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Sleep and Nutrition

Two essential factors to health and survival are sleep and nutrition. Nutrition provides our bodies with daily energy from the nutrients and compounds in the foods we eat, but what we eat during the day ultimately affects how we shut down at night. Your body needs all the nutrients to function properly—carbohydrates, protein, fat, vitamins, minerals, and water. The best way to get essential nutrients is having a well-balanced diet. An acute deficiency or surplus of even one nutrient will negatively affect your body's ability to function in the short term. Research studies have found that an over-intake or under-intake of particular nutrients have a correlation with the quality of sleep.

Epidemiological and laboratory studies have shown that short sleep intervals have a connection with greater risks for metabolic disruption. This includes decreased leptin, increased ghrelin, impaired insulin resistance, impaired glucose tolerance, and increased body mass index. According to Dr. Michael Grandner, the director of the sleep and health research program at the University of Arizona, it can be conceived that “short sleep causes high fat intake which then causes increased BMI, but it is also conceivable that high fat intake causes both short sleep and high BMI. It is also possible that short sleep affects leptin and ghrelin, which alters appetite and satiety” (Grandner, 2010). Evidence gathered in Grandner's research suggests that sleep is associated with synthesis of macromolecules. It is likely that a high consumption of exogenous fats does not entail synthesis of lipid and cholesterol macromolecules—which would subside a signal for sleep (Grandner, 2010).

Dr. Jean-Philippe Chaput, an expert in Nutrition and Dietetics, highlights that inadequate sleep is correlated with increased caloric consumption, substandard dietary habits, and obesity: “There is increasing evidence showing that sleep has an influence on eating behaviors. Short sleep duration, poor sleep quality, and later bedtimes are all associated with increased food intake, poor diet quality, and excess body weight. Insufficient sleep seems to facilitate the ingestion of calories when exposed to the modern obesogenic environment of readily accessible food” (Chaput, 2014). Insufficient sleep has also been shown to increase snacking and the number of meals that are consumed daily. Katri Peuhkuri, an expert in Food Science, Nutrition and Dietetics at University of Helsinki, postulates that the reasoning behind an increased food intake is to provide energy needed to sustain further wakefulness.

Past studies suggest that people who sleep less than 6 hours per night gain nearly double the amount of weight over a period of 6 years as people who sleep 7 to 8 hours per night. In a 2005 study with a sample of 10,000 adults, it was proposed that the obesity epidemic in the United States may partially be caused by a consistent decrease in the average number of sleep hours. Dr. Karine Spiegel of French Institute of Health and Medical Research claims, “Sleep loss due to voluntary bedtime curtailment has become a hallmark of modern society... Chronic sleep loss, [whether] behavioral or sleep disorder related, may represent a novel risk factor for weight gain, insulin resistance, and Type 2 diabetes” (Spiegel, 1999).

Evidence demonstrating that sleep is influential on dietary choices has been increasing. Studies involving large groups of people, as well as epidemiologic studies, have exhibited that individuals lacking adequate sleep are more prone to consuming energy-rich foods (i.e., refined carbohydrates or fats), fewer servings of fruits and vegetables, less energy-rich foods, and are

subject to having more irregular meal patterns (Peuhkuri et al., 2012). On the other hand, adequate sleep is positively connected with implementing a healthy diet. These connections have been present in children, adolescents, and adults (Grandner, 2010). Sleep physiologist Dr. Rachel Markwald notes, “[Researchers] observed that transitioning from an insufficient to adequate/recovery sleep schedule decreased energy intake, especially the intake of fats and carbohydrates, and led to weight loss” (Markwald et al., 2013).

Sleep disruption can be caused by many internal and external factors. Katri Peuhkuri, an expert in Food Science, Nutrition and Dietetics at University of Helsinki, claims that deficiencies of group B vitamins and minerals may interrupt sleep. She states that, “Their effect seems to be based on their influence on the secretion of melatonin” (Peuhkuri et al., 2012). Melatonin is a sleep-inducing hormone that is naturally secreted by the pineal gland—primarily at night. In studies conducted by researchers Dr. Armagan Altun (head of cardiology department at Trakya University medical school) and Dr. Ingeborg van Geijlswijk (a hospital pharmacist at Utrecht University), it was founded that pharmacological doses of melatonin aid in stimulating and upholding sleep in children and adults with standard sleep patterns and those who have insomnia. Your body needs an abundant quantity of group B vitamins in order to absorb and convert melatonin. Based on evidence, it can be concluded that nutritional deficiencies, such as group B vitamins and minerals, have the ability to impair sleep.

To maintain a normal sleep rhythm, a normal eating rhythm must be maintained. The reasoning for this is the human body’s cortisol rhythm. Dr. Anna Lebidzińska, a researcher for the Department of Food Sciences at Medical University of Gdańsk, says that a normal cortisol rhythm is “a key to better sleep” (Lebidzińska et al., 2016). Cortisol is a steroid hormone

produced by the adrenal glands that aids in the regulation of numerous body processes. Some of these processes include energy production, metabolism, muscle strength, and metabolism. Cortisol plays a vital function in helping the body respond to stress and is a primary element in how revitalizing sleep will be. Dr. Lebedzińska also correlated cortisol levels to food glycemic index. Cortisol levels are quick to respond to our food intake daily. Dr. David Ludwig, a practicing endocrinologist and researcher at Boston Children's Hospital, states that the glycemic index is a system for classifying carbohydrate-containing foods according to how they affect our blood glucose levels (Ludwig, 2002). Foods that contain a high amount of sugar and a low amount of fiber have a high glycemic index, thus resulting in broader fluxes in insulin levels compared to foods with a low glycemic index (Lebedzińska et al., 2016). In other words, carbohydrates classified with a low glycemic index take a longer time to be digested, absorbed, and metabolized. This results in a slower and lower upsurge in blood glucose and consequently insulin levels. Although consuming a high glycemic meal is not good, having no meal at all is worse. Within five hours of not eating after a previous meal or snack was consumed, the cortisol level tends to increase; “A rise above the normal range during the day almost guarantees that the nighttime cortisol will be high and thus disrupt REM sleep” (Lebedzińska et al., 2016). Called rapid eye movement, REM sleep is a recurring sleep stage in which your eyes rapidly move back and forth, vivid dreams are more prevalent, and body movements occur. Thus, skipping a meal, eating a meal late, and/or consuming a meal with a high glycemic index during the day can consequence in a high cortisol level at night. When your cortisol level is higher than it should be during the night, there is an interference of REM sleep—hence, a non-rejuvenated sleep.

Finding a suitable sleeping strategy must be a part of one's healthy living and nutrition routine. Consistent habits of good sleepers include an adequate intake of calories per day, eating a

balanced variety of foods (such as fresh fruits, vegetables, lean proteins and grains), staying hydrated with water, and keeping fats in moderation. Knowing what foods to avoid during the evening and eating the right combination of foods before powering off for the night can be helpful with sleep enhancement. By doing so, there is a much better chance of getting necessary vitamins, minerals, and antioxidants that aid in promoting general health and a good night's worth of sleep.

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