

Prevalence of Different Brands and SMBG Frequency of Glucometer in Dakshina Kannada

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ABSTRACT

Glucometer is helpful to find out the glucose in blood. The purpose of the study was to assess the frequency of self-monitoring of glucose and the prevalence of different brands of glucometer used by the diabetic patients. The prospective observational study was conducted among 150 patients above 18 years of age. 45.33% of participants were males and 54.67% of patients were females. The big percentage of age group belongs to 51-70 years (76.6%) followed by 71-90 years (16%) and age of 31-50 years (7.3%). Of the total, 24% has elementary school education, were 33.3% high school pass outs, and 42.6% were college/university graduates. Out of 150 patients, 54.67% used glucometer and 45.33% were not using glucometer. Among these, 30.49% used Accu-chek, 21.95% One-touch, 14.63% Gluco-one and 32.93% used other brands. Out of 54.67%, 5.33% of people were using daily, 21.33% weekly once, 28.00% were using monthly and 45.33% were not using glucometer.

The present study concluded that SMBG is to help people with diabetes to improve their glycemic control. The relationship between blood glucose and SMBG frequency supported the view that SMBG is an essential element in diabetes management. The patient compliance regarding SMBG is finite. Thus, almost 60% of patients did not perform daily SMBG and above 45% did not perform routine test. Accu-chek glucometer to have an acceptable accuracy with the sensitivity of 81%, specificity 65%, PPV (positive predictive value) 74% and NPV (negative predictive value) 74%. Accu-chek was found to be the most accurate and widely used glucometer.

Keywords: Frequency, Glucometer brand, SMBG (Self monitoring of blood glucose)

INTRODUCTION

Nowadays, DM is a challenging public problem that is the most of the elderly persons are suffering from diabetes. A glucometer is a medical device for determining the concentration of glucose in the blood. It is a key element of home glucose monitoring (HBGM) by people with diabetes mellitus or hypoglycaemia. Daily self monitoring is believed to be important for patients treated with insulin or oral agents to detect asymptomatic hypoglycaemia. This self monitoring of blood glucose (SMBG) is useful for maintaining near normal blood glucose

levels, providing feedback to the health care provider and the patient regarding therapeutic effectiveness, helping patients adjust insulin dosages and diet and exercises and aiding in the detection and prevention asymptomatic hypoglycaemia and extreme hyperglycemia.

A study showed that 60% of those with Type 2 diabetes and 67% of those with Type 1 diabetes reported practicing SMBG less frequently than recommended by American Diabetes Association [1]. Self monitoring at least once per day was practiced by 39% of those taking insulin and 5-6% of those treated with oral agents or

diet alone. For all patients combined, the proportion of patients who tested their blood glucose increased with an increasing HbA1c value.

Some study showed that Accu-chek glucometer to have an acceptable accuracy with the sensitivity of 81%, specificity 65%, PPV (positive predictive value) 74% and NPV (negative predictive value) 74% [8].

METHODOLOGY

The study was prospective observational to assess the frequency of SMBG and prevalence of different brands of glucometer. Study was conducted at a community in Mangalore for 6 months from January to June 2021. The study was conducted among patients above 18 years of age. A total of 150 patients participated in our study. Study protocol was approved by the Institutional Ethics Committee (IEC) Srinivas Institute of Medical Science Research Centre (SIMS&RC), Mukka, Mangaluru. The patients greater than 18 years of age belonging to both gender with Type 1 and Type 2 diabetes mellitus, willing to participate were included in the study. On the contrary, patients with age less than 18 years of age, suffering from terminally ill conditions and not willing to participate were excluded from the study. The data for the study were collected using data collection form. It involved collecting and scrutinizing every data sample in a set of items from which sample can be drawn and were analysed using Microsoft excel 2010.

RESULTS

Demographic Details Of The Study Participants

A total of 150 patients participated in our study. 45.33% of participants were males and 54.67% of patients were females. The highest percentage of age group was 51-70 years (76.6%) followed by 71-90 years (16%) and age group of 31-50 years (7.3%). Of the total, 24% has elementary school education, were 33.3% high school pass outs, and 42.6% college/university graduates.

Table 1. Demographic details of study participants (N=150)

Characteristics	Number	Percentage (%)
Gender		
Male	68	45.3
Female	82	54.6
Age (in years)		
31-50	11	7.3
51-70	115	76.6
71-90	24	16
Educational level		
Elementary school	36	24
High school	50	33.3
College/ university	64	42.6

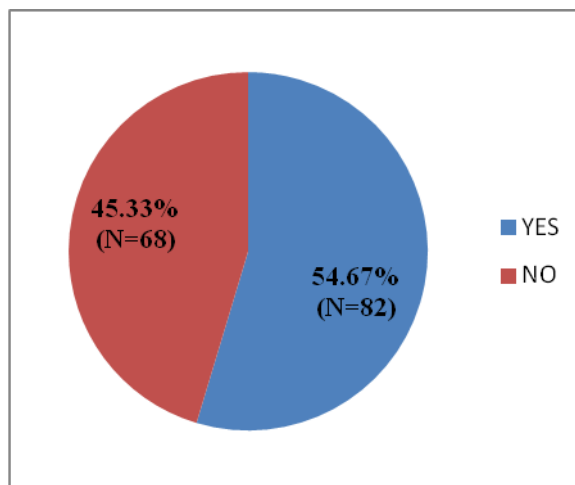


Figure 1. Usage of glucometer among people

Out of 150 patients, 54.67% (N=82) were using glucometer and 45.33% (N=68) were not using glucometer

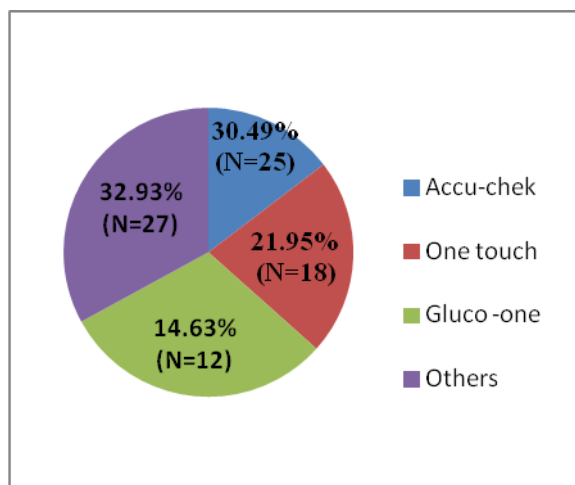


Figure 2. Usage of glucometer brand

Out of 150 patients 54.67% (N=82) were using glucometer. And in this 30.49% (N=25) were using Accu-chek, 21.95% (N=18) were using One-touch, 14.63% (N=12) were using Gluco-one and 32.93% (N=27) were using other brands.

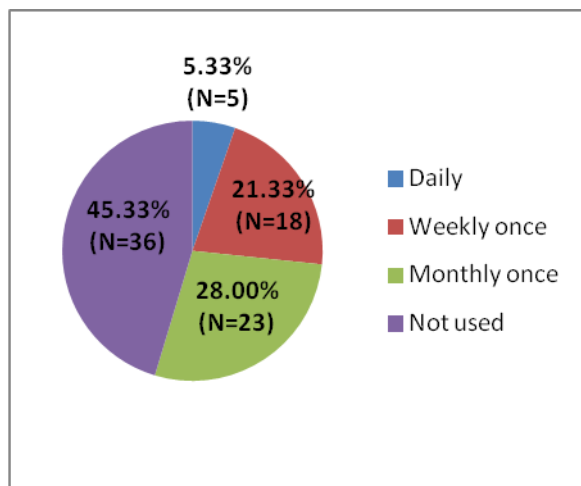


Figure 3. Frequency of usage of glucometer

Out of 54.67% (N=82), 5.33% (N=5) of people were using daily, 21.33% (N=18) of people were using weekly once, 28.00% (N=23) of people were using monthly and 45.33% (N=36) were not using.

Table 2. Glucometer specifications

Accu-chek blood glucometer is considered as the best and widely used glucometer available. It is easy to handle and provides accurate blood glucose measurement. It has cost ranging from Rs/-412 to Rs/-6196 and cost per 100 strips are Rs/-1725.

One touch has cost ranges from Rs/-980 to Rs/-1749 and cost per 50 strips are Rs/-1325.

Gluco-one has cost ranges from Rs/-136 to Rs/-1020 and per 50 strips are Rs/-760.

AccuSure has cost ranges from Rs/-560 to Rs/-1200 and cost per 50 strips is Rs/-740.

Table 2. Glucometer specifications

Glucometer brand	Cost of glucometer (Range)	Cost of test strips
Accu-chek	Rs/- 412 to Rs/-6,196	For 100 strips Rs/-1725
One touch	Rs/- 980 to Rs/-1749	For 100 strips Rs/-1325
Gluco-one	Rs/-136 to Rs/- 1020	For 50 strips Rs/-760
AccuSure	Rs/- 560 to Rs/-1200	For 50 strips Rs/-740

DISCUSSION

Self-monitoring of blood glucose (SMBG) should be part of a systematic management plan for patients with diabetes. Self-monitoring of blood glucose delivers information regarding an individual's

effective blood glucose profile. This information can help with the applicable scheduling of food, activity, and medication. It is also essential for understanding of the timing of blood glucose variations.

The present study was conducted among 150 patients who were having diabetes mellitus. 45.33% of participants were males and 54.67% of patients were females. The big percentage of age group was found to be 51-70 years (76.6%) followed by 71-90 years (16%) and age group of 31-50 years (7.3%). Of the total, 27% has elementary school education, were 32% high school pass outs, and 43% were college/university graduates.

A study by Adu MD *et al.*, the performance of six self monitoring blood glucose machines were examined using venous blood samples from 88 patients. Changing the glucometer brands is affecting the precision and accuracy of the results [1]. Likewise in our study, 47.33% patients were changing their glucometer brands. Accu-chek blood glucose meter is considered as the best glucometer available. It is easy to handle and provides accurate blood glucose measurement. It has duration of 2-4 min, frequency is 3-4 min/week and cost is Rs 1500/.

A study by Hansen MV *et al.*, SMBG was carried out daily by 39% of the patients and less than weekly by 24%. 67% patients described to perform routine testing, while the remaining 33% only tested when hypo-or hyperglycaemia was suspected. Age, gender, and level of diabetes-related concern were related with test pattern. Reported frequencies of mild and severe hypoglycaemia were independently associated with testing behaviour, whereas the presence of late diabetic complications was not. Lower HbA1c was related with more testing [4]. Similarly in our study, only 5.33% of people were using daily, 21.33% were using weekly once, 28.00% of people were using monthly and 45.33% were not using.

A study by Woong WM *et al.*, participants often considered frequent

SMBG as unnecessary, and this caused them to change the way they monitored their blood glucose levels based on their own perceived needs [2]. Similarly in our study, 63.33% of patients had lack of knowledge and were unaware of how to use the glucometer and 36.67% and 54.67% doesn't know how to interpret the data given on glucometer.

CONCLUSION

The main interest of SMBG is to help people with diabetes improve their glycemic control. The relationship between blood glucose and SMBG frequency supports the view that SMBG is an essential element in diabetes management. The patient compliance regarding SMBG is finite. The present study concluded that almost 60% of the patients do not perform daily SMBG and above 45% do not perform routine tests.

Accu-check glucometer to have an acceptable accuracy with the sensitivity of 81%, specificity 65%, PPV (positive predictive value) 74% and NPV (negative predictive value) 74%. Accu-check was the most accurate and widely used glucometer.

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