# Fueling the Mind: The Impact of Dietary Choice on Employee Cognitive Performance and Creative Output in the Modern Workplace

**[1]Abdul Sami**
*Vice President (Financial Institution)*

**[2]Dr.Liaqat Ali**
*Professor, Management Studies Department, Bahria University Karachi, Pakistan.*

**[3]Dr. Mehboob Ahmad**
*Air University, Islamabad, Pakistan.*

**[4]Dr. Muhammad Asif**
*Assistant Professor, Management Studies Department, Bahria University Karachi, Pakistan.*

**[5]Dr. Khawar Hussain**
*Assistant Professor, Business Studies Department, Bahria University Karachi, Pakistan.*
**DOI:** https://doi.org/10.5281/zenodo.18341418

## Abstract

A nutritionally adequate diet can be provided to improve the productivity of the workers. When employees do not eat a proper diet, their chances of falling sick are higher than those who eat a proper diet. Therefore, a balanced diet is one of the significant factors that contribute to work performance. This current research paper will assess the impacts of various dietary consumptions, including carbohydrates, keto diets, protein, and junk food, on the cognitive performance of employees. The energy that a worker brings to the workplace is a significant factor in organizational performance. It used a deductive method, and the data gathered were quantitative. Online questionnaires were distributed through convenience sampling to five assistant managers of five large banks in Karachi, i.e. Bank Al Habib, Habib Bank Limited, Faysal Bank, MCB, and UBL. The data collected was analysed using IBM SPSS Version 24.

Findings revealed that, except for the keto diet, the three types of diets — namely, carbohydrates, junk food, and protein — had a significant influence on employee cognitive performance. Protein had a positive effect, whereas carbohydrates and junk food had no effect. The bank management should therefore give health and wellness programs due consideration. Such programs need to be developed to maintain or improve employee well-being by educating them on the relative merits and shortcomings of particular diets. In addition, if banks offer in-house cafeterias, healthy food items such as fruits, vegetables, low-oil foods, and low-carbohydrate options should be included in the menus whenever possible.

**Keywords:** Food Choices, Carbohydrate diet, Keto Diet, Protein Diet, Junk Food and Employee Cognitive Performance.

## Introduction

Companies have recognized that nutrition is a critical factor in determining the health and productivity of the working population. A diet with an appropriate composition of carbohydrates, proteins, lipids, and vitamins is essential for maintaining an optimised physical and psychological condition, thereby contributing to concentration and alertness, which are crucial for effective work performance (Fallowfield & Carins, 2025). Poor nutrition habits may trigger overweight and obesity, leading to health complications that negatively impact mental health, such as depressive symptomatology and increased vulnerability to work-related diseases. Iron deficiency, which is common among most populations, is linked to poor productivity; hence, there is a nexus between nutrition and macroeconomic progress (Franke & Pulignano, 2023). Nutrition also plays a significant role in preventing diseases and reducing occupational health issues in the workplace. Inefficient nutrition increases the amount that employers spend on health-related issues, and obesity is a pressing problem that hinders employee productivity and exacerbates healthcare expenses. Employees with a balanced diet have lower morbidity and better work conduct compared to those on poor dietary plans, who face more health setbacks (Salinger et al., 2023). Dietary intake analyses reveal heterogeneous dietary intake patterns across all nutrient groups, underscoring the need to investigate the impact of food on cognitive functioning. The preservation of the nutritional value of meals offered in the workplace depends on the presence of proper food storage practices and the proficiency of personnel working in the kitchen (Imran, Mahmood, Malik, Rashid, & Asif, 2025). A balanced diet provides the necessary macro- and micronutrients that aid metabolism and overall health, thereby influencing employee performance. The need for a balanced diet must be acknowledged, as well-nourished individuals have been found to perform better at work compared to those with unbalanced diets (Zatsu et al., 2024).

Taste significantly impacts a human being's social life by defining food preferences through specific gustatory modalities, such as salty, sweet, bitter, and sour, which are sensed with gustatory receptors located on the tongue. Not only do some people prefer foods with the best nutritional values over those with the most palatable flavours, but they also acquire flavour preferences in infancy that are shaped by genetic dispositions and eating habits (Martín-Rodríguez et al., 2024). The quality of the food and the variety of culinary options available worldwide further refine this process and, in turn, influence both personal and organizational approaches to nutrition. Memory manipulation, especially concerning recent meals, may influence food intake in the near future. Therefore, understanding how recollection relates to eating behaviour is essential to prevent health-related complications.

Additionally, a wise choice of food in the workplace can enhance employees' health habits and reduce the likelihood of health complications (Hawkins, Chung, Hertz, & Antolin, 2023). Nutritional components, including proteins, carbohydrates, and fats, play a significant role in metabolism and long-term body composition. A balanced diet is crucial in maintaining health and allowing the proper functioning of the body (Amjad, Bibi, & Mahmood, 2025). The positive association between healthy

eating habits and better ageing processes and overall health outcomes supports the relevance of nutritional studies, which can lead to positive health outcomes (Shiwen & Ahn, 2023).

It has been established that there is a strong correlation between the intake of balanced diets and improved cognitive performance. Diets lacking essential nutrients are associated with measurable cognitive decline (van Soest, van de Rest, Witkamp, & de Groot, 2024). The significance of an ideal diet is especially acute during periods of extreme developmental challenges, such as gestation and infantile growth, when dietary provisions lay the groundwork that undergirds cognitive development (L. Huang et al., 2023). The state of nutrition has a noticeable effect on mental functioning, especially during complex activities, where significant deficits can occur due to nutrient inadequacies. Healthy eating practices in infancy can help achieve the greatest intellectual potential in adulthood, a fact that empirical research studies have consistently highlighted through the association of dietary habits and neural abilities (Fekete et al., 2023). Indeed, empirical research supports the notion that malnutrition significantly increases the risk of cognitive decline in adulthood and highlights the association between caloric deprivation and poor cognitive performance, thus supporting the diet-brain nexus (Jia et al., 2024). Proper nutrition can prevent functional deterioration and even improve cognitive functions, especially in relation to memory consolidation and processing speed. The impact of nutrition on brain functions highlights the need to use evidence-based, personalised nutritional advice to promote brain health and well-being (Keawtep et al., 2024).

Lack of nutrition has been linked to high levels of depressive symptoms, particularly in older adults, thus indicating the mutual relationship between nutrition and higher-order thinking. Workforce health and well-being are key issues in Human Resource Management (HRM), as they are strongly correlated with employee satisfaction and performance (Hejase et al., 2024). Employee health is becoming a strategic business tool that contemporary organisations highly consider. The constant pursuit of improving job satisfaction is often associated with increasing the nutritional value of the food offered, as it has already been proven to influence work performance (Olivier, 2024). The traditional practice of providing meals to employees at the workplace has gained new significance, especially considering the negative health effects of poor diets. The achievement of organizational goals depends fundamentally on the optimisation of employee performance; hence, the need for a cognitively alert human resource (van der Merwe & Olivier, 2024). Empirical research has demonstrated a positive correlation between employee well-being and productivity, which is supported by wellness programs designed to mitigate health risks and foster healthy attitudes among staff members. The productivity, and consequently, the organisational profitability and growth, are directly affected by investments in the well-being of the workforce (Garcia, 2025).

Considering the growing healthcare spending attributed to food-related diseases, the low level of knowledge about food selection among the workforce presents a significant challenge. A detailed understanding of these eating choices is crucial for developing and implementing effective wellness programs that enhance health outcomes and reduce expenses (Shrestha et al., 2024). Sufficient nutrition is a key factor in recovering from deficiencies that directly impact productivity (Rafique,

Muzammil, & Khan, 2025). The current research aims to investigate the impact of various dietary intakes, including carbohydrates, keto diets, protein intake, and junk food, on employee cognitive performance, a variable directly linked to organisational effectiveness (Hyży, Jaworski, Cieślak, Gotlib-Małkowska, & Panczyk, 2023). The focus on wellness programs highlights the potential for a healthier workforce, which can reduce high healthcare expenses. The new literature suggests that dietary habits have a substantial impact on individual and societal mental well-being, and hence, better health and performance can be achieved through effective nutrition. However, the impact of balanced diets on work performance is an area of study that is in its infancy (Rafique et al., 2025). Considered critical to physical and cognitive functioning (Rantala et al., 2024), the connection between nutrition and cognitive performance remains an underexplored area. The literature has shown inconsistencies regarding the connection between nutrition and cognitive performance, reflecting an increasing academic interest in addressing these gaps (Wronska, 2023). Despite numerous studies on promoting healthy food in the workforce, there is a lack of literature reviews on the impact of healthy food on psychological well-being and employee performance (Jackson et al., 2025). This research study will contribute to the field by critically examining the effects of various dietary sources on cognitive performance in the workplace.

Food habits have a significant impact on mental health and cognition, which are key determinants of workforce performance. Incorporating a balanced diet is essential, as it helps reduce the negative effects on health and improve employee performance (Wu, Tan, Li, Liang, & Fan, 2024). This study examines the perceptions of nutrition and their impact on work performance, with a special emphasis on the role of health promotion programs in enhancing workforce performance. Understanding the connection between dietary habits and cognition is crucial for avoiding dependence on unhealthy food. Maximising nutritional intake promotes physical and mental well-being, benefiting the employer, organization, and society, while also enhancing the corporate image (Shrestha et al., 2024).

**Research Objectives:**

This study aims to investigate the potential efficacy of various diets on employee cognitive performance. Dividing the main objective into the following sub objectives

**RO1:** To identify the impact of a carbohydrate diet on employee cognitive performance.

**RO2:** To identify the impact of the keto diet on employee cognitive performance.

**RO3:** To identify the impact of a protein diet on employee cognitive performance

**RO4:** To identify the impact of a junk food diet on employee cognitive performance.

## Literature Review and Theoretical Development

### Human Capital Theory

Human Resource Management (HRM) conceptualisation is a broad practice that encompasses numerous activities central to organizational management and has a direct impact on the corporate workforce (Edeji, 2024). The application of effective HR practices in both developed and emerging economies yields significant improvements in employee performance, underscoring the importance of HRM in enhancing the performance of workers and organisations. HRM serves to homogenise the workforce's attitudes and behaviours, promoting a strong employer-employee relationship (Guryeva, Davydova, Plotnikova, & Petrenko, 2023). Globalization drives corporations to focus on human capital practices that enhance skills, knowledge, commitment, and overall organizational effectiveness. With the dynamics of market competition becoming increasingly competitive, companies are likely to implement strategies that effectively utilise human resources (Ray, Nyberg, & Maltarich, 2023). Human capital investment is viewed as a necessary step towards developing loyalty and aligning organizational and employee goals. Without human capital, it is impossible to develop a competitive advantage, as it is a unique resource that competitors can hardly imitate (Kholifah et al., 2025). In addition, the productivity of the workforce can be enhanced by investing in nutritional health, which underscores why a healthy workforce is key to economic prosperity (England & Folbre, 2023).

### Social Exchange Theory and Workplace Nutrition

The fact that organisations are providing their employees with nutritional resources is increasing evidence of a strategic initiative by organisations aimed at fostering health-promoting attitudes among employees within the workplace environment (Robinson, 2024). These programs would have physiological benefits that translate into monetary returns, such as lower healthcare costs and reduced labour turnover, thereby improving productivity across the entire workforce. The social exchange theory can be used to analyse the phenomenon, suggesting that the employer-employee relationship is a two-way value exchange (Nazarian, Ranjbaran, Afifi, Atkinson, & Sadeghilar, 2024). When employees perceive their organisation as caring, they feel compelled to reciprocate with positive attitudes and behaviours, usually manifested as loyalty. Empirical studies consistently find that positive actions initiated by an organisation foster positive attitudes among employees, and in turn, lead to lower turnover intentions (Virk, Corner, Combs, & Jaskiewicz, 2024). Social exchange theory cannot be overlooked in the evaluation of the psychological implications of healthy food choices in the workplace. It has been argued that organisations should address the changing demands of the modern labour force by integrating healthy food interventions into their remuneration systems (Mahmood, Imran, Ali, Khan, & Rashid, 2025). More recent developments of the social

exchange theory suggest that behaviour, including the consumption of healthy food, could be viewed as beneficial instigators that cultivate positive employee attitudes (Jun & Eckardt, 2025).

## The Social Transformations of Eating at Work

A shift in eating and food consumption patterns has occurred over the last century, largely driven by the dramatic social and economic transformations on the international level. During the post-war period, urbanisation increased at a faster rate due to the industrialisation and mechanisation of agriculture, thereby altering traditional food production processes and dietary habits (Agostoni, Baglioni, La Vecchia, Molari, & Berti, 2023). This transition was further shaped by the latter Industrial Revolution, which became a key focus of the social sciences. Lifestyle changes have been reflected in the evolution of food preparation methods. Historically, stoves served both as cooking units and heating units in the house, and it was a common practice for workers to pack their own lunches, as cafeterias were very rare in the workplace (Warde, 2024). Industrialisation led to the emergence of on-site canteens, which satisfied the employees and increased their productivity (Odhano, Mahmood, Naqvi, & Ahmed, 2025).

Following World War II, capitalist economies expanded, increasing household incomes and introducing technologies such as refrigerators and gas appliances that revolutionised food preparation and the domestic setting. Separate cooking and eating areas were established, and factory canteens were set up to address malnutrition and food shortages among workers (Jayasinghe, Byrne, & Hills, 2025). Over time, pre-cooked food became popular, indicating another shift in consumption patterns. Weekends and celebrations were increasingly spent on ready-made food, which led to the emergence of fast-food products, including hamburgers, pizza, and ice cream. Such a tendency led to the emergence of new cultural and social spaces for communication and interaction.

## Eating Habits

Major dietary changes in the second half of the twentieth century have led to an increase in the use of ultra-processed foods and a subsequent decrease in the consumption of healthy foods, including fruits, vegetables, and fish, thereby triggering nutritional deficiencies. Such changes have been linked to increased rates of severe disease conditions such as obesity (Abdoli et al., 2023), type 2 diabetes mellitus, and hypertension, most of which can be largely credited to the increased consumption of snack foods, which are low-nutrition foods at the expense of nutritionally balanced foods (Fisberg, Gioia, & Maximino, 2024). The literature records a change in eating habits, particularly among children and adolescents, where breakfast is often missed, and nutritionally deficient snacks high in fat and sugar replace meals. The need to adopt healthy eating habits is instilled in childhood, developing through exposure to various foods (Ares, Antúnez, Curutchet, & Giménez, 2023). The behavioral determinants of eating include decisions on the type of food, volume of food, timing and social situations (Akhtar & Mahmood, 2025). Promoting a healthy diet

is critical to achieving a healthier population and reducing the non-communicable disease burden. The general health condition of individuals is closely linked to their eating habits, and inadequate eating habits can lead to somatic and psychosocial health problems (Moschonis & Trakman, 2023). They have found convenience stores and fast-food establishments to be environmental antecedents that promote unhealthy eating behaviours, especially in young adults, thereby worsening the health-related harms (Moscatelli et al., 2023).

**Nutrition**

Nutrition plays a pivotal role in enhancing human health, but there is confusion as to what constitutes a healthy diet. The contradictions are evident when assessing separate food products, such as butter and eggs, and entire food systems, including Mediterranean and keto diets, which can have either a positive, negative, or neutral impact on health outcomes (Byrd-Bredbenner et al., 2024). Proper nutrition is linked to the best dieting elements, while malnutrition and overnutrition may trigger extreme negative health effects. Nutrition, along with lifestyle and environmental factors, plays a crucial role in health outcomes and disease prevention (Saavedra & Prentice, 2023). Human nutrition, a field of study that encompasses both agriculture and food technology, deals with a continuum of physiological conditions and methodologies, such as the alleviation of nutritional deficiencies through fortification strategies (Lim, Mahmood, Zaidi, & Areeb, 2024). A pattern of eating—the amount and type of food intake—has increasingly received respect in response to reducing the two extremes of undernourishment and overeating (Bojang & Manchana, 2023). Foods contain nutrients, and the nutrients are divided into macronutrients (carbohydrates, proteins and lipids) and micronutrients (vitamins and minerals), none of which the body can perform without. Other non-nutrients, not categorised in these groups, include a variety of organic and inorganic substances (Ensminger & Ensminger, 2023).

**Carbohydrates**

Carbohydrate nutrients, also known as carbohydrates, are vital macronutrients found in a wide range of foodstuffs and drinks, including simple sugars, complex starches, and dietary fibre. Despite the fact that carbohydrates are a vital source of energy for most of the population, consumption habits differ, and not everyone consumes the nutrients in significant amounts (Holesh, Aslam, & Martin, 2023). The empirical data indicate that higher carbohydrate levels are linked to morphological changes in the gastrointestinal tract, which help meet cerebral energy needs. Traditionally, the human diet has included both animal-based sources of protein and plant-based sources of carbohydrates, such as fruits and starchy vegetables (Yamatsugu & Kanai, 2023). In modern days, especially in the developing parts, the consumption of carbohydrates has increased due to three main determinants, namely, the replacement of animal-derived foods with plant-based foods, the mass production of refined sugars by industries, and the spread of processed foods after the Second World War (Durrani, Raziq, Mahmood, & Khan, 2024). Moreover, the initially affordable economic price

of carbohydrate-rich foods, compared to sources of protein or lipid, has facilitated their large-scale consumption (Liang et al., 2024).

**Keto Diet**

The keto diet is a low-carbohydrate diet plan that has been proven effective in managing weight. It began in the 1920s and is defined by a low level of carbohydrate consumption (10% or less of total energy), which creates a metabolic state of ketosis where catabolism of adipose tissue dominates and ketones are produced without the need to consume external glucose (Tzenios, Tazanios, Chahine, & Jamal, 2023). The keto diet's macronutrient profile focuses on high consumption of protein and lipids. In the past, this nutritional method has been used therapeutically in the treatment of epilepsy and other nervous system diseases (Masood, Annamaraju, Suheb, & Uppaluri, 2023). Despite its growing popularity, the adoption of the diet remains a controversial issue due to ongoing debates over its safety profile, efficacy, and potential adverse effects. Similar studies have been conducted on the effects of caffeine on cognitive functions, and the results have indicated that the use of caffeine can significantly improve alertness and focus in various contexts (Athinarayanan et al., 2024).

**Protein Diet**

The protein plays a vital role in the mechanical and structural growth of living organisms, as it is essential for the performance and recovery from exercise. As a major dietary nitrogenous compound, adequate protein sources include meat, dairy products, eggs, soy, and fish (Sakaguchi, Kaimori, & Isaka, 2023). Beef, among other sources, is generally considered a major source of protein and fat in various dietary patterns, thus fulfilling human nutrient needs and enhancing overall human capital quality (Woyengo, Knudsen, & Børsting, 2023). It is known that dairy products, milk, cheese, and yoghurt are good sources of protein, minerals, and vitamins, which have a beneficial effect on the populations of infants and adults alike, alleviating deficiencies in certain minerals and eliminating chronic diseases, including rickets among infants and osteoporosis in adults (Monteyne et al., 2023). Moreover, vegetables and fruits are considered economical and provide a variety of essential proteins, vitamins, and minerals. This highlights the need for a balanced diet that includes these food categories to achieve maximum health (Torreggiani, Wang, Fois, & Piccoli, 2023).

**Junk Food**

Junk food is defined by the lack of nutrients and high levels of fat and low levels of dietary fibre, which lead to the adverse health effects of obesity and hypercholesterolemia. Over the past thirty years, the consumption of junk food among adolescents has increased due to various factors, including increased palatability, easy access, and low cost (Daradkeh et al., 2023). These foods are generally low in nutritional value and high in added sugar, sodium, and saturated fats. Common examples used in the United States include confectionery, salty snacks, and ice cream; however, a strict, universally recognised definition has never been agreed upon (Schwartz-Narbonne et al., 2023). The category encompasses foods that are high in fats, cholesterol, sodium, and salt, e.g., fried

chicken, French fries, pizza, doughnuts, burgers, and hot dogs (Y.-S. Chen, 2010). In addition, soft drinks, like other beverages, contain elevated sugar levels, contributing to surplus caloric consumption (Watson, Perrigot, & Dada, 2024).

**Employee Cognitive Performance**

There is no way that occupational performance can be accomplished without the cognitive abilities, which encompass problem-solving, decision-making, and logical reasoning. The main sub-elements include general intelligence, fluid intelligence, and crystallised abilities, which collectively comprise an individual's ability to perform effectively (Rama, Setyorini, Cuhenda, Anggraini, & Yakin, 2024). Experimental research suggests a moderate relationship between cognitive functioning and occupational success, whereby higher cognitive abilities lead to better decision-making and a greater interest in job-related matters (Y. Chen et al., 2023). The positive effects of cognitive performance enhancements can include alleviating mental health issues and improving employee productivity, which is a critical factor in organisational achievement (Mahmood, Mubarik, Islam, & Naghavi, 2021). Employee performance, which refers to the quality and effectiveness of work, is very important in predicting the outcome of an organisation. Mental health interventions cannot be ignored, as they significantly influence work productivity and performance levels (Voordt & Jensen, 2023).

**Conceptual Framework**

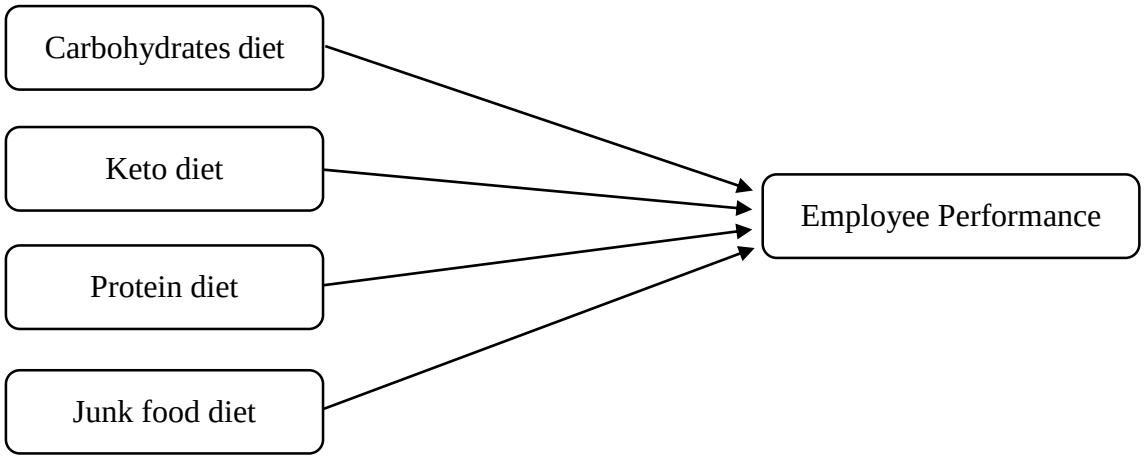


**Figure 1: Conceptual Framework**

**Hypothesis Development**

**Carbohydrates & Employees' Cognitive Performance**

Carbohydrate intake seems to have a significant effect on cognitive performance. There is empirical evidence that interventions like oral glucose administration can impact cognitive performance and that intake of refined carbohydrates is associated with a decline in cognitive function (Arshad et al., 2025). Excessive saturated fats have been linked to poor memory performance, while high-fat lunches have been associated with improved mental performance. On the contrary, breakfasts rich in fat and sugar appear to harm cognitive functioning (Arsalandeh, Shemirani, Nazari, Mirmiran, & Golzarand, 2025). The continuous intake of fat has been associated with impairments in memory, particularly in recalling words (Mahmood & Mubarik, 2020). The Western dietary trend, characterised by high levels of saturated fat and sugar intake, negatively affects cognitive performance. Additionally, processed sugar (white rice) has been linked to cognitive deterioration (Poon et al., 2024). The increase in glucose levels can suppress cognition and be an indicator of metabolic imbalance. Although others claim that carbohydrate solutions lower alertness and cognitive performance, studies indicate a positive correlation between carbohydrate intake and cognitive function (Nagashima et al., 2023). Based on the above discussion, the following hypothesis has been deduced:

**H1:** A carbohydrate diet has an unfavourable substantial impact on employee cognitive performance.

**Keto diet & Employee Cognitive Performance**

Ketones provide around sixty per cent of the brain's energy requirements and serve as a vital alternative energy source to glucose, especially during hypoglycemic conditions (Chinna-Meyyappan et al., 2023). Not only do their benefits increase cerebral metabolism, but they also enhance muscular performance. The stimulating effect of a keto diet on cognitive functions is proven by empirical evidence. Studies in rodents have demonstrated that a keto diet improves both physical and cognitive functioning, suggesting possible therapeutic potential for metabolic diseases in humans (Henderson, van den Berg, & Shaw, 2023). Diets and lifestyle significantly impact the maintenance of cognitive abilities during ageing. Cocoa and berries, which contain bioactive compounds, are effective for cognitive functioning. According to Rong et al. (2024), obesity may compromise cognitive functions, which can be mitigated by following a keto diet. In addition, the keto diet can improve symptoms of anxiety and depression. Coffee has often been linked to increased productivity level and general well-being (Bosworth, Loh, Stranahan, & Palmer, 2023). Based on the above discussion, the following hypothesis has been deduced:

**H2:** The Keto diet has a favourable substantial impact on employee cognitive performance.

**Protein & Employee Cognitive Performance**

The increased intake of fruits and vegetables (FV) is linked to better well-being, especially in young adults, with those who consume more FV products reporting better well-being when compared to those who consume less. This relationship suggests that FV consumption can be a source of high life satisfaction and happiness, as evidenced by lower rates of depression (Adams, Mensink, & Joris,

2024). The psychological advantages of FV are relatively unexplored, but the available research demonstrates that FV consumption is positively associated with psychological well-being. In addition, consuming more grains, fruits, and vegetables is positively associated with better cognitive functioning, with nuts and mushrooms having a particularly positive influence (Su et al., 2024). Empirical studies also indicate a strong association between vegetable intake and cognitive performance, suggesting that a nutrient-rich diet is linked to reduced cognitive decline. High fruit and vegetable diets that contain a considerable level of potassium are beneficial in reducing blood pressure and the risk of stroke (He et al., 2024). Additionally, milk and dairy products are linked to improved health outcomes, and protein-based diets are also crucial in enhancing physical activity and performance. Together, better nutrition practices, such as increased FV intake, are associated with increased job performance and overall well-being (Fan et al., 2024). Based on the above discussion, the following hypothesis has been deduced:

**H3:** A Protein diet has favorable substantial impact on employee cognitive performance.

**Junk Food & Employee Cognitive Performance**

Junk food is regarded as unhealthy because it typically contains high levels of sugar or fat and lacks essential vitamins, minerals, protein, and other critical nutritional elements. While meat can be a protein source, when prepared with saturated fats, it may also be classified as junk food (Purwaningtyas, Ahmiyanasari, & Ningtyas, 2025). Excessive consumption of junk food contributes to obesity in children, adolescents, and adults globally, with varying prevalence influenced by trade policies and nutrition levels in different countries. This consumption is linked to serious health risks, including cognitive decline and mental health issues, while also causing chronic diseases such as obesity and hypertension due to its low nutritional value (Heidari et al., 2023). The reason behind this is the liberalised policies related to trade & foreign investment in food. In this context, the variations observed in the nutritional level of food are considered a reason behind obesity (ElBarazi & Tikamdas, 2024). Based on the above discussion, the following hypothesis has been deduced:

**H4:** A junk food diet has an unfavourable, substantial impact on employee cognitive performance.

## Methodology

In this study, the questionnaire comprises two parts. The first part consists of questions related to demographic factors, whereas the second part includes questions relating to the independent and dependent variables. The questions of all diets have been adapted from a food frequency questionnaire used by Osler & Heitmann. However, the questions regarding employee cognitive performance have been adapted from the questionnaire used by Nejati. In this study, a 5-point Likert scale was developed. The scales range from 1 (Strongly Agree) to 5 (Strongly Disagree). Convenience sampling helps overcome various limitations related to the research. For instance,

selecting friends or family as a sample portion is more convenient than targeting individuals who are unfamiliar with the study (Vehovar, Toepoel, & Steinmetz, 2016). The demographics of the respondents are given in Table 1. Most participants are male (66.7%) and female (33.3%). The age group of 21-30 years (51.5 per cent) is the most representative, followed by 31-40 years (29 per cent), 41-50 years (14.5 per cent), and those over 50 years (5 per cent). Postgraduate respondents are the most dominant (40.3%), followed by graduates (32.3%) and undergraduates (27.4%). Concerning professional experience, the distribution is quite diverse: 24.8% have 1 year of experience, 23.8% have 2-5 years, 13.2% have 6-10 years, 16.5% have 11-15 years, and 21.8% have more than 15 years. In general, the data indicate that the sample is young, male, and relatively well-educated, with diverse work experience.

**Table 1: Respondents' profile**

| Category | Frequency | Percentage |
|---|---|---|
| **Gender** | | |
| **Male** | 202 | 66.7 |
| **Female** | 101 | 33.3 |
| **Age** | | |
| **21-30 years** | 156 | 51.5 |
| **31-40 years** | 88 | 29.0 |
| **41-50 years** | 44 | 14.5 |
| **Above 50 years** | 15 | 5.0 |
| **Qualification** | | |
| **Undergraduate** | 83 | 27.4 |
| **Graduate** | 98 | 32.3 |
| **Postgraduate** | 122 | 40.3 |
| **Experience** | | |
| **1 year** | 75 | 24.8 |
| **2-5 years** | 72 | 23.8 |
| **6-10 years** | 40 | 13.2 |
| **11-15 years** | 50 | 16.5 |
| **Above 15 years** | 66 | 21.8 |

**Data Analysis**

IBM Corporation devised the most popular statistical software, known as SPSS. It is most extensively employed by scholars worldwide. It has several merits, including a highly user-friendly interface and facilitating the easy execution of diverse statistical tests or analyses. It can be used in conducting evaluations related to univariate, bivariate, and multivariate analysis, regardless of whether parametric or non-parametric statistical methods are involved. It is the utmost responsibility of the researcher to select precise or accurate statistical software for conducting data analysis in

accordance with the study's objectives (George & Mallery, 2024).

## Results and Analysis

### Reliability Statistics

The exhibition of internal consistency is termed as reliability. In other words, when a questionnaire is devised to measure a specific variable and then completed, the generated results must be consistent every time it is completed. Table 2 indicates the reliability statistics of the variables involved in the study. Reliability is the exhibition of internal consistency represented by the value of Cronbach's alpha in this study. The threshold value of Cronbach's alpha is 0.7, suggested by Hair et al. (2019). All the variables of the study have a Cronbach's alpha value greater than 0.7.

**Table 2: Reliability Statistics**

| S. No | Variables | Cronbach's Alpha | No of Items |
|---|---|---|---|
| **1** | Carbohydrates Diet | 0.871 | 5 |
| **2** | Keto Diet | 0.821 | 4 |
| **3** | Protein Diet | 0.843 | 4 |
| **4** | Junk Food Diet | 0.861 | 4 |
| **5** | Employee Cognitive Performance | 0.869 | 4 |

## Descriptive Statistics

Table 3 presents the values of descriptive statistics, including minimum, maximum, mean, standard deviation, skewness, and kurtosis. The minimum value is one, and the maximum value is 5, as the study employed a point Likert scale questionnaire. The mean value suggests the inclination of the respondent towards one or two options on the Likert scale. A protein diet also had a mean value of around 2, suggesting that most respondents consumed this diet once daily. The protein diet has a mean value of around 4, suggesting that it is consumed once or more per month by the respondents.

**Table 3: Descriptive Statistics**

| Variables | Mean | Std. Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| **Carbohydrates** | 4.1180 | .65032 | -1.431 | 3.164 |
| **Junk Food** | 2.0149 | .89110 | 1.189 | 1.130 |
| **Keto** | 1.9518 | .69296 | 1.111 | 2.533 |
| **Protein** | 3.8985 | .80549 | -.848 | .2830 |
| **Cognitive Performance** | 4.0371 | .72764 | -1.086 | 1.436 |

## Correlation

Table 4 presents the correlation statistics among the variables involved in the study. Carbohydrate is negatively and moderately correlated with employee cognitive performance, as demonstrated by the Pearson correlation value of -.560. Similarly, junk food is also negatively and moderately correlated with employee cognitive performance, with a correlation of -.535. However, the keto diet is positively but negligibly correlated with employee cognitive performance, i.e., 0.187. Moreover, a protein diet is also positively and strongly correlated with employee cognitive performance, i.e., 0.863.

**Table 4 Correlation**

| | | CARB | JUNK | KETO | PROT | COG |
|---|---|---|---|---|---|---|
| **Carbohydrate** | Pearson Correlation | 1 | .457** | -.300** | -.550** | -.560** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 |
| | N | 303 | 303 | 303 | 303 | 303 |
| **Junk Food** | Pearson Correlation | .457** | 1 | -.168** | -.491** | -.535** |
| | Sig. (2-tailed) | .000 | | .003 | .000 | .000 |
| | N | 303 | 303 | 303 | 303 | 303 |
| **Keto** | Pearson Correlation | -.300** | -.168** | 1 | .140* | .187** |
| | Sig. (2-tailed) | .000 | .003 | | .015 | .001 |
| | N | 303 | 303 | 303 | 303 | 303 |
| **Protein** | Pearson Correlation | -.550** | -.491** | .140* | 1 | .863** |
| | Sig. (2-tailed) | .000 | .000 | .015 | | .000 |
| | N | 303 | 303 | 303 | 303 | 303 |
| **Cognitive Performance** | Pearson Correlation | -.560** | -.535** | .187** | .863** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .001 | .000 | |
| | N | 303 | 303 | 303 | 303 | 303 |

**Regression**

Regression analysis has been employed to identify the relationship between two or more elements using an equation known as the regression line. Table 5 presents the model summary statistics. The value of R-squared is around 77 per cent, suggesting that all the independent variables of the study jointly explain 77 per cent of the variance in the dependent variable, i.e., employee cognitive performance.

**Table 5 Regression Analysis**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| **1** | .876[a] | .768 | .764 | **.35318** |

**a. Predictors: (Constant), Protein, Keto, Junk Food, Carbohydrate**

**Anova**

Table 6 shows the ANOVA statistics. The value of F is approximately 26 greater than the threshold value, i.e., 7, implying the fitness of the model, which is also justified by the significance value of less than 5 per cent.

**Table 6 ANOVA**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| **1** | Regression | 122.723 | 4 | 30.681 | 25.961 | **.000[b]** |
| | Residual | 37.172 | 298 | .125 | | |
| | Total | 159.895 | 302 | | | |

**a. Dependent Variable: COG**

**b. Predictors: (Constant), PROTEIN, KETO, JUNK, CARB**

**Coefficient**

Table 7 presents the results of the study's hypothesis. The role of a carbohydrate diet in predicting employee cognitive performance is found to be significant, given that the significance value is less than 5 per cent, specifically 0.032. The value of beta suggests that when the carbohydrate diet increases by 1, then employee cognitive performance decreases by 7.7 per cent. Similarly, the role of a junk food diet in predicting employee cognitive performance is also found to be significant, given that the significance value is less than 5 per cent, i.e., 0.000. The value of beta suggests that when the junk food diet increases by 1, then employee cognitive performance decreases by 12.3 per cent.

**Table 7 Coefficient**

| Model | Standardized Coefficients Beta | t | Sig. |
|---|---|---|---|
| **(Constant)** | | 6.391 | .000 |
| **Carbohydrate** | -.077 | -2.149 | .032 |
| **Junk Food** | -.123 | -3.697 | .000 |
| **Keto** | .037 | 1.273 | .204 |
| **Protein** | .755 | 21.349 | .000 |

**a. Dependent variable: Employee Cognitive Performance**

## Discussion and Conclusion

Dietary behaviours are the reasons behind the efficacy of a diet on mental health. A deep understanding of the impact of diet on cognition helps identify how efficient dietary manipulation can lead to enhanced mental fitness. Sustaining a healthy and balanced diet is crucial for the workforce. Having a balanced diet not only facilitates the prevention of adverse health issues but also enhances the performance level of employees. The findings of this study indicate that a carbohydrate-rich diet is significantly and unfavourably related to employee cognitive performance, consistent with previous studies. As stressed by the cognitive deficit associated with refined carbohydrate consumption. Moreover, Noble, Hsu, and Kanoski (2017) advocated that the Western diet generally consists of high levels of saturated fat and added sugar, and its consumption unfavourably influences cognitive activities.

In terms of junk food, the study also found a significant and unfavourable association with employee cognitive performance, confirming the findings of previous studies. For instance, Almobayed and Smith (2025) contended that cognitive decline can result from consuming fast food & coca cola. As stressed by Khazdouz et al. (2025), there is an association between diets high in junk food & cognitive aspects. López-Gil et al. (2025) suggested that consuming junk food leads to employee exhaustion, which in turn causes poorer mental health. Lastly, the role of a protein diet in predicting employee cognitive performance is found to be significant. According to Arnob, Akter, and Rahman (2025), consuming a higher level of grains, fruits & vegetables is related to superior cognitive function. Moreover, Al-Fartusie, Mohammed, Thani, Kader, and Khadim (2025) proclaimed that nuts & mushrooms are regarded as good sources of nutrition, and their association with superior cognitive function is favourable.

Furthermore, W. Huang, Chen, and Hu (2025) found a considerable or substantial relationship

between vegetables & cognitive performance. Consuming an adequate level of protein is beneficial for enhancing performance. A higher performance level in one's job is associated with consuming a healthy diet, including fruits and vegetables.

## Managerial Implications

A deep understanding of the influence of diet on cognition helps individuals efficiently manipulate their diet to enhance cognitive abilities. Mental health can be enhanced by consuming a proper diet. The study has several practical implications. Given the significant negative impact of carbohydrate-rich and junk food diets on the cognitive performance of the banking sector workforce, it is suggested that bank management should raise awareness among employees and pursue several initiatives in this regard. One of these initiatives involves investing in health and wellness programs. This type of initiative is very common in the West; however, in Pakistan, not all sectors invest in such programs. The development of a wellness program is necessary to maintain or improve employees' well-being by providing them with adequate education regarding diets, such as which ones are more beneficial and which are not.

## Conclusion

This study is conducted to identify the efficacy of different diet intakes, such as carbohydrates, the keto diet, protein, and junk food, on employees' cognitive performance. The energy employees bring to work plays a vital role in enhancing organisational effectiveness. It cannot be underestimated that a healthy workforce can achieve organizational effectiveness. The findings of this study revealed that, aside from the keto diet, all three diets—carbohydrates, junk food, and protein—significantly affect employees' cognitive performance. However, protein favourably influences employee cognitive performance, while carbohydrates and junk food unfavourably affect it. After analyzing the results, managerial implications have been suggested.

## Limitations & Future Directions

This research has several limitations. Due to time constraints, the study did not consider the banking sector in other geographical areas of Pakistan and focused solely on Karachi. Moreover, only five well-known banks operating in Karachi have been selected for this study, namely Habib Bank Limited, Bank Al Habib, Faysal Bank, MCB, and UBL. Future studies can be conducted by considering the other banks operating in Karachi. Moreover, further studies can also be conducted by targeting the banks operating in other geographic areas of Pakistan. Future studies can be conducted by considering other diets to identify their impact on employee cognitive performance in the banking sector. Moreover, besides diet, some environmental or cultural elements could be incorporated in the model for conducting further studies. Furthermore, by adding the mediating or moderating variable in the model under investigation, more studies can be conducted in the future.

## References

Abdoli, M., Scotto Rosato, M., Cipriano, A., Napolano, R., Cotrufo, P., Barberis, N., & Cella, S. (2023). Affect, body, and eating habits in children: a systematic review. *Nutrients, 15*(15), 3343.

Adams, M. S., Mensink, R. P., & Joris, P. J. (2024). Effects of dietary proteins on cognitive performance and brain vascular function in adults: a systematic review of randomised controlled trials. *Nutrition Research Reviews*, 1-15.

Agostoni, C., Baglioni, M., La Vecchia, A., Molari, G., & Berti, C. (2023). Interlinkages between climate change and food systems: the impact on child malnutrition—narrative review. *Nutrients, 15*(2), 416.

Akhtar, B., & Mahmood, T. (2025). Kneading Optimism Into The Workday: Exploring The Tetrad Of Work-Life Balance, Optimism, Employee Innovative Performance, And Well-being In The Banking Sector. *Journal of Business and Management Research, 4*(2), 580-595.

Al-Fartusie, F. S., Mohammed, M. A., Thani, M. Z., Kader, S., & Khadim, R. M. (2025). Evaluation of heavy metal and specific trace elements levels among fast-food workers and their susceptibility to atherosclerosis. *Biological Trace Element Research, 203*(3), 1317-1326.

Almobayed, S., & Smith, A. (2025). An umbrella review of associations between health-related behaviours and well-being. *World Journal of Pharmaceutical and Medical Research, 11*(4), 397-410.

Amjad, T., Bibi, M., & Mahmood, T. (2025). Psychological Warfare at Work: Emotional Intelligence as a Moderator between Workplace Gaslighting and Employee Well-being. *Advance Journal of Econometrics and Finance, 3*(3), 103-112.

Ares, G., Antúnez, L., Curutchet, M. R., & Giménez, A. (2023). Warning labels as a policy tool to encourage healthier eating habits. *Current Opinion in Food Science, 51*, 101011.

Arnob, R. H., Akter, S., & Rahman, M. M. (2025). Evaluation of the relationship between consumption of carbonated soft drinks/fast food and anxiety-related sleep disturbance in school adolescents in Bangladesh. *PLOS Global Public Health, 5*(3), e0004322.

Arsalandeh, F., Shemirani, F., Nazari, M. A., Mirmiran, P., & Golzarand, M. (2025). Effect of low-carbohydrate diets on quality of life, mental health, and speed of memory in adults: a systematic review and meta-analysis of randomised controlled trials. *International Journal of Food Sciences and Nutrition, 76*(1), 4-19.

Arshad, M. T., Maqsood, S., Altalhi, R., Shamlan, G., Mohamed Ahmed, I. A., Ikram, A., & Abdullahi, M. A. (2025). Role of Dietary Carbohydrates in Cognitive Function: A Review. *Food Science & Nutrition, 13*(7), e70516.

Athinarayanan, S. J., Roberts, C. G., Vangala, C., Shetty, G. K., McKenzie, A. L., Weimbs, T., & Volek, J. S. (2024). The case for a ketogenic diet in the management of kidney disease. *BMJ Open Diabetes Research & Care, 12*(2).

Bayakhmetova, A., Bayakhmetova, L., Bayakhmetova, L., Daniyar, M., & Shchepkina, N. (2023). *Ecological aspects of the model of transformation of the eating behavior of students in Kazakhstan.* Paper presented at the E3S Web of Conferences.

Bojang, K. P., & Manchana, V. (2023). Nutrition and healthy aging: a review. *Current Nutrition Reports, 12*(3), 369-375.

Bosworth, A., Loh, V., Stranahan, B. N., & Palmer, C. M. (2023). Case report: Ketogenic diet acutely improves cognitive function in patient with Down syndrome and Alzheimer's disease. *Frontiers in Psychiatry, 13*, 1085512.

Byrd-Bredbenner, C., Berning, J. R., Kelley, D. S., Abbot, J., Moe, G., & Beshgetoor, D. (2024). *Wardlaw's perspectives in nutrition*: McGraw Hill.

Chen, Y.-S. (2010). The drivers of green brand equity: Green brand image, green satisfaction, and green trust. *Journal of Business ethics, 93*(2), 307-319.

Chen, Y., Zhang, Z., Zhou, J., Liu, C., Zhang, X., & Yu, T. (2023). A cognitive evaluation and equity-based perspective of pay for performance on job performance: A meta-analysis and path model. *Frontiers in Psychology, 13*, 1039375.

Chinna-Meyyappan, A., Gomes, F. A., Koning, E., Fabe, J., Breda, V., & Brietzke, E. (2023). Effects of the ketogenic diet on cognition: a systematic review. *Nutritional neuroscience, 26*(12), 1258-1278.

Daradkeh, F. M., Hassan, T. H., Palei, T., Helal, M. Y., Mabrouk, S., Saleh, M. I., . . . Elshawarbi, N. N. (2023). Enhancing digital presence for maximizing customer value in fast-food restaurants. *Sustainability, 15*(7), 5690.

Durrani, N., Raziq, A., Mahmood, T., & Khan, M. R. (2024). Barriers to adaptation of environmental sustainability in SMEs: A qualitative study. *Plos one, 19*(5), e0298580.

Edeji, O. C. (2024). Neo-liberalism, human capital theory and the right to education: Economic interpretation of the purpose of education. *Social Sciences & Humanities Open, 9*, 100734.

ElBarazi, A., & Tikamdas, R. (2024). Association between university student junk food consumption and mental health. *Nutrition and health, 30*(4), 861-867.

England, P., & Folbre, N. (2023). Reconceptualizing human capital *A research agenda for skills and inequality* (pp. 177-195): Edward Elgar Publishing.

Ensminger, M. E., & Ensminger, A. H. (2023). *Foods & Nutrition Encyclopedia, Volume 1*: CRC press.

Fallowfield, J. L., & Carins, J. (2025). Whole System Approach to designing, implementing and measuring health and performance benefits of improving diet behaviour in a military setting: British Medical Journal Publishing Group.

Fan, Z., Yang, C., Qu, X., Zhang, J., Wu, H., Yang, Y., . . . Yang, J. (2024). Association of oxidative stress on cognitive function: a bidirectional Mendelian randomisation study. *Molecular Neurobiology, 61*(12), 10551-10560.

Fekete, M., Lehoczki, A., Tarantini, S., Fazekas-Pongor, V., Csípő, T., Csizmadia, Z., & Varga, J. T. (2023). Improving cognitive function with nutritional supplements in aging: a comprehensive narrative review of clinical studies investigating the effects of vitamins, minerals, antioxidants, and other dietary supplements. *Nutrients, 15*(24), 5116.

Fisberg, M., Gioia, N., & Maximino, P. (2024). Transgenerational transmission of eating habits. *Jornal de Pediatria, 100*, S82-S87.

Franke, M., & Pulignano, V. (2023). Connecting at the edge: Cycles of commodification and labour control within food delivery platform work in Belgium. *New Technology, Work and Employment, 38*(2), 371-390.

Garcia, A. G. (2025). The impact of sustainable practices on employee well-being and organizational success. *Brazilian Journal of Development, 11*(3), e78599-e78599.

George, D., & Mallery, P. (2024). *IBM SPSS statistics 29 step by step: A simple guide and reference*: Routledge.

Guryeva, M. A., Davydova, M. V., Plotnikova, K. S., & Petrenko, L. (2023). Ecological intelligence in the concept of human capital theory. *Russian Journal of Innovation Economics, 13*(3), 1641-1662.

Hawkins, G. T., Chung, C. S., Hertz, M. F., & Antolin, N. (2023). The school environment and physical and social-emotional well-being: implications for students and school employees. *Journal of School Health, 93*(9), 799-812.

He, Q., Ji, L., Wang, Y., Zhang, Y., Wang, H., Wang, J., . . . Liu, J. (2024). Acetate enables metabolic fitness and cognitive performance during sleep disruption. *Cell Metabolism, 36*(9), 1998-2014. e1915.

Heidari, M., Khodadadi Jokar, Y., Madani, S., Shahi, S., Shahi, M. S., & Goli, M. (2023). Influence of food type on human psychological–behavioral responses and crime reduction. *Nutrients, 15*(17), 3715.

Hejase, H. J., El Dirani, A., Haidar, Z., Alawieh, L., Ahmad, A., & Sfeir, N. (2024). The impact of employee well-being on organizational effectiveness: Context of Lebanon. *International Journal of Human Resource Studies, 14*(2), 15-54.

Henderson, L. R., van den Berg, M., & Shaw, D. M. (2023). The effect of a 2 week ketogenic diet, versus a carbohydrate-based diet, on cognitive performance, mood and subjective sleepiness during 36 h of extended wakefulness in military personnel: An exploratory study. *Journal of Sleep Research, 32*(4), e13832.

Holesh, J. E., Aslam, S., & Martin, A. (2023). Physiology, carbohydrates *StatPearls [Internet]*: StatPearls Publishing.

Huang, L., Tao, Y., Chen, H., Chen, X., Shen, J., Zhao, C., . . . Zhang, R. (2023). Mediterranean-dietary approaches to stop hypertension intervention for neurodegenerative delay (MIND) diet and cognitive function and its decline: a prospective study and meta-analysis of cohort studies. *The American Journal of Clinical Nutrition, 118*(1), 174-182.

Huang, W., Chen, B., & Hu, C. (2025). The latent profile structure of negative emotion in female college students and its impact on eating behavior: the mediating role of physical exercise. *Frontiers in Public Health, 13*, 1663474.

Hyży, A., Jaworski, M., Cieślak, I., Gotlib-Małkowska, J., & Panczyk, M. (2023). Improving eating habits at the office: an umbrella review of nutritional interventions. *Nutrients, 15*(24), 5072.

Imran, M., Mahmood, T., Malik, K., Rashid, R. M., & Asif, M. (2025). Ambidextrous Leadership and Entrepreneurial Orientation: A Dual-Path Strategy for Enhancing Operational Performance in Pakistan's Pharmaceutical Sector. *Sefarad*.

Jackson, A. T., Mazzola, J. J., Loveless, J. P., Gargurevich, R., Jang, H., & Cheon, S. H. (2025). The Impact of Healthy Choices at Work: Daily Barriers, Facilitators, and Their Effects on Stress and Performance. *Occupational Health Science*, 1-24.

Jayasinghe, S., Byrne, N. M., & Hills, A. P. (2025). Cultural influences on dietary choices. *Progress in Cardiovascular Diseases*.

Jia, W., Wang, H., Li, C., Shi, J., Yong, F., & Jia, H. (2024). Association between dietary vitamin B1 intake and cognitive function among older adults: a cross-sectional study. *Journal of translational medicine, 22*(1), 165.

Jun, M., & Eckardt, R. (2025). Training and employee turnover: A social exchange perspective. *BRQ Business Research Quarterly, 28*(1), 304-323.

Keawtep, P., Sungkarat, S., Boripuntakul, S., Sa-Nguanmoo, P., Wichayanrat, W., Chattipakorn, S. C., & Worakul, P. (2024). Effects of combined dietary intervention and physical-

cognitive exercise on cognitive function and cardiometabolic health of postmenopausal women with obesity: a randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity, 21*(1), 28.

Khazdouz, M., Safarzadeh, R., Hejrani, B., Hasani, M., Mahdavi, F. S., Ejtahed, H.-S., & Qorbani, M. (2025). The association between junk foods consumption and attention deficit hyperactivity disorder in children and adolescents: a systematic review and meta-analysis of observational studies. *European Child & Adolescent Psychiatry, 34*(3), 825-834.

Kholifah, N., Nurtanto, M., Sutrisno, V. L. P., Majid, N. W. A., Subakti, H., Daryono, R. W., & Achmadi, A. (2025). Unlocking workforce readiness through digital employability skills in vocational education Graduates: A PLS-SEM analysis based on human capital Theory. *Social Sciences & Humanities Open, 11*, 101625.

Liang, J., Jiang, J., Cai, T., Liu, C., Ye, J., Zeng, X., & Wang, K. (2024). Advances in selective conversion of carbohydrates into 5-hydroxymethylfurfural. *Green Energy & Environment, 9*(9), 1384-1406.

Lim, W., Mahmood, T., Zaidi, S. A., & Areeb, Y. M. (2024). Leadership dynamics in the knowledge-based landscape: unravelling the mediating forces of cognition on innovative behaviour. *Journal of Information & Knowledge Management, 23*(04), 2450060.

López-Gil, J. F., Quiroz-Cárdenas, F., Montenegro-Espinosa, J. A., Cisneros-Vásquez, E., Miño, C., Castillo-Miñaca, M. E., . . . Masache-Cruz, M. J. (2025). Eating distractions as predictors of ultra-processed food consumption and Mediterranean diet adherence in adolescents. *Scientific Reports, 15*(1), 7579.

Mahmood, T., Imran, M., Ali, L., Khan, A. A., & Rashid, R. M. (2025). Driving Innovation in Pakistani Manufacturing SMEs: How Human, Relational, and Structural Capital Foster Innovative Performance Through Technological Innovativeness, moderating role of Perceived Organizational Support. *Sefarad*.

Mahmood, T., & Mubarik, M. S. (2020). Balancing innovation and exploitation in the fourth industrial revolution: Role of intellectual capital and technology absorptive capacity. *Technological forecasting and social change, 160*, 120248.

Mahmood, T., Mubarik, M. S., Islam, T., & Naghavi, N. (2021). Ambidextrous intellectual capital (AIC): a measuring framework *The dynamics of intellectual capital in current era* (pp. 1-30): Springer.

Martín-Rodríguez, A., Belinchón-deMiguel, P., Rubio-Zarapuz, A., Tornero-Aguilera, J. F., Martínez-Guardado, I., Villanueva-Tobaldo, C. V., & Clemente-Suárez, V. J. (2024). Advances in understanding the interplay between dietary practices, body composition, and sports performance in athletes. *Nutrients, 16*(4), 571.

Masood, W., Annamaraju, P., Suheb, M. Z. K., & Uppaluri, K. R. (2023). Ketogenic diet *StatPearls [Internet]*: StatPearls Publishing.

Monteyne, A. J., Coelho, M. O., Murton, A. J., Abdelrahman, D. R., Blackwell, J. R., Koscien, C. P., . . . Dirks, M. L. (2023). Vegan and omnivorous high protein diets support comparable daily myofibrillar protein synthesis rates and skeletal muscle hypertrophy in young adults. *The Journal of nutrition, 153*(6), 1680-1695.

Moscatelli, F., De Maria, A., Marinaccio, L. A., Monda, V., Messina, A., Monacis, D., . . . Messina, G. (2023). Assessment of lifestyle, eating habits and the effect of nutritional education among undergraduate students in southern Italy. *Nutrients, 15*(13), 2894.

Moschonis, G., & Trakman, G. L. (2023). Overweight and obesity: the interplay of eating habits and physical activity (Vol. 15, pp. 2896): MDPI.

Nagashima, Y., Ehara, K., Ehara, Y., Mitsume, A., Kubo, K., & Mineo, S. (2023). Effects of continuous carbohydrate intake with gummies during the golf round on interstitial glucose, golf performance, and cognitive performance of competitive golfers: a randomized repeated-measures crossover design. *Nutrients, 15*(14), 3245.

Nazarian, A., Ranjbaran, A., Afifi, M., Atkinson, P., & Sadeghilar, N. (2024). Cross-cultural examination of effects of ethical leadership of independent hotels based on Social Exchange Theory. *International Journal of Cross Cultural Management, 24*(3), 463-484.

Nejati, V. (2013). Cognitive abilities questionnaire: Development and evaluation of psychometric properties.

Noble, E. E., Hsu, T. M., & Kanoski, S. E. (2017). Gut to brain dysbiosis: mechanisms linking western diet consumption, the microbiome, and cognitive impairment. *Frontiers in behavioral neuroscience, 11*, 9.

Odhano, Q. A., Mahmood, T., Naqvi, S. R., & Ahmed, M. (2025). From Knowledge to Growth: How Intellectual Capital Drives Technological Innovation and Firm Performance in Pakistan's Manufacturing Sector. *Annual Methodological Archive Research Review, 3*(6), 147-162.

Oleson, S., Gonzales, M. M., Tarumi, T., Davis, J. N., Cassill, C. K., Tanaka, H., & Haley, A. P. (2017). Nutrient intake and cerebral metabolism in healthy middle-aged adults: Implications for cognitive aging. *Nutritional neuroscience, 20*(8), 489-496.

Olivier, B. H. (2024). The relationship between employee well-being and organizational effectiveness. *SA Journal of Industrial Psychology, 50*(1), 1-13.

Osler, M., & Heitmann, B. (1996). The validity of a short food frequency questionnaire and its ability to measure changes in food intake: a longitudinal study. *International journal of epidemiology, 25*(5), 1023-1029.

Poon, E. T.-C., Tsang, J. H., Sun, F., Ali, A., Rollo, I., & Wong, S. H.-S. (2024). Exploring the ergogenic potential of carbohydrate–caffeine combined mouth rinse on exercise and cognitive performance: A systematic review. *Applied Physiology, Nutrition, and Metabolism, 49*(12), 1611-1621.

Purwaningtyas, D. R., Ahmiyanasari, A., & Ningtyas, L. N. (2025). Nutritional Status and Body Composition Based on Junk Food Consumption, Stress, and Sleep Quality among University Administrative Staff. *Jurnal Gizi Kerja dan Produktivitas, 6*(1), 175-184.

Rafique, R., Muzammil, H. S., & Khan, I. U. D. (2025). The Effectiveness of Nutrition, Life Style and Work Place Environment in Relation to Occupational Health and Productivity. *Indus Journal of Bioscience Research, 3*(2), 465-477.

Rama, R., Setyorini, E. E. D., Cuhenda, C., Anggraini, D. U., & Yakin, I. (2024). The Influence Of Cognitive Ability On Employee Performance With Communication As A Moderating Variable. *Innovative: Journal Of Social Science Research, 4*(4), 14687-14697.

Rantala, E., Vanhatalo, S., Valtanen, M., Lindström, J., Pihlajamäki, J., Poutanen, K., . . . Karhunen, L. (2024). Effectiveness of workplace choice architecture modification for healthy eating and daily physical activity. *BMC Public Health, 24*(1), 939.

Ray, C., Nyberg, A. J., & Maltarich, M. A. (2023). Human capital resources emergence theory: The role of social capital. *Academy of Management Review, 48*(2), 313-335.

Robinson, W. T. (2024). *Pandemic-time shifts in food purchasing behavior through the lens of Social Exchange Theory and Social Norms.* The Ohio State University.

Rong, L., Peng, Y., Shen, Q., Chen, K., Fang, B., & Li, W. (2024). Effects of ketogenic diet on cognitive function of patients with Alzheimer's disease: a systematic review and meta-analysis. *The Journal of nutrition, health and aging, 28*(8), 100306.

Saavedra, J. M., & Prentice, A. M. (2023). Nutrition in school-age children: a rationale for revisiting priorities. *Nutrition Reviews, 81*(7), 823-843.

Sakaguchi, Y., Kaimori, J.-Y., & Isaka, Y. (2023). Plant-dominant low protein diet: a potential alternative dietary practice for patients with chronic kidney disease. *Nutrients, 15*(4), 1002.

Salinger, M. R., Levy, D. E., McCurley, J. L., Gelsomin, E. D., Rimm, E. B., & Thorndike, A. N. (2023). Employees' baseline food choices and the effect of a workplace intervention to promote healthy eating: secondary analysis of the ChooseWell 365 randomized controlled trial. *Journal of the Academy of Nutrition and Dietetics, 123*(11), 1586-1595. e1584.

Schwartz-Narbonne, H., Xia, C., Shalin, A., Whitehead, H. D., Yang, D., Peaslee, G. F., . . . Blum, A. (2023). Per-and polyfluoroalkyl substances in Canadian fast food packaging. *Environmental Science & Technology Letters, 10*(4), 343-349.

Shiwen, L., & Ahn, J. (2023). Role of employee personality traits in job performance in the restaurant food franchise context. *International Journal of Hospitality Management, 113*, 103512.

Shrestha, A., Tamrakar, D., Ghinanju, B., Shrestha, D., Khadka, P., Adhikari, B., . . . Bhandari, N. (2024). Effects of a dietary intervention on cardiometabolic risk and food consumption in a workplace. *Plos one, 19*(4), e0301826.

Su, T., Shen, H., He, M., Yang, S., Gong, X., Huang, C., . . . Mi, T. (2024). Quercetin promotes the proportion and maturation of NK cells by binding to MYH9 and improves cognitive functions in aged mice. *Immunity & Ageing, 21*(1), 29.

Torreggiani, M., Wang, A. Y.-M., Fois, A., & Piccoli, G. B. (2023). *Personalized low-protein diet prescription in CKD population: merging evidence from randomized trials with observational data.* Paper presented at the Seminars in Nephrology.

Tzenios, N., Tazanios, M., Chahine, M., & Jamal, P. O. B. (2023). The Positive Effects of the Keto Diet on Muscle Building: A Comprehensive Overview. *Special Journal of the Medical Academy and other Life Sciences., 1*(4).

van der Merwe, C. P., & Olivier, B. H. (2024). The relationship between employee well-being and organizational effectiveness. *SA Journal of Industrial Psychology, 50*, 13.

van Soest, A. P., van de Rest, O., Witkamp, R. F., & de Groot, L. C. (2024). The association between adherence to the EAT-Lancet diet and cognitive ageing. *Age and Ageing, 53*(Supplement_2), ii39-ii46.

Vehovar, V., Toepoel, V., & Steinmetz, S. (2016). *Non-probability sampling* (Vol. 1): The Sage handbook of survey methods.

Virk, R., Corner, A., Combs, J. G., & Jaskiewicz, P. (2024). Social exchanges in family businesses: A review and future research agenda. *Family Business Review, 37*(3), 320-346.

Voordt, T. V. D., & Jensen, P. A. (2023). The impact of healthy workplaces on employee satisfaction, productivity and costs. *Journal of Corporate Real Estate, 25*(1), 29-49.

Warde, A. (2024). Changing Eating Habits *Everyday Eating* (pp. 1-16): Bristol University Press.

Watson, A., Perrigot, R., & Dada, O. (2024). The effects of green brand image on brand loyalty: The case of mainstream fast food brands. *Business Strategy and the Environment, 33*(2), 806-819.

Woyengo, T., Knudsen, K. B., & Børsting, C. (2023). Low-protein diets for broilers: current knowledge and potential strategies to improve performance and health, and to reduce environmental impact. *Animal Feed Science and Technology, 297*, 115574.

Wronska, M. D. (2023). *Designing and evaluating a participatory workplace nutrition intervention to improve the health and well-being of blue-collar (construction) workers*: University of Salford (United Kingdom).

Wu, T., Tan, X., Li, Y., Liang, Y., & Fan, J. (2024). The relationship between occupational fatigue and well-being: the moderating effect of unhealthy eating behaviour. *Behavioral Sciences, 14*(1), 32.

Yamatsugu, K., & Kanai, M. (2023). Catalytic approaches to chemo-and site-selective transformation of carbohydrates. *Chemical Reviews, 123*(10), 6793-6838.

Zatsu, V., Shine, A. E., Tharakan, J. M., Peter, D., Ranganathan, T. V., Alotaibi, S. S., . . . Nayik, G. A. (2024). Revolutionizing the food industry: The transformative power of artificial intelligence-a review. *Food Chemistry: X, 24*, 101867.