110/A

Glycaemic and insulinaemic responses to three breakfast meals and effects of breakfast meals on a standard lunch meal with type 2 diabetic patients

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Scientific data regarding glycaemic and insulinaemic responses to Sri Lankan meals are useful in dietary management of type 2 diabetic patients. Apart from having an immediate beneficial effect on postprandial glycaemic status, certain meals have shown to influence the subsequent meal as well (second meal effect). Thus, the aim of this study was to determine the glycaemic and insulinaemic responses of type 2 diabetic patients (n=11) to three breakfast meals and to study second meal effect of breakfast meals on a standard lunch meal. Breakfast meals served were 1) chickpea, 2) red rice, lentil curry & coconut sambol and 3) atta *roti.* The standard lunch meal was red rice, lentil curry, boiled egg, and *gotukola* (C*entella asiatica*) sambol. All meals were prepared to contain 25 g available carbohydrate portions. Breakfast meals and the standard meal (white bread) were given on separate mornings after overnight fast (10-12 h) and fasting venous blood samples were taken. Further blood samples were taken at 30, 45, 60, 90, 120, 150 and 180 minutes after consuming breakfast meals. Blood sample at 240 min (4 hours) was taken before lunch was served. After lunch, further blood samples were taken at similar time intervals as before. Incremental area under curve (IAUC) of glucose and insulin responses following breakfast and lunch were calculated separately. Glycaemic index (GI) and insulinaemic index (II) of breakfast meals were calculated.

GI of chickpea, rice and *roti* meals were 40±7, 64±11, and 88±9 respectively. The II of three meals were 76±13, 90±20 and 115±28 respectively. Glycaemic and insulinaemic responses showed a positive linear relationship. Glycaemic and insulinaemic responses of lunch following the *roti* breakfast were lower than that of standard bread, though not significant ($p>0.05$). According to results of this study chickpea and rice breakfast meals can be categorized as low GI foods as was observed with healthy individuals previously. Medium GI was observed for *roti*, however *roti* had a low GI when given to healthy individuals. This could be due to the portion (50 g) served to healthy individuals, as bulk meals are shown to influence the glycaemic response. According to the patients, chickpea breakfast yielded the highest satiety while *roti* the lowest. A glucose response curve with a plateau was observed for the chickpea meal. Thus, two low GI meals can be recommended for diabetic patients. However, none of the breakfast meals produced a second meal effect on the subsequent lunch meal.

Keywords: Glycaemic index, Insulinaemic index, Type 2 diabetic patients, second meal effect

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