

Brief communication

White rice eaters in Asian countries and increased risk of development type-2 diabetes mellitus: Facts to ponder

Das S¹, Thent Z C²

The global incidence of type-2 diabetes mellitus (T2DM) is increasing. According to the International Diabetes Federation, approximately 382 million individuals suffer from diabetes worldwide and by the year 2035, it is predicted that around 592 million would be affected globally.¹

There is a continuous debate on the association between white rice consumption and increased risk of development of T2DM. More than 90% of rice is produced and consumed by Asians.² In the 1960s, the success of the 'Green Revolution' resulted in a steady increase in Asia's per capita rice consumption. The consumption in 1960s was approximately 85 kg and it increased up to 100 kg by the year 2010 whereas the global per capita consumption increased from 50 to 65 kg during the same period.² According to reports, the increase in per capita consumption in combination with the increase in the population resulted in almost tripling of the total rice eaters in Asia during this same period and it rose from 150 to 450 million t (milled rice equivalent). The global rice consumption is expected to increase further from 439 million t (milled rice) in 2010 to 555 million t in 2035 and Asia is predicted to account for 67% of the total increase.²

It cannot be forgotten that white rice is a staple diet for many individuals in Asia. T2DM is very common in many Asian countries and very soon it may become pandemic. Scientific studies suggest that consumption of white rice may also lead to development of T2DM. Also, micronutrient deficiencies are quite common in rice eating Asian population. Throughout the world, billions of individuals are affected by micronutrient deficiency. The fact to ponder is that we have to think for proper measures for all individuals from developing countries who consume white rice and are continuously exposed to the risk of developing T2DM.

Interestingly, it has been described that consumption of refined grains is responsible for the rise in risk of diabetes.³ Majority of white rice consumed throughout the world is processed by milling. Milling removes the outer covering of rice. Processed white rice is deficient in fibres, vitamins, minerals and possesses high glycaemic index. While processing brown rice to white rice, its outer covering is removed and this results in loss of many essential vitamins and minerals. Even different cultural preferences like boiling of rice and cooking it in different styles may result in loss of minerals and vitamins. Brown rice with its intact germ and bran layer may possess less glycaemic index and thereby prove to be beneficial. During recent years, many research studies have been performed on brown rice to justify its beneficial effects.

A better method to process the rice is by parboiling method. If the process of parboiling is done, then there is a possibility that many vitamins and minerals may be preserved but parboiling process may involve high expenditure which many developing nations may not be able to bear.

Bangladesh Journal of Medical Science Vol. 15 No. 04 October'16

1. Srijit Das, Department of Anatomy, 18th Floor, Pre-Clinical Block, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000, Cheras, Kuala Lumpur, E-mail: drsrijit@gmail.com
2. Zar Chi Thent, Anatomy Unit, Faculty of Medicine, Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia

Corresponds to:

Srijit Das, Department of Anatomy, 18th Floor, Pre-Clinical Block, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000, Cheras, Kuala Lumpur, E-mail: drsrijit@gmail.com

Parboiling may not be common practice everywhere. In few regions, rice was even mixed with minerals before being consumed.

Stress is a major concern in any developing nation. Stressful conditions in the body lead to acidic state. Increase in the acidic content in the body is known to predispose to dreaded diseases such as cancers and diabetes. Following consumption of white rice, it may be broken down to sugar and this causes the immediate spike in the blood sugar level. It may not be forgotten that cooked white rice is always acidic. Human saliva is slightly alkaline with a pH of 7.35-7.4. The resultant reaction of mixing white rice and human saliva may result in further aggravation of the acidic state. It is strange that no research studies have been performed to date to observe the consumption of white rice and its resultant reaction with saliva. Interestingly, in future studies, the activity of the starch digesting enzyme amylase present in the saliva, also needs to be evaluated in different age groups. These individuals may be warned beforehand on the consequences arising due to consumption of white rice.

It is noteworthy to mention the recommendations of wheat and maize flour fortification recommended by World Health organization (WHO). WHO/CDC logic model for micronutrient interventions in public health describes the programme theory and defines the probable relationship that exist between inputs and expected improvements in Millennium Development Goals (MDGs) and this may be adapted to different

circumstances.⁴ In fact, WHO has also stressed on fortification of food as a step towards public health improvement. As per WHO recommendation, rice can be even fortified by adding micronutrient powder which may adhere to its outer covering or even sprayed on the surface of the rice grains.

It depends on individual countries how they formulate their own health policies and programmes to employ the process of fortification of food products. Rice fortification programme may also depend on the infrastructure, amount of demand and supply, quality, existing food quality programmes and the education level of the community. Greater role of the administration and health planners are required in Asian countries. A major step in rice fortification was taken in a conference hosted in September 2014 in Bangkok where 200 experts drawn from nine major countries met under the aegis of World Food Programme.⁵ Such an approach is praiseworthy but it needs the participation of other developing nations, as well.

We would suggest greater involvement of all health care personnel, administrators, experts in food and technology and research scientists in any rice fortification programme in developing countries.

Conflict of interest: None declared

Disclosure: None of the authors have any conflict of interest to declare. No funding was received from any organization.

There are no competing interests to declare.

References:

1. International Diabetes Federation. 2013. IDF diabetes atlas. 6th ed. Brussels, Belgium: *International Diabetes Federation*.
 2. <http://ricepedia.org/rice-around-the-world/asia>. Accessed on 14 July, 2015
 3. Hu EA, Pan A, Malik V, Sun Q. White rice consumption and risk of type 2 diabetes: meta-analysis and systematic review. *BMJ* 2012;**344**:e1454.doi <http://dx.doi.org/10.1136/bmj.e1454>
 4. World Health Organization, Centers for Disease Control and Prevention. Logic model for micronutrient interventions in public health. Vitamin and Mineral Nutrition Information System. Geneva: *World Health Organization*, 2011. (WHO/NMH/NHD/MNM/11.5) (<http://www.who.int/vmnis/toolkit/WHOCDC-english-colour.pdf>, accessed 14 July 2015).
 5. http://www.who.int/elena/titles/rice_fortification/en/ Accessed on 14 July, 2015.
-