

# Factors associated with self-monitoring of glycaemic control among persons with diabetes in Benin City, Nigeria

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## Abstract

Persons with diabetes in our hospital are taught various methods of self-monitoring. However, the factors associated with this practice are poorly documented. We therefore investigated 100 consecutive patients from our clinic. Seventy-two (72%) subjects practised self-monitoring, 63 by testing urine, 8 by testing blood glucose, and 1 person by tasting his urine. Most tested once a week, and the frequency of testing differed on the basis of the method employed and also the level of education. We therefore recommend the inclusion of routine teaching of self-monitoring to diabetic persons in health educational talks.

## Introduction

Self-monitoring of glycaemic control is a cornerstone of diabetes care that can ensure patient participation in achieving and maintaining specific glycaemic targets. The most important objective of monitoring is the assessment of overall glycaemic control and initiation of appropriate steps in a timely manner to achieve optimum control. In our centre, all diabetic persons are taught the rationale for and the methods and target goals of self-assessment of glycaemic control at (or as close as possible to) the first presentation.

Generally, patients are taught the essence/importance of monitoring by the physicians, and the practice/techniques by nurses, with considerable overlap. They are informed about self-monitoring of urine glucose (SMUG) and self-monitoring of blood glucose (SMBG), for which there are a variety of products in our locality. These include urine glucose test strips, Clinitest® tablets, blood glucose strips, and glucose meters. Patients are encouraged to document the results of all tests, with dates and comments as appropriate and to present this log-book for review by physicians at follow-up appointments in the diabetes clinic. Their knowledge of monitoring is reinforced during health talks at Diabetes Association

meetings and in the diabetes clinic.

There is a lack of information on the practice of self-monitoring of glycaemic control among diabetic persons in Nigeria. This study reports on some factors associated with this practice in a tertiary hospital setting.

## Patients and methods

The study was conducted over a 4-week period in the diabetes clinic of the University of Benin Teaching Hospital, Benin City, Nigeria. Questionnaires were administered by the authors to all consecutive diabetic patients who consented to participate in the study. Socio-demographic data obtained included age, sex, educational status, occupation, and duration of diabetes. Clinical data documented included anthropometric indices and blood pressure. The persons' knowledge of methods of self-monitoring, the techniques used, the frequency of tests, and documentation of results were ascertained. Long-term glycaemic control was assessed by mean fasting plasma glucose (FPG) in each subject in the 12 months preceding recruitment into the study, as facilities for assessment of glycated haemoglobin were unavailable in our hospital at the time. Comparison of means and proportions was done using the Student's t-test and Chi-square test (with Yates' correction as appropriate), respectively. The level of statistical significance was set at  $p < 0.05$ .

## Results

A total of 100 patients (46 males and 54 females), out of a total number of 250 seen in the clinic over the study period consented to and were included in the study. Type 2 diabetes was diagnosed in 87% of subjects (39 males, 48 females), type 1 diabetes in 11% (7 males, 4 females) and gestational diabetes in 2%. A total of 88 (88%) subjects were educated, with a minimum of primary level of education in 49 (56%) persons, 10–12 completed years of education in 30 (34%) persons, and 9 (10%) persons with tertiary level of education. The mean FPG was  $8.7 \pm 2.9$  mmol/l).

Table 1 shows the patient characteristics. The females tended to be more obese and older, with longer diabetes duration than their male counterparts; however, these differences were not significant. Seventy-two subjects (72%) practised self-monitoring, one of them by tasting his urine! Of the 71 patients using conventional methods,

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Table 1 Characteristics of the study patients (means±SD)

Parameters	Males (n = 46)	Females (n = 54)	p value
Age (years)	51±13	58±13	NS
Body mass index (kg/m <sup>2</sup> )	24.8±3.8	26.8±4.5	NS
Waist circumference (cm)	88±11	94±11	NS
Waist:hip ratio	0.94±0.07	0.92±0.09	NS
Duration of diabetes (years)	7±8	8±7	NS

63 (89%) practised self-monitoring of urine glucose (SMUG) and 8 (11%) practised self-monitoring of blood glucose (SMBG). There was no significant difference in the method of self-monitoring used by either sex. Similarly, there was no significant difference in the methods used on the basis of educational attainment.

Figure 1 shows the frequency of self-monitoring. Forty-three (68%) persons practising SMUG and 5 (62%) practising SMBG did their tests once a week or less frequently. The frequency of testing differed significantly on the basis of the method used: patients were more likely to do tests more than 2–3 times a week if practising SMUG, and more educated persons tested significantly more often than the less educated ( $p < 0.05$ ).

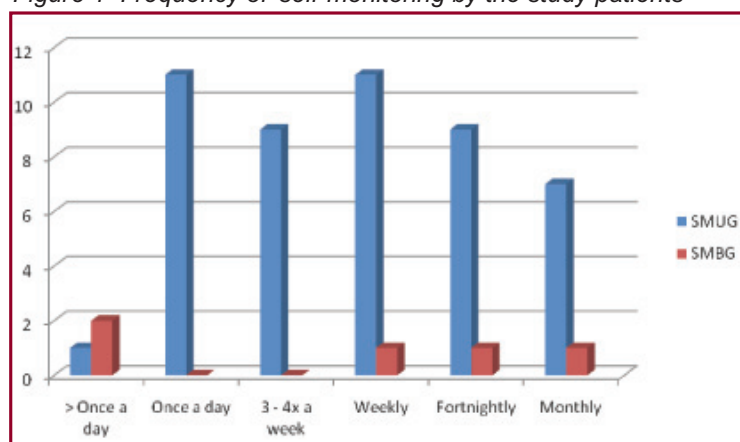
Of the 72 patients who self-monitored, 63 (87%) urine tested (61 with Clinitest tablets and 2 with urine glucose strips), and 9 (13%) blood tested (5 with a glucose meter and 4 with visually read strips).

## Discussion

Self-monitoring provides information about current glycaemic status, allowing for assessment of therapy and guiding adjustments in diet, exercise, and medication in order to achieve optimal glycaemic control. Our study shows that most persons practised self-monitoring. The person who monitored control by tasting his urine is reminiscent of the scientists in medical history that discovered 'mellituria'.<sup>1,2</sup> This method is entirely subjective and should be actively discouraged as a means of self-assessment of glycaemic control.

There was no significant difference between males and females in the testing methods employed in our study. Interestingly, educational attainment had no significant

Figure 1 Frequency of self-monitoring by the study patients



impact on the method of self-monitoring employed. We believe that this may be a reflection on the fact that most patients practise SMUG, using a simple technique that requires simple counting to execute the test and colour comparison to interpret the result, both of which can be easily performed (after adequate instruction) by most individuals, including those who are illiterate.

Our study showed that patients practising SMBG were fewer than those practising SMUG and more of these persons used glucose meters than visually read blood glucose test strips. In recent times, during routine health education talks given to patients in our unit, the use of blood glucose meters and practise of SMBG has been emphasised. We therefore attributed this increased use compared with visually read blood glucose strips to this intervention. However, these numbers are few, mainly due to cost. Holmes and Griffith<sup>3</sup> in a meta-analysis of studies on self-monitoring of glycaemic control concluded that there was no basis to recommend SMBG over SMUG. Miglani et al,<sup>4</sup> in their study of glycaemic control in young diabetic patients, concluded that the method of monitoring used made no difference to glycaemic status. They thus recommended that cost considerations support urine glucose monitoring as an approach to diabetes self-care in developing countries. Therefore, while we acknowledge the limitations of urine glucose monitoring, we believe that regular SMUG is better than no monitoring of glycaemic control, and we recommend its continued use in our locality in patients with financial constraints. We advocate the inclusion of blood glucose meters, blood glucose test strips and urine test strips in the health insurance programme in Nigeria to ease the burden of self-monitoring in diabetic patients.

Despite the high rate of self-monitoring (72%) in this study, the frequency of testing was low, with most persons testing once a week or less. The reasons for this low frequency of testing are unclear, although we believe that cost, availability of test supplies, and, in some cases, lack of the relevant skills are contributory factors. Further large scale studies are required to clarify these factors and determine their impact on monitoring and the long-term consequences of diabetes in our area. We believe that addressing these issues will result in increased self-monitoring and participation in self-care, with better achievement of glycaemic targets and reduction in disease burden. We therefore recommend the inclusion of self-monitoring in health talks to diabetic patients in order to reduce morbidity and mortality.

## References

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