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High Carbohydrates Intake Toxicity

Assignment 2 Essay

Carbohydrates are a fundamental component of the human diet, crucial in providing energy. They are present in foods like grains, fruits, vegetables, and dairy products and are integral to nutritional intake worldwide. However, contemporary dietary patterns, often characterised by excessive intake of processed and high-carbohydrate foods, have raised concerns regarding the health risks associated with high carbohydrate consumption. This essay critically examines the implications of consuming high carbohydrate intake (over 100 grams per day), exploring its metabolic effects and the associated health risks, thus providing a comprehensive understanding of its potential toxicity in human health.

The metabolism of carbohydrates is central to human physiology. Upon ingestion, carbohydrates are broken down into simpler sugars like glucose, which might be used as a primary energy source and as a metabolic process intricately linked with insulin, a hormone regulating blood glucose levels. However, excessive carbohydrate intake can lead to sustained elevation of blood glucose levels, known as hyperglycemia, necessitating increased insulin production and potentially leading to insulin resistance [IR], a precursor to type 2 diabetes (Taylor, R. 2012).

IR is a significant health concern, increases the risk of diabetes and contributes to metabolic syndrome, encompassing conditions like hypertension, dyslipidemia, and increased cardiovascular disease risk (Cho, Y. -A. and Choi, J. -H. 2021)). Furthermore, high carbohydrate diets, particularly those rich in refined sugars, are implicated in obesity development. Excess carbohydrates are stored as fat, contributing to weight gain and exacerbating metabolic disorders (Sartorius, K. *et al.* , 2018).

The immediate effects of high carbohydrate consumption include energy spikes and crashes, affecting overall well-being. A diet high in simple carbohydrates, like sugar, can rapidly increase blood glucose, providing short-lived energy bursts followed by fatigue and hunger (Christensen, L. 1997). The pattern of unstable blood sugar levels can disrupt appetite regulation, leading to overeating and weight gain. Additionally, high carbohydrate intake can affect mental health, contributing to mood swings and reduced cognitive performance (Thornley, S. , Russell, B. and Kydd, R. 2023).

Furthermore, a diet high in simple carbohydrates can disrupt gut health. Excessive sugar intake can alter the balance of gut microbiota, leading to issues like bloating, gas, and changed bowel habits. These gastrointestinal disturbances can impact nutrient absorption and

overall digestive health (Zhang, Y. *et al.* , 2020). Additionally, high carbohydrate intake, especially from sugary foods, is linked to an increased risk of dental problems, including tooth decay and gum disease (Atkinson, F. S. *et al.* , 2021).

In the context of mental health, diets rich in high-glycemic carbohydrates can lead to fluctuations in mood and energy, which can exacerbate feelings of anxiety and depression and impact cognitive functions like memory and attention (Chong, C. P. *et al.* , 2019). The immediate effects of high carbohydrate intake, particularly sugars, on mental well-being are an area of growing research interest, emphasising the importance of dietary balance for mental health (Firth, J. *et al.* , 2020).

Long-term health risks of excessive carbohydrate intake include chronic diseases such as obesity, type 2 diabetes, and heart disease. The relationship between high carbohydrate diets and obesity is well-established, with overconsumption leading to an imbalance in energy homeostasis (Merchant, A. T. *et al.* , 2009). The risk of developing type 2 diabetes is also heightened, as prolonged high carbohydrate intake can impair insulin sensitivity (Gadgil, M. D. *et al.* , 2012). Moreover, diets high in refined carbohydrates are linked to an increased risk of cardiovascular diseases, primarily through mechanisms involving dyslipidemia and hypertension (Jo, U. and Park, K. 2023).

Another critical long-term risk involves cognitive health (Hanson, N. 2012). Emerging research indicates that diets high in sugar and refined carbohydrates may increase the risk of cognitive decline and dementia. High sugar intake is suspected to contribute to the development of Alzheimer's disease, often referred to as 'type 3 diabetes', due to its link with IR in the brain (Nguyen, T. T. *et al.* , 2020).

The impact on cardiovascular health extends beyond the well-known risks of hypertension and dyslipidemia. Chronic high carbohydrate intake, particularly sugars, can lead to an increased risk of developing heart failure. The metabolic strain imposed by constant high sugar levels can lead to cardiac muscle dysfunction and, eventually, heart failure (Jia, G. , Hill, M. A. and Sowers, J. R. 2018).

Beyond the risks of obesity and diabetes, long-term excessive carbohydrate intake, especially from refined sources, is associated with an increased risk of certain cancers. Studies have shown a correlation between high glycemic diets and the risk of colorectal and breast cancers (Maino-Vieytes, C. A. *et al.* , 2019). Cancer risk is attributed to the

inflammation and IR prompted by high sugar levels, creating an environment conducive to cancer cell growth.

While highlighting the risks of high carbohydrate intake, it's essential to consider counter-arguments as carbohydrates are common in our diet, providing energy and supporting bodily functions. The type of carbohydrate consumed also matters; complex carbohydrates found in whole grains, fruits, and vegetables are healthier than refined sugars (Malik, V. 2019). Therefore, a nuanced understanding of carbohydrate types and their differential effects on health is crucial.

This essay has examined the potential toxicity of consuming carbohydrates daily. While carbohydrates are an essential energy source, excessive intake of significantly refined carbohydrates is associated with various health risks, including IR, obesity, and cardiovascular diseases. Maintaining a balanced carbohydrate intake is critical, emphasising whole grains, fruits, and vegetables over processed foods. Future research should focus on understanding the differential impacts of various carbohydrate types on human health and developing comprehensive dietary guidelines. Therefore, it is critical for public health recommendations to emphasise not only the quantity but also the quality of carbohydrate intake. In light of the explored evidence, it is evident that the consumption of over 100 grams of carbohydrates daily, especially from refined sources, poses significant long-term health risks. These risks span a range of severe conditions, from metabolic syndromes like obesity and diabetes to increased risks of cancer, cognitive decline, and heart failure.

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