

The Impact of Dietary Intake on Work Time and Productivity: A Comprehensive Review

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ABSTRACT

Nutrition plays a pivotal role in determining labour efficiency and overall productivity, directly influencing both physical and cognitive capacities essential for optimal work performance. This review x-rayed the complex relationship between dietary intake and work performance, highlighting the mechanisms by which nutritional status affects physical capacity, cognitive function, and resilience to workplace stress. It delves into specific workplace dietary patterns, such as the consumption of energy-dense, nutrient-poor foods, and examines how deficiencies in essential nutrients like vitamins, minerals, and omega-3 fatty acids can impair cognitive abilities, reduce concentration, and hinder decision-making processes. Additionally, the review addresses the impact of nutrition-related chronic diseases; including obesity, diabetes, and cardiovascular conditions on absenteeism, presenteeism, and reduced productivity. It integrates current research to emphasize the crucial role of balanced diets in maintaining energy levels, improving mental clarity, and enhancing physical endurance, which are all critical for sustained work efficiency. The review also discusses barriers to achieving optimal nutrition in the workplace, such as time constraints, limited access to healthy foods, and a lack of nutrition education, and suggests practical recommendations to promote healthier dietary habits among employees. By highlighting the critical link between nutrition and productivity, this review emphasises the need for targeted interventions, such as workplace nutrition programs, that can foster healthier eating behaviours, reduce the incidence of nutrition-related diseases, and ultimately maximize workforce productivity.

Keywords: Nutrition, Productivity, Cognitive function, Dietary patterns, Chronic diseases.

INTRODUCTION

Nutrition is a fundamental determinant of work performance, directly influencing both physical and

cognitive capacities. The science that studies the physiological process of nutrition is called nutritional science. Human nutrition is the process by which

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substances in food are transformed into body tissues and provide energy for the full range of physical and mental activities that make up human life (Carpenter *et al.*, 2021). As workplaces evolve within a competitive global economy, maintaining a healthy and productive workforce is becoming increasingly critical for organizations striving for excellence (McKinsey Health Institute and World Economic Forum, 2025). The quality of an individual's diet affects energy levels, concentration, endurance, and overall job performance, making nutrition a cornerstone of human capital development (Salim and Basrowi, 2024). A well-nourished workforce demonstrates lower absenteeism, enhanced cognitive function, better physical stamina, and improved resilience against work-related stress.

While the detrimental effects of malnutrition on work capacity have long been established manifesting in conditions like anaemia, muscle wasting, and decreased immunity recent studies reveal that even subtle variations in daily dietary choices can have profound impacts on productivity and performance (Hoddinott *et al.*, 2021). For instance, inadequate intake of essential nutrients can impair cognitive function, reduce attention span, and diminish decision-making abilities, while poor dietary patterns can lead to chronic conditions such as obesity, diabetes, and cardiovascular diseases, further affecting work capacity (Sarwar *et al.*, 2015).

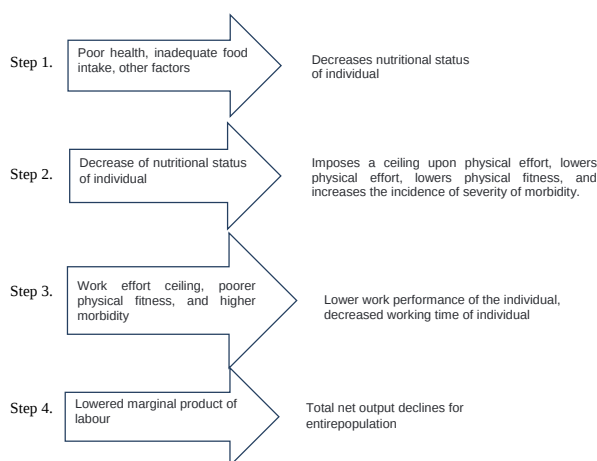


Figure 1: Relationship between Nutrition and Productivity

This review explores the intricate relationship between nutrition and work performance, highlighting how balanced diets not only prevent disease but also optimize physical and mental function (Crichton *et al.*, 2016). Additionally, it addresses the various barriers that workers face in achieving optimal nutritional status, including time constraints, access to healthy food options, and workplace culture. These dynamics highlights the importance of

targeted interventions, such as workplace nutrition programmes, that can foster healthier dietary habits and ultimately enhance productivity. Nutrition has a role to play in performance enhancement (performance enhancement means improving any form of activity in humans). The relationship between nutrition and productivity is diagrammatically (Figure 1) represented above as described by Popkin (1978). According to Popkin (1978); Rachma *et al.* (2021). Nutritional status can affect productivity mainly through its impact on the amount of productive labour time, the intensity of work, and the productive value of the work activities selected. The productivity or intensity of work in each hour or short time period improves as nutritional status improves.

The Role of Nutrition in Physical and Cognitive Performance

Nutrition and Physical Performance

Macronutrients such as carbohydrates, proteins, and fats are crucial for maintaining physical health and work performance. Carbohydrates are the primary energy source for physical activity, stored as glycogen in muscles and liver (Reynolds *et al.*, 2019; Vargas-Garcia *et al.*, 2017; García-Sánchez *et al.*, 2020). Inadequate carbohydrate intake can lead to early fatigue and reduced performance. Proteins are essential for muscle repair and growth, with deficiencies impairing muscle function and recovery (Hoddinott *et al.*, 2021). Fats, although often viewed negatively, provide concentrated energy and support the absorption of fat-soluble vitamins (Vargas-Garcia *et al.*, 2017; García-Sánchez *et al.*, 2020). Hydration is also vital; dehydration impairs physical performance, reducing strength, endurance, and coordination (McDonnell, 2017). Adequate fluid intake is particularly important for those engaged in physically demanding jobs.

Nutrition and Cognitive Performance

Nutrition plays a critical role in maintaining cognitive function, directly influencing memory, attention, problem-solving, and decision-making skills (Penchyna, 2024). The brain, as an energy-intensive organ, relies on a steady supply of glucose to function optimally (Fioramonti and Pénicaud, 2019). Rapid fluctuations in blood glucose levels, often caused by diets high in refined carbohydrates and sugars, can lead to brain fog, reduced concentration, and impaired decision-making (Davidson *et al.*, 2022). Consistent energy levels and stable glucose supply are necessary for sustaining mental alertness and cognitive performance throughout the workday.

Omega-3 fatty acids, particularly those found in fatty fish like salmon, mackerel, and plant oils such as flaxseed, are essential for brain health (Harvard T.H. Chan School of Public Health, 2025). These fats help maintain the structural integrity of brain cell membranes and promote

neuroplasticity, which is crucial for learning and memory (Goyena *et al.*, 2024). Essential micronutrients, including B vitamins, vitamin D, iron, and zinc, further support cognitive functions. B vitamins, for instance, aid in neurotransmitter synthesis and nerve function, while vitamin D and zinc play roles in cognitive processing and memory retention. Iron is crucial for oxygen transport to the brain, and deficiencies can lead to fatigue, poor concentration, and decreased productivity (Pacheco *et al.*, 2020; Davidson *et al.*, 2022).

A diet rich in whole grains, lean proteins, healthy fats, and a variety of fruits and vegetables can provide the nutrients necessary to optimize brain health and cognitive performance. Consequently, ensuring a balanced nutritional intake is fundamental for maintaining high levels of productivity, especially in cognitively demanding work environments (Drewnowski, 2019).

The Impact of Poor Nutrition on Work Productivity

Effects of Malnutrition on Physical Capacity

Malnutrition, encompassing both under-nutrition and over-nutrition, has profound effects on physical capacity and work productivity. Under nutrition, characterized by inadequate intake of essential nutrients, results in muscle wasting, weakened immune function, and increased susceptibility to infections (Morale *et al.*, 2023). These conditions lead to chronic fatigue, reduced physical endurance, and overall diminished work performance (Popkin, 1978). On the other hand, over nutrition, marked by excessive calorie consumption and high intake of unhealthy fats, leads to obesity and associated health complications such as type 2 diabetes and cardiovascular disease (Hruby and Hu, 2015; WHO, 2021). These conditions contribute to impaired physical mobility, increased fatigue, and reduced work efficiency. Obesity not only affects physical stamina but also increases the risk of joint problems and cardiovascular strain, further limiting physical capacity (Cahill, 2014). Addressing both under-nutrition and over-nutrition is essential for maintaining optimal physical health and maximizing work productivity.

Effects of Poor Nutrition on Cognitive Function

Poor nutrition can significantly impair cognitive function, leading to noticeable fluctuations in energy levels and concentration. Diets high in refined carbohydrates and sugars cause rapid changes in blood glucose levels, which can disrupt brain function and cognitive performance (Guillou *et al.*, 2023). This instability often results in reduced attention span, memory issues, and overall diminished cognitive abilities (Davidson *et al.*, 2022). Furthermore, deficiencies in critical nutrients, such as omega-3 fatty acids, essential vitamins, and minerals, are linked to cognitive decline and increased mental fatigue. These deficiencies undermine brain health by impairing

neurotransmitter function, reducing neural plasticity, and exacerbating oxidative stress, all of which contribute to decreased cognitive performance and productivity (Goyena *et al.*, 2024). Ensuring a well-balanced diet rich in essential nutrients is therefore crucial for maintaining optimal cognitive function and enhancing workplace productivity.

Nutrition and Work-Related Diseases

Proper nutrition plays a crucial role in preventing work-related diseases, which can significantly impact productivity. Diets rich in antioxidants, including vitamins C and E, are particularly beneficial in reducing oxidative stress and inflammation (Vargas-Garcia *et al.*, 2017). These antioxidants help combat cellular damage and lower the risk of chronic diseases such as cardiovascular disease, diabetes, and cancer (García-Sánchez *et al.*, 2020). On the other hand, diets high in processed foods and unhealthy fats contribute to increased oxidative stress and inflammation, exacerbating the risk of chronic conditions. The resultant health issues, including obesity, hypertension, and metabolic syndrome, can lead to higher rates of absenteeism and presenteeism, further reducing overall workplace productivity (Pacheco *et al.*, 2020). Ye *et al.* (2022) therefore suggest that, adopting a balanced diet that emphasizes nutrient-dense foods and minimizes the intake of processed items can enhance employees' health, reduce the incidence of work-related illnesses, and ultimately improve productivity and job performance.

Workplace Dietary Patterns and Their Impact on Productivity

Common Workplace Diets

Common dietary patterns in workplace settings frequently revolve around convenience foods that are high in calories, unhealthy fats, and sugars. Typical examples include fried foods, processed snacks, and sugary beverages. These dietary choices are often driven by the demands of a busy workday, where quick and easily accessible options take precedence (Gupta *et al.*, 2019). Unfortunately, such diets are linked to a host of health problems, including obesity, cardiovascular disease, and type 2 diabetes (Cahill, 2014). The consumption of high-fat and high-sugar foods contributes to weight gain and metabolic syndrome, which in turn negatively impacts physical health and cognitive function. Poor dietary habits can lead to decreased energy levels, reduced concentration, and diminished work productivity (Laraia *et al.*, 2017). Improving workplace nutrition by offering healthier food options and promoting balanced diets can enhance overall worker well-being and performance, leading to more sustainable productivity gains.

Sugar-Sweetened Beverages (SSBs)

Sugar-sweetened beverages (SSBs), including soft drinks, energy drinks, and flavoured coffees, are significant contributors to excessive caloric intake and are linked to a range of health issues such as obesity, type 2 diabetes, and cardiovascular disease (Terry *et al.*, 2022). These beverages are often high in added sugars, which lead to rapid spikes in blood glucose levels followed by abrupt crashes (Vargas-Garcia *et al.*, 2017). Such fluctuations can cause fatigue, decreased alertness, and impaired cognitive function (Crichton *et al.*, 2016), directly affecting work performance and productivity (Pacheco *et al.*, 2020; Janzi *et al.*, 2024; Goyena *et al.*, 2024). Additionally, the high caloric density of SSBs contributes to weight gain and obesity, which are associated with decreased physical capacity and increased risk of chronic diseases (Sweet, 2019; Davidson *et al.*, 2022). Reducing SSB consumption and replacing them with healthier alternatives, like water or unsweetened beverages, can help stabilize energy levels and improve overall work performance (Vargas-Garcia *et al.*, 2017).

Snacking Habits

Snacking habits play a crucial role in influencing productivity throughout the workday. Healthy snacks, such as fruits, nuts, and whole grains, offer a steady supply of energy and essential nutrients that support sustained cognitive function and physical performance. They help stabilize blood sugar levels, prevent energy crashes, and maintain focus and alertness (Schwartz *et al.*, 2020; Rao *et al.*, 2024). Conversely, unhealthy snacks high in refined sugars, trans fats, and artificial additives can lead to rapid spikes and subsequent crashes in energy levels, impairing concentration and overall productivity (Chae, 2023). These unhealthy options not only contribute to short-term fatigue but also long-term health issues like weight gain and metabolic disorders. Incorporating mindful eating practices, such as planning and choosing nutritious snacks, can significantly enhance snack quality and overall health. Making conscious decisions about snack choices, individuals can improve their energy levels, cognitive function, and work performance (GERDHelp Team, 2025).

The Relationship between Nutritional Status and Absenteeism

Nutritional Deficiencies

Nutritional deficiencies can profoundly impact both health and workplace productivity (Drake WellbeingHub, 2024). Deficiencies in key nutrients often result in a range of health problems that contribute to increased absenteeism and reduced work performance. For instance, iron deficiency can lead to anaemia, which manifests as fatigue, decreased cognitive function, and diminished

physical capacity, all of which directly impair productivity (Beard and Garenne, 2022). Similarly, deficiencies in essential vitamins, such as Vitamin C and Vitamin D, compromise immune function, making individuals more susceptible to infections and illnesses (Carr and Maggini, 2017). This weakened immune response not only increases the likelihood of absenteeism but also affects overall energy levels and work efficiency (Calder, 2020). Addressing these deficiencies through a balanced diet rich in essential nutrients is crucial for maintaining optimal health and enhancing workplace productivity. By ensuring adequate intake of these vital nutrients, individuals can reduce their risk of health issues and improve their ability to perform effectively in their roles.

Chronic Diseases

Chronic diseases, including diabetes and cardiovascular conditions, are closely linked to poor nutrition and have a significant impact on workplace absenteeism and productivity (Fitzgerald *et al.*, 2016). These conditions often result from dietary patterns high in refined sugars, unhealthy fats, and excessive calories, which contribute to systemic inflammation and metabolic dysfunction (Colberg *et al.*, 2016; Smith *et al.*, 2019). Individuals suffering from these chronic illnesses may experience frequent health complications, requiring more sick leave and resulting in decreased work efficiency. Moreover, the long-term management of such diseases often involves complex treatments and lifestyle adjustments, further straining personal and professional productivity. Improving nutritional practices, such as adopting a balanced diet rich in whole foods, fibre, and essential nutrients, can play a crucial role in preventing and managing these chronic conditions (Alyafei and Daley, 2025). Addressing the root causes through better nutrition, organizations can mitigate the adverse effects of these diseases, leading to reduced absenteeism, improved health outcomes, and enhanced overall productivity.

Workplace Nutrition Programmes and Their Effectiveness

Types of Programmes

Workplace nutrition programs encompass a variety of strategies designed to improve employee health and productivity. Key components of these programs include nutrition education, access to healthy food options, and weight management initiatives. Nutrition education, delivered through workshops, seminars, or digital platforms, provides employees with essential knowledge about balanced diets, portion control, and the benefits of healthy eating, empowering them to make informed dietary choices (Thorndike *et al.*, 2014). Healthy food options, such as nutritious snacks and meals available in workplace cafeterias or vending machines, encourage employees to opt for more wholesome choices, reducing

the intake of unhealthy fats, sugars, and processed foods (Rosmiati *et al.*, 2025). Weight management initiatives, often featuring personalized coaching, physical activity sessions, and dietary guidance, support employees in achieving and maintaining a healthy weight, thus enhancing their physical well-being and productivity (Belo *et al.*, 2024). Together, these programmes create a comprehensive approach to fostering a healthier workforce, reducing absenteeism, and promoting overall productivity.

Impact on Productivity

Effective workplace nutrition programs have a substantial impact on employee productivity by promoting better health outcomes, reducing absenteeism, and enhancing job performance (Goetzel *et al.*, 2020; Aldana *et al.*, 2022; Juba, 2024). These programmes foster improved cognitive function by ensuring employees receive adequate nutrients that support brain health, such as omega-3 fatty acids, vitamins, and minerals, leading to sharper focus, quicker decision-making, and enhanced problem-solving skills. Additionally, proper nutrition helps in mood regulation by stabilizing blood sugar levels and reducing the risk of mood swings and energy crashes, which can adversely affect concentration and efficiency (Jacka *et al.*, 2017). Workplace nutrition programmes also help mitigate chronic diseases like obesity, diabetes, and cardiovascular conditions, reducing health-related absenteeism and presenteeism (Below *et al.*, 2024); when employees are present at work but not fully functioning due to health issues. By addressing both physical and mental well-being, these programmes create a healthier workforce that is more engaged, motivated, and capable of sustaining high levels of productivity over time. This, in turn, translates to increased organizational efficiency and overall business success.

Barriers to Proper Nutrition in the Workplace

Time Constraints

Time constraints, such as irregular work schedules, long hours, and fast-paced environments, often hinder employees from preparing or consuming balanced meals (Escoto *et al.*, 2012). These challenges lead many workers to skip meals or rely on convenience foods that are typically high in unhealthy fats, sugars, and refined carbohydrates, which can negatively impact energy levels and productivity (Kearney *et al.*, 2015; Tanaka *et al.*, 2018). Irregular eating patterns, in turn, can cause fluctuations in blood sugar levels, resulting in reduced concentration, fatigue, and decreased cognitive function, ultimately affecting work performance. To combat these issues, employers can implement strategies that make it easier for employees to maintain a nutritious diet despite time constraints (Chiong *et al.*, 2024). Offering flexible meal breaks, providing access to healthy snacks, and

promoting a workplace culture that values nutrition and self-care are effective measures. Through supporting proper nutrition through these means, companies can foster a healthier workforce, improve morale, and enhance overall productivity, even in high-pressure environments (Hyzy *et al.*, 2024).

Limited Access to Healthy Foods

Limited access to healthy food options, often due to residing in "food deserts," poses a significant barrier to proper nutrition for many employees (Vilar-Compte *et al.*, 2021). Food deserts are areas where affordable, nutritious food is scarce, often forcing individuals to rely on fast food or convenience store options that are high in unhealthy fats, sugars, and sodium (Walker *et al.*, 2010). This lack of access can lead to poor dietary habits, contributing to chronic health conditions such as obesity, diabetes, and heart disease, which can, in turn, affect workplace productivity and increase healthcare costs. Employers have a unique opportunity to address these challenges by creating healthier food environments at work (Centres for Disease Control and Prevention [CDC], 2023). They can provide nutritious options in on-site cafeterias, vending machines, or through meal delivery services. Partnering with local vendors or community-supported agriculture (CSA) programmes to supply fresh fruits, vegetables, whole grains, and lean proteins can also be an effective strategy. Additionally, organizing workshops on healthy eating and providing resources on nutrition can further support employees in making better food choices, thereby promoting overall health, reducing absenteeism, and enhancing productivity (Re *et al.*, 2025).

Strategies to Support Optimal Nutrition in the Workplace

To enhance work performance through better nutrition, organizations should adopt comprehensive strategies that address the various obstacles employees face in achieving a healthy diet. Therefore, the key strategies include:

Nutrition Education and Awareness Programmes:

Regular workshops and seminars can educate employees about healthy eating habits and the impact of nutrition on productivity. This can include guidance on meal planning, portion control, and the selection of nutrient-dense foods (Thorndike *et al.*, 2014). Providing easy-to-understand materials, like brochures and digital resources, further supports informed dietary choices (Rosmiati *et al.*, 2025).

Promoting Access to Healthy Food Options: Employers can facilitate access to healthier food choices by offering nutritious meals and snacks on-site or collaborating with local vendors to supply affordable, healthy options (Walker *et al.*, 2010). For workplaces located in "food deserts," where access to fresh fruits and vegetables is limited,

establishing partnerships with local farmers or grocery delivery services can help bridge the gap (Tay *et al.*, 2024).

Encouraging Healthy Snacking Habits: Providing healthy snacks in common areas, such as nuts, fruits, and whole-grain options, can help employees maintain stable energy levels throughout the day (Schwartz *et al.*, 2020; Rao *et al.*, 2024). Employers can also promote mindful eating practices to encourage healthier snacking choices.

Flexible Meal Breaks and Schedules: Addressing time constraints is crucial for fostering better nutrition. Implementing flexible meal breaks can allow employees to consume balanced meals without rushing, contributing to sustained energy levels and improved cognitive function (Kearney *et al.*, 2015; Tanaka *et al.*, 2018). Encouraging a workplace culture that values health and nutrition also helps reduce the stigma associated with taking time to eat properly.

Integrating Nutrition into Workplace Wellness Programmes: Comprehensive wellness programmes that include nutrition components, such as weight management support and personalized diet consultations, can significantly enhance employee health outcomes (Goetzel *et al.*, 2020; Aldana *et al.*, 2022; Juba, 2024; Hyży *et al.*, 2024). Offering incentives for participation, like gym memberships or discounts on healthy foods, can further motivate employees to engage in these programmes (Lima *et al.*, 2021). As supported by Morales *et al.* (2023), implementing these strategies, workplaces can foster an environment that promotes optimal nutrition, ultimately leading to reduced absenteeism, enhanced cognitive performance, and overall productivity gains.

CONCLUSION

Nutrition is integral to work productivity, affecting physical capacity, cognitive function, and overall health. Proper nutrition enhances performance, while poor dietary habits and nutritional deficiencies lead to reduced productivity and increased absenteeism. Implementing effective workplace nutrition programs and addressing barriers to proper nutrition can significantly improve employee health and productivity. Future research should continue to explore these relationships.

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