V SUMMARY AND CONCLUSION

The rising rates of non-communicable diseases (chronic diseases and their associated metabolic disorders) is due to two factors namely: the demographic change and the increasing prevalence of overconsumption and inactivity associated with the Western lifestyle. These have public health and economic implications and continue to be a matter of great concern. With the world’s population aged 60 years or more increasing at more than three times the overall population growth rate and rising to about 1200 million in 2025, the importance of lifelong health promotion and disease prevention activities that can prevent or delay, the onset and severity of non-communicable diseases and promote healthy ageing should be considered.

This has resulted in continued interest in both diet and lifestyle modifications in prevention and treatment. Carbohydrates are the most important nutrient of our diet, in terms of fulfilling energy requirements and other metabolic functions. Carbohydrate intake has been a fairly neglected area until recently--a surprising fact because carbohydrate accounts for most calories in most diets. Until recently, when the importance of different kinds of carbohydrates, high-fiber, and whole-grain types of carbohydrates, the quality of carbohydrates may need to be considered.

There is increasing evidence that both the amount and type of carbohydrate play an important role in weight management and risk of chronic diseases. Classifying carbohydrates according to their post-prandial glycemic effect (ie, the glycemic index of foods) has yielded more useful insights than the historical distinctions of simple versus complex chemical structure. Diets based on carbohydrate foods that are more slowly digested and absorbed (ie, low glycemic index diets) have been independently linked to reduced risk of type 2 diabetes, cardiovascular disease, and some types of cancer. By definition, the GI compares equal quantities of carbohydrate and provides a measure of carbohydrate quality but not quantity. In 1997 the concept of Glycemic Load(GL) was introduced by researchers at Harvard University to quantify the overall glycemic effect of a portion of food available carbohydrate content in foods, first proposed in 1981.
The methodology for the study was carried out in five phases.

In Phase A, thirty different varieties of test foods namely were tested. A 50-g dextrose anhydrous load was used as the reference. All the test food samples were prepared as per instructions on the packaging or as they are usually prepared for consumption. The portion size of each test food contained 50g available carbohydrate (ACHO) defined as total carbohydrate minus dietary fibre. Sixty healthy volunteers aged between 21 and 60 inclusive with no known medical condition and otherwise who fulfilled the inclusion and exclusion criteria were recruited for the study and all the subjects signed an informed consent form.

Each of the test food samples were tested in minimum 10-12 subjects. The inclusion of at least 10 subjects will provide a reasonable degree of power and precision for measuring GI. The reference food was tested three times and the test food was tested only once. The Incremental area under the curve for test and reference foods were analysed and the GI values were calculated by expressing each subject's AUC of the test food as a percentage of the same subject's mean reference AUC. The mean of the resulting values was the GI of the test food. Glycemic Load(GL) was then calculated.

The GI of the composite meals was calculated using the mixed meal calculation formula.

In Phase B fourteen different varieties of rice were tested for their amylose and amylopectin content using the K-AMYL 07/11 enzyme assay kit. The amylose content was then correlated with the GI values of the rice.

In Phase C, High Resolution Melting (HRM) technology which is a new, post-PCR method that can be used to identify variations in nucleic acid sequences was used in profiling 16 types of rice samples for their GI.

In Phase D involved formulating five low GI healthier food products compared to their market counter parts and testing these products for their Glycemic Index.

A thorough search on the low GI ingredients was carried out using the Sydney University's GI database. In addition to it information on GI of ingredients were sourced from ingredient suppliers/product specifications. The ingredients were purchased from reliable suppliers, with certificate of analysis (COA).
In Phase E knowledge and awareness of glycemic concept was assessed and educational tools on GI were developed. Three different types of questionnaires namely: one for the general public, one for health professionals and another one for food industry representatives were constructed and administered during 2009/10 and 2012/13. Survey conducted among the general public included 2139 participants who were randomly selected to complete the survey. Appropriate evidence based information about GI was delivered in form of print material (pamphlets), booklet, talks, workshops, cooking demonstration and recipe book.

**Findings of the study**

**Phase A**

- A wide range of GI values from moderate to high glycemic index among the foods tested was noted.

- The rice values had a wide range of GI values and certain unpolished varieties like red unpolished rice, brown rice (short grain) were higher in GI. The parboiled basmati rice was lower in GI compared to the polished varieties.

- None of the rice varieties tested in this study had amylose content more than 25%. The basmati rice (Type 3), which had the highest amylose content, fell under the medium GI category.

- The results show that the amylose content of the rice samples had an influence on the GI values, with the exception of parboiled basmati rice.

- The HRM technology is a novel, sensitive, cost-effective, high throughput technique, which can be used as a screening tool to characterise various rice samples, which can be beneficial to farmers, traders and end users.

- All the developed low GI products were well accepted and had potential for commercialization.

- The survey results showed that 73.5% of the respondents were not aware of the low GI concept. This necessitates that the awareness on GI needs to be stepped up.

- Educational tools on GI such as pamphlet, booklet, composite/mixed meal recipes compiled into a recipe book were well received by the target group.
Cooking demonstration sessions on low GI recipes, talks and workshops were proved to increase the awareness.

**Conclusion**

Rice is the most important staple in Asian countries and when there is an uprise in the lifestyle disorders experienced by population groups in the present day, the type and amount of carbohydrates needs to be assessed in the rice varieties and the present study was focused in this line enabling the determination of GI of the staple foods and develop low GI products. Creating an awareness on the importance of glycemic control amongst the general population will assist them in making small adjustments in their regular meal plan which will provide sustainable measures in supporting a healthy lifestyle. The health implications of GI of various foods will help in promotion of informed food choices and thereby aid in the primary prevention of chronic diseases.