40%) males and 54 (60%) females with a mean age of 54 ± 23 years, and a mean duration of diabetes of 8 years. Eighty-one (90%) had type 2 diabetes while nine (10%) had type 1 diabetes. Eighteen type 2 patients (20%) were on insulin alone, 52 (58%) on oral drugs, and 20 (22%) were on a combination. Fifty-two patients knew only about using glucose meters for SBGM, 30 knew about using both meters and urine dipsticks, and 4 did not know of any method. Only 24 (27%) patients had glucose meters and no type 1 patient had a meter. The highest frequency of monitoring was once daily in six patients. None of the patients practised urine monitoring. In conclusion, this study has shown that the practice of SBGM in our patients is inadequate despite reasonable knowledge of the technique. This is most likely due to scarce resources. The importance of SBGM should be emphasised more in our practice, especially in patients with type 1 diabetes, and there should be motivation for improved self-monitoring resources.

Introduction

The management of diabetes mellitus emphasises patient education and participation, which is known to be beneficial.¹ In recent times, patients have been encouraged to own and use glucose meters to monitor their blood glucose levels at home. This is especially important in patients with type 1 diabetes or type 2 patients on insulin. In developed countries with well-established health systems, owning a glucose meter for diabetic patients is the rule, rather than the exception. However in resource-poor settings this is hardly the case. In some

places patients still carry out diabetes monitoring by urine testing. This has several drawbacks; it is only semi-quantitative, it is retrospective, and is significantly dependent on the patient's individual renal threshold and can only detect concentrations above this threshold. It also cannot distinguish between normal glucose levels and hypoglycaemia.² Notwithstanding, urine testing is still recommended for monitoring by the International Diabetes Federation as a viable, cost-effective way of monitoring diabetes control, especially when the cost of blood glucose monitoring makes it inaccessible or when people do not wish to perform blood testing.² This study aims to critically appraise the knowledge and use of glucometers and/or urine dipsticks for the self blood glucose monitoring (SBGM) by our patients.

Patients and methods

Ninety (90) diabetic patients attending the diabetic clinic in a tertiary health institution in Port Harcourt were recruited consecutively over a 2-week period. Newly diagnosed patients and those with gestational diabetes were excluded.

Patients were assessed with self-administered questionnaires to obtain information about their age, time since diagnosis, type of diabetes treatment and their knowledge and frequency of usage of glucose meters and/or urine dipsticks for monitoring of their blood or urine glucose.

Results

Out of the 90 patients, 36 (40%) were males and 54 (60%) females (male:female ratio of 2:3). Nine (9) of the patients were classified as type 1, while 81 (90%) had type 2 diabetes. The age range was from 20 to 80 years with a mean age of 54 ± 23 years. Most (51%) patients were aged 40–59 years, 38% were over 60 years, and 11% were 20–39 years.

The duration of diabetes ranged from 1 to 28 years with a mean of 8 years. All nine type 1 patients were on twice-daily insulin regimens using a pre-mix 30/70 combination of regular and isophane insulin. None of the type 1 patients was on a basal-bolus regimen.

Of the 81 type 2 patients, 46 (57%) were on oral hypoglycaemic agents (OHAs) alone, 21 (26%) were on a combination of OHAs and insulin, while 14 (17%) were on insulin alone. The most commonly used insulin in the type 2 patients was a once-daily bedtime injection of isophane (eight of the patients), the remaining six being

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on twice-daily pre-mixed 30/70 insulin.

Out of all the 90 patients, only 4 (4%) were unaware of SBGM. Among the 86 patients who had knowledge of SBGM, 76 (88%) learnt about it from a healthcare provider, 2 (2%) from the Diabetic Association of Nigeria, and 8 (10%) from their fellow diabetic patients.

Fifty-two (52) patients knew only about glucose monitoring, 30 knew about using both blood and urine for monitoring, while 4 patients did not know of any methods.

Only 24 (27%) patients had glucose meters. Half of them were on OHAs and the other half were on insulin treatment, though only 8 out of the 12 on insulin treatment who owned meters actually used them to monitor their blood glucose. All the patients on insulin who owned meters were insulin-treated type 2 patients, as none of the type 1 patients had a glucose meter.

The highest frequency of monitoring was once daily in six patients, eight others monitored their blood glucose 1–2 times a week, while in four patients, the frequency of monitoring was as low as once or twice a month. Out of the eight patients on insulin who used their glucose meters, four monitored their blood glucose daily (usually once only), while the other four used their meter between 1 and 2 times a week. Overall, six of the patients who owned a meter had never used it.

Discussion

SBGM is one of the key methods by which patients are encouraged to participate in the management of their diabetes. An earlier study by Udezue and colleagues from Nigeria³ demonstrated the reliability of glucose meters as a means of assessing glycaemic control in patients. In type 1 patients SBGM is crucial in their management. This is especially important in type 1 patients on basal-bolus insulin regimens who have to test their blood glucose frequently and ideally adjust their insulin doses accordingly with respect to meals and exercise.⁴

The awareness of the importance of SBGM was high (96%). Most of these patients were informed about SBGM by a healthcare provider, which suggests that counselling about SBGM in our centre is fairly adequate. However, despite this knowledge of the use of SBGM, only a small proportion (27%) actually owned meters. This is likely to be due to financial reasons⁵ and not due to low educational status as up to 56% of the patients had at least a secondary level of education, though the income level of the patients was not assessed.

A similar study on SBGM by Coker and Fasanmade⁶ reported that 50% of their patients practiced either blood or urine glucose monitoring. The use of urine testing, though no longer widely prescribed, could be an alternative in the patients who cannot afford glucose meters. However, the study demonstrated that only 30 (33%) of the patients knew about urine testing, though none car-

ried it out. The fact that only few patients knew about urine testing is probably because the healthcare providers who counselled them about diabetic care did not teach them about it as they may have been of the opinion that it is out-dated and unreliable. Six of the patients who owned meters had never used them before, one saying it was because he was afraid of needle-pricks, while the others said they had not bothered to learn to use them. The frequency of monitoring was quite poor among those who used their meters with only six of them monitoring at least once a day.

Two trials^{7,8} have shown that SBGM can be beneficial in some patients with type 2 diabetes. The frequency of SBGM in type 2 diabetic patients on oral agents should be individualised and the International Diabetes Federation (IDF) has recommended that it be done at diagnosis as part of diabetes education, but should be used only when individuals and/or their care-givers have the knowledge, skills and willingness to incorporate SBGM into their diabetes care plan in order to attain agreed treatment goals.⁹ However, for those patients on insulin, including all type 1 patients, it is advocated that SBGM be carried out at least four times daily.⁹ This was not achieved in our patients. It was quite unacceptable that none of the type 1 patients in this study carried out SBGM despite the fact that they were being managed with insulin. The low level of ownership and use of meters by the patients probably was accountable for the type of insulin regimens they were placed on (i.e. few were on basal-bolus systems). Financial support for SBGM in Africa remains a major barrier to improved blood glucose control, both in type 1 and type 2 diabetic patients.

References

1. Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Med Care* 1999; 37: 5–14.
2. International Diabetes Federation (IDF). Position statement – urine glucose monitoring. The role of urine glucose monitoring in diabetes. www.idf.org 2005.
3. Udezue EO, Ezeoke AC, Oli JM. Use of portable glucose meter in a Nigerian diabetic clinic. *Trop Geogr Med* 1989; 41: 141–5.
4. American Diabetes Association. Executive Summary: Standards of Medical Care in Diabetes – 2009. *Diabetes Care* 2009; 32: S1.
5. Enwere OO, Salako BL, Falade CO. Prescription and cost consideration at a diabetic clinic in Ibadan, Nigeria: a report. *Ann Ibadan Postgraduate Med* 2006; 4; 35–39.
6. Coker AO, Fasanmade OA. Quality of care for patients with type 2 diabetes in Lagos University Teaching Hospital. *Nig Quart J Hosp Med* 2005; 16: 6–9.
7. Schweder U, Siebolds M, Mertes G, et al. Meal-related structured self-monitoring of blood glucose. Effect on diabetes control in non-insulin-treated type 2 diabetic patients. *Diabetes Care* 2002; 25: 1928–32.
8. Guerci B, Drouin P, Grange V, et al. Self-monitoring of blood glucose significantly improves metabolic control in patients with type 2 diabetes mellitus; the Auto-Surveillance Intervention Active (ASIA) study. *Diabetes Metab* 2003; 29: 587–94.
9. International Diabetes Federation (IDF). IDF Guideline on self-monitoring of blood glucose in non-insulin treated type 2 diabetes. www.idf.org 2008.