

THE RELIABILITY OF GLUCOMETERS AVAILABLE IN SRI LANKA, FOR MONITORING CAPILLARY BLOOD GLUCOSE

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Glucometers are used for self monitoring of blood glucose by diabetic individuals. It is essential for each new generation of glucometer to demonstrate improved accuracy to ensure that health care professionals and patients are able to gain the full benefit from this technology. The aim of this study was to compare the capillary blood glucose concentrations measured by six different glucometers with the serum glucose concentration measured by the standard laboratory method in a group of diabetic patients.

A total of 50 patients were selected. The mean age and body mass index of the patients were 56 ± 8.9 years, and $23.7 \pm 1.5 \text{ Kg m}^{-2}$, respectively. Capillary blood glucose concentration was estimated by the glucometers, 'Accu-Chek Active', 'Gluco Dr', 'Match', 'Isotech', 'FreeStyle Optium H' and 'SensoLite Nova'. The serum glucose concentration was estimated by the enzymatic method. The glucometer readings were also analysed, after stratification of the serum blood glucose values into three groups such as $<180 \text{ mg/dl}$, between $180\text{-}300 \text{ mg/dl}$ and $>300 \text{ mg/dl}$ according to the recommendation of the American Diabetes Association.

The mean capillary blood concentration in mg/dl estimated by glucometers were; 'Accu-Chek Active', 147.6 ± 82.5 ; 'Gluco Dr', 154.2 ± 82 ; 'Match', 146.7 ± 81.5 ; 'Isotech', 153.6 ± 86.7 ; 'FreeStyle Optium H' 159.6 ± 92.9 ; 'SensoLite Nova', 159.2 ± 98.5 . The mean serum glucose concentration was $123.8 \pm 79.5 \text{ mg/dl}$. A significant difference was found between the capillary blood glucose concentration and the serum glucose concentration ($P < 0.05$). However, no significant inter device difference was found. When serum glucose was $>180 \text{ mg/dl}$, there was a greater variance in the capillary measurements. 'Match' and 'Accu-Chek Active' were the most accurate devices in the normal range, 'Accu-Chek Active' and 'FreeStyle Optium H' were most accurate in the higher range. In the severe glycaemic range ($> 300 \text{ mg/dl}$), 'Accu-Chek Active' and 'Gluco Dr' were the most accurate devices. All other devices overestimated the true glucose concentration.

'Accu-Chek Active' showed better performance in the entire glycaemic range, whereas all the other devices showed better performance in the low glycaemic range and tended to be less accurate in the high glycaemic range. However, capillary measurements quite often show more than 20% higher values than serum glucose values, and thus caution should be exercised in interpreting the readings when serum glucose concentrations are elevated.

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