Editorial

High Glycaemic Index (GI) of Asian Diet—What are the Clinical Implications?

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Traditional Asian diets are characterised and dominated by high-glycaemic carbohydrates[1,2] with primarily rice as the staple grain. Studies have shown that Asian rice, rice porridge, and glutinous (sticky) rice are extremely high in glycaemic index (GI).[3] Plain rice has a high GI value of approximately 80,[1] which elicits postprandial glucose responses close to that of pure glucose.[3] Because rice and high GI foods are consumed in high amounts, the Asian diet is naturally high in glycaemic load (GL = GI x grams of carbohydrates). Even with rapid modernisation and increase in the intake of fats and protein, carbohydrates still accounted for more than 50% of the total calorie intake in the Asian Chinese populations.[4]

The glycaemic index and glycaemic load reflect the nature of carbohydrates in causing rapid postprandial increase in blood glucose and insulin levels,[5] which have been consistently recognised to contribute to adversely impact a variety of metabolic risk factors. Studies in both animals[6] and humans[5,7] have shown a positive association of a high GI/GL diet with weight gain and obesity. A high GI/GL diet has similarly been shown to be positively associated with higher levels of serum triglycerides, low-density lipoprotein (LDL) cholesterol levels, and serum coagulation factors.[5,8] Hyperinsulinaemia resulting from a high GI/GL diet may stimulate ovarian secretion of androgens, leading to adverse metabolic consequences with increased risk of developing type 2 diabetes in women.[9] Resulting from the above-mentioned mechanisms, a high GI/GL diet has been shown to adversely affect glycaemic control in individuals with diabetes[10] and being associated with greater risk of developing type 2 diabetes,[11] coronary heart disease,[12] and stroke[13] in prospective studies.

Whilst a high-glycaemic Asian diet did not formerly contribute to disease in an active and lean population, such a diet has important implications in the modernising Asian societies characterised by increasing rates of adiposity and sedentary lifestyle particularly in the urban regions.[14,15] This is due to an important biologic synergy in which high GI diet elicits significantly greater adverse risks among overweight and sedentary populations.[15] A significantly stronger effect on the development of type 2 diabetes,[11] coronary heart disease,[12,16] and stroke[13] have been noted among those with greater adiposity (body mass index (BMI) >23 or BMI >25). High GL has also been observed to be more strongly associated with colorectal cancer incidence among those with higher BMI,[17] and high-glycaemic sugar-sweetened beverages more strongly linked with pancreatic cancer among those with low physical activity and/or greater adiposity.[18] This synergistically increased adverse risk has been attributed to the deteriorating state of insulin resistance and glucose control in overweight individuals, who are more susceptible and prone to uncontrolled postprandial hyperglycaemia after glucose challenge from a high-glycaemic meal.[16] Many Asian populations have a higher total and central adiposity for a given body weight when compared with matched white populations.[14] A higher prevalence of metabolic syndrome in South and Southeast Asians is mostly attributed to the higher prevalence of central adiposity with its associated increased visceral fat mass.[14,19] Visceral fat increases the risk of diabetes and hyperlipidaemia by increasing insulin resistance.[20] Evidence from clinical trial indicates that a high GI diet induces a sequence of hormonal and metabolic changes that promote excessive food intake in obese individuals,[21] adding to the vicious cycle with the effect of excess calorie intake, a risk factor for a vast majority of chronic diseases.

With rapid modernisation, populations in many Asian countries have gone on to adopt lifestyle and dietary patterns of the West. The consumption of added sugars, particularly in the form of sugar-sweetened beverages like soda and fruit drinks, are accompanying and compounding the traditional high-glycaemic carbohydrate diet. A comparative analysis of more than 100 countries, indicates that from 1962 to 2000, consumption of added sugars has increased

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globally.[22] High-fructose corn syrup, the primary sweetener found in sugared beverages, has been shown to induce rapid and dramatic spikes in blood glucose and insulin concentrations.[23] Consumption of such high-glycaemic sugar-sweetened beverages has been consistently associated with increased systemic inflammation,[24] weight gain,[25] increased risk of obesity and type 2 diabetes as a result of its high-glycaemic properties.[11]

The recent obesity epidemic in many Asian countries[14] bodes ominously for increased risk of chronic disease by virtue of adiposity itself, but also predicts a rising tide of even greater adverse compounding risk from a high-glycaemic diet.

The high GI staple diet in many Asian countries will become an even greater public health concern as it will compound the adverse effects of increasing adiposity, leading to dramatically increased cardiometabolic risks.[15] There is enormous cost to society from the resultant diabetes and cardiovascular morbidity.[26] These effects will be felt most dramatically in Asian countries with the fastest growing obesity epidemic like China and India.[14] It is imperative that the governments of these affected Asian countries initiate public health programmes urgently to reverse the tide of the emerging obesity epidemic in their countries, thereby to pre-emptively defuse the enormous compounding health risks stemming from the negative convergence of obesity with a high GI Asian diet.[15]

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