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A New Preliminary Model for Studying the Interconnection Between Nutrition and Neuropsychiatric Symptoms: Design and Impact Assessment

Lucia Blendea
Grigore T. Popa University of Medicine and Pharmacy, 16, University Street, 700115 Iasi, Romania.
lucia.blendea@gmail.com, https://orcid.org/0009-0001-1394-4903

Ancuta Andreea Miler
Doctoral School, Grigore T. Popa University of Medicine and Pharmacy, 16 Universitatii Str., 700115 Iasi, Romania.
Department of Surgery, Grigore T. Popa University of Medicine and Pharmacy, 700115 Iasi, Romania. miler.ancuta@umfiasi.ro

Malina Visternicu*
Ioan Haulica Institute, Apollonia University, Pacurari Street 11, 700511 Iasi, Romania. malina.visternicu@yahoo.ro
https://orcid.org/0009-0001-0315-1264

Ioan Gotca
Department of Morpho-Functional Sciences II, Grigore T. Popa University of Medicine and Pharmacy, 16, Universitatii Street, 700115 Iasi, Romania. igotca@yahoo.com
https://orcid.org/0000-0001-7455-344X

Judit Csabai
University of Nyíregyháza, Sóstói street 31/B H-4400 Nyíregyháza, Hungary. csabai.judit@nye.hu.
https://orcid.org/0000-0002-5550-3399

Bogdan Novac*
Faculty of Medicine, University of Medicine and Pharmacy Grigore T. Popa, 700115 Iasi, Romania. bogdannvc@gmail.com
https://orcid.org/0000-0003-4501-1718

Abstract: *Mental, neurological, and substance use disorders represent a major global problem. In this context, nutrition is crucial as it affects both the severity and incidence of neuropsychiatric symptoms. In addition to drug treatments, lifestyle modifications, including dietary interventions and targeted supplementation with specific nutrients, could have a beneficial effect on various neuropsychiatric disorders. This study introduces a preliminary framework for assessing the link between nutrition and neuropsychiatric symptoms. Thus, the Evaluating the Importance of Nutrition in Neuropsychiatric Manifestations (SENM) Scale provides a structured approach to examine how diet affects mental health. The study sample of 264 participants, including patients diagnosed with depression, anxiety, and bipolar disorder, as well as mental health and nutrition specialists. Preliminary results indicate a significant correlation between nutritional deficiencies (e.g., B vitamins, omega-3) and worsening of symptoms. Also, most participants emphasised integrating nutritional education into neuropsychiatric treatments. The conclusions suggest that nutrition can be an effective adjunct in mental health treatments, with practical applications and promising future directions.*

Keywords: *nutrition; mental health; neuropsychiatry; nutritional education; omega-3.*

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Otilia Novac
Faculty of Medicine, University of Medicine and Pharmacy Grigore T. Popa, 700115 Iasi, Romania. otilia76@gmail.com
https://orcid.org/0000-0002-4708-3603

Anca Trifan
Department of Gastroenterology, Grigore T. Popa University of Medicine and Pharmacy of Iasi, University Street No. 16, 700115 Iași, Romania,
Institute of Gastroenterology and Hepatology, St. Spiridon University Hospital, 700115 Iași, Romania. ancatrifan@yahoo.com
https://orcid.org/0000-0001-9144-5520

Daniel Vasile Timofte
Department of Surgery, Grigore T. Popa University of Medicine and Pharmacy, 700115 Iasi, Romania. daniel.timofte@umfiasi.ro
https://orcid.org/0000-0002-6604-874X

** Corresponding Authors*

1. Introduction

Mental health is influenced by a variety of environmental and genetic factors, and in recent years, evidence regarding the link between nutrition and neuropsychiatric manifestations has become increasingly consistent (Adan et al., 2019; Gautam et al., 2024). Nutrition not only supports optimal body functioning but also plays a significant role in regulating neurochemical and neuroinflammatory processes involved in psychiatric disorders. The consequences of a poor diet also have an impact on obesity, which is a global health threat because it presents numerous obesity-related comorbidities, including Alzheimer's disease and depression (Owen & Corfe, 2017). Many studies highlight the importance of essential nutrients in nervous system health, including B and D vitamins, polyunsaturated fatty acids (PUFAs), as well as mineral components such as magnesium (Mg), zinc (Zn), copper (Cu), selenium (Se) (Muscaritoli, 2021; Zielińska, Łuszczki, & Dereń, 2023).

Although the field of nutritional psychiatry is new (Jacka, 2017), recent studies highlight a close connection between daily diet and mental health. However, while many of these studies have focused on specific nutrients or isolated aspects of nutrition, this study aims to provide a comprehensive evaluation of the broader impact of nutrition on neuropsychiatric symptoms, with particular attention to nutrient deficiencies and their role in mental health disorder. To maintain the normal function of the body, good nutritional status is necessary. Nutritional deficiencies lead to impaired body functions (Muscaritoli, 2021). Vitamins and minerals are necessary for humans due to their essential roles in a variety of metabolic pathways. They engage in DNA synthesis, oxygen transport, and neuronal functions, which are essential for brain function (Tardy et al., 2020). Vitamin C, for example, contributes to the protection of cells against reactive oxygen species and supports the inflammatory response (Wintergerst, Maggini, & Hornig, 2006). Vitamin C is a vital antioxidant molecule in the brain and helps maintain the integrity and function of several processes in the central nervous system, including neuronal maturation and differentiation. Furthermore, abnormal concentrations of this vitamin in nervous tissue are associated with neurological disorders (Kocot et al., 2017). B vitamins, including B6 and B12, are directly involved in the synthesis of some neurotransmitters. Vitamin B12 delays the onset of signs of dementia, but it must be taken before the first symptoms appear. Moreover, cobalamin supplementation improves brain and cognitive functions in the elderly (Selhub et al., 2000). Inadequate intake of vitamins (folate, B6, B12) may be associated with neurocognitive and neurological dysfunctions (Selhub et al., 2000). Vitamin D engages in the prevention of various aspects of neurodegenerative diseases, and vitamin K engages in the biochemistry of nerve tissue (Bourre, 2006). Zn deficiency is quite common among psychogeriatric patients and appears to be more pronounced in those suffering from other psychiatric disorders besides depression (Grønli et al., 2013). Omega-3 fatty acids are natural products that have neuroprotective, anti-inflammatory, and antioxidant effects that intervene in the regulation of glucose in the brain and ensure its optimal development (Chitre, Moniri, & Murnane, 2019; Pifferi, Cunnane, & Guesnet, 2020).

Minerals such as Mn, Cu, and Zn participate in various enzymatic mechanisms that protect against free radicals (Bourre, 2006). Iron is necessary because it ensures oxygenation and can also produce energy in the brain parenchyma and is also important for the synthesis of neurotransmitters and myelin. It has been found that children with attention deficit hyperactivity disorder (ADHD) have Fe deficiency. Mg is the second most abundant intracellular cation in the human body, having numerous important biological roles, including oxidation-reduction but also in ionic regulation. Iodine ensures the energy metabolism of brain cells and its reduction in diet during pregnancy induces severe brain dysfunctions (Bourre, 2006; Muscaritoli, 2021). Nutrient deficiencies, including protein, vitamin D, B vitamins, Mg, Zn, Fe, Ca, Se, and omega-3 fatty acids, have a significant impact on brain and nervous system function, which may contribute to depressive symptoms (Zielińska, Łuszczki, & Dereń, 2023). Furthermore, the fluid requirement of normally hydrated adults is 30–40 ml/kg body weight/day, but fluid requirements typically increase during fever (Biesalski et al., 2009).

Many studies have explored the link between diet and gut microbiota, because dietary interventions have the potential to shape the composition of the gut microbiota (Hibberd et al., 2017; Alou, Lagier, & Raoult, 2016). Nutritional deficiencies can alter gut microbiota (Hibberd et al., 2017). The gut microbiota has also been shown to be an additional regulator of the gut-brain axis, which may be involved in numerous neurodegenerative and neurodevelopmental disorders (Cenit, Sanz, & Codoñer-Franch, 2017). The gut-brain axis consists of the bidirectional exchange between the gastrointestinal tract and the central nervous system (Appleton, 2018). In addition, it has been observed that the intestinal microbiota can affect brain functions by modulating the neurotransmission of the serotonergic, dopaminergic, noradrenergic, glutamatergic, and gamma-aminobutyric acid (GABA) systems (Socała et al., 2021). The gut microbiome affects the brain by altering levels of key brain transmitters, circulating cytokines, and short-chain fatty acids (SCFA) that can cross the blood-brain barrier (Dübüş et al., 2023). Gut bacteria have been associated with various mental disorders, including depression, bipolar disorder, schizophrenia, and autism, with patients having significant alterations in their gut microbiota. These alterations can be influenced by nutritional, ergogenic, and behavioural interventions, such as exercise (Clemente-Suárez et al., 2024).

To better contextualise the relationship between nutritional deficiencies, emotional distress, and neuropsychiatric symptoms, several theoretical frameworks can be considered. For instance, the neurocognitive stress theory posits that chronic stress impairs cognitive function by altering brain structures and neurochemical pathways, which may contribute to symptom severity (Lupien et al., 2009; McEwen, 2007). Similarly, developmental trauma theory highlights how early life stress and trauma impact neurodevelopment and increase vulnerability to cognitive impairments and emotional dysregulation later in life (Anda et al., 2006; Teicher & Samson, 2016). These models help explain how emotional distress, potentially exacerbated by nutritional deficiencies, may lead to cognitive deficits and psychiatric symptoms, including suicidal ideation. Integrating such frameworks provides a robust theoretical basis for understanding the complex interactions observed in this study.

This study builds upon these findings by introducing a novel framework for assessing the relationship between nutrition deficiencies and neuropsychiatric symptoms, using the SENM scale, and emphasising the role of nutrient deficiencies and gut microbiota in the development of mental health disorders. This framework and the SEMN Scale represent a preliminary but innovative attempt to structure the subjective association between nutrition and psychiatric manifestations. By focusing on perception, the study aims to identify potential models that can inform the development of future standardised instruments in nutritional psychiatry. The originality of this approach lies in its integrative perspective and exploratory methodology, addressing a growing need for conceptual and practical tools in this emerging field.

2. Nutritional Assessment and Estimation of Nutritional Needs

Nutritional health is maintained by balancing nutrient intake with the body’s requirements (Jeejeebhoy, 2015). When net nutrient intake is less than required, malnutrition occurs, leading to a cascade of metabolic abnormalities, loss of body mass, physiological changes, and reduced organ and tissue function (Jeejeebhoy, 2015). According to the World Health Organization (WHO), malnutrition poses a significant threat to human health. Maintaining a healthy diet throughout life helps prevent malnutrition and other nutritionally related diseases. Royall (2015) emphasises the importance of strategies in the context of preventing, detecting, and treating malnutrition in hospitals and other care settings in Canada. Detecting malnutrition through nutritional risk screening is a first step in an effective intervention programme. Protein-calorie malnutrition occurs when the body's protein stores are depleted due to semi-starvation. To prevent this type of malnutrition, initiatives such as protected meal programmes are implemented, which reduce meal interruptions and provide support to patients (Royall, 2015).

According to the American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines, it is essential to perform a nutritional screening for critically ill patients (McClave et al., 2016). If it is predicted that the patient will not be able to consume sufficient nutrients orally for a period of 5-7 days, specialised nutritional support should be initiated (Kreymann et al., 2006). Nutrients are administered parenterally if the enteral method is not appropriate or possible. Nutritional screening is performed in critically ill patients to identify patients at risk of malnutrition. Nutritional screening should also consider the impossibility of a complete nutritional assessment and the influence of fluid balance and stress response on weight and proteinemia. Anthropometric measures such as patient weight in intensive care is technically difficult and can fluctuate due to fluid changes during the intensive care stay (Narayan, Gudivada, & Krishna, 2020).

Nutritional goals in trauma, burns, and sepsis include meeting caloric needs and achieving a positive nitrogen balance in the short term to support protein synthesis and reduce catabolism. In the long term, the goal is to minimise lean body mass loss and maximise wound healing, by ensuring adequate nutrient supply for tissue regeneration. Enteral nutrition is the primary method of support, and a high-carbohydrate, low-fat diet is preferred because it reduces pneumonia rates and promotes a positive nitrogen balance, unlike lipids (Shields & Nakakura, 2023). Total daily calorie requirements are calculated using the Harris-Benedict (HB) equation and adjusted using a previously measured activity and injury factor to arrive at daily requirements (Long et al., 1979).

Although the HB equations are commonly used to estimate energy requirements, their accuracy varies depending on patient characteristics. In obese individuals, the HB equations are more accurate, with an accuracy of 68.5% for patients with a body-mass index (BMI) between 25 and 40 kg/m^2 and 62.4% for those with a BMI above 40 kg/m^2. In contrast, for healthy individuals of normal weight, these equations remain among the best for estimating resting energy expenditure. However, the accuracy of the HB equations decreases significantly in the elderly or in patients with extreme BMI, as well as in those with chronic or acute conditions, where they tend to overestimate or underestimate energy requirements. Thus, although the HB equations are widely used and perform well under certain conditions, they present important limitations, especially for patients requiring complex nutritional interventions (Bendavid et al., 2021).

Given these limitations, measuring energy expenditure by indirect calorimetry (IC) is essential to determine basal metabolic rate and guide appropriate energy prescription. IC is a clinically recommended method for assessing energy expenditure. This, together with technologies for assessing body composition, are essential tools for correct therapeutic adjustments (Bendavid et al., 2021; Mtaweh et al., 2018). By using IC, differences between actual caloric needs and standard estimates can be accurately determined, allowing for more precise interventions. In the absence of this method, calculating caloric needs using the HB equation, with a stress factor of 1.4, is a commonly used alternative (González et al., 2023).

In addition to assessing energy needs, another important aspect of nutrition is the proportion of macronutrients in the diet, which should be adjusted according to the patient's age, weight, and health status. The main macronutrients are carbohydrates, proteins, and fats (Espinosa-Salas & Gonzalez-Arias, 2023), and their proportion in the diet can be adjusted according to individual needs, without there being a perfect universal balance. Thus, the recommendations for the daily intake of macronutrients, expressed as a percentage of total energy consumed are: for children (1-3 years), 30-40% fat, 45-65% carbohydrates, and 5-20% protein are recommended. For children between 4-18 years, the fat intake is 25-35%, and proteins should represent 10-30% of energy (Institute of Medicine (US) Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, 2011). Furthermore, the European Society for Clinical Nutrition and Metabolism (ESPEN) recommends a daily protein intake for healthy people over 65 years of 1.0-1.2 g protein/kg body weight. In the case of acute or chronic diseases, the requirement increases to 1.2-1.5 g/kg/ body weight, and in severe cases, such as injuries or malnutrition, to 2.0 g/kg/ body weight. Studies suggest that a higher protein intake is needed even from the age of 50 to prevent age-related muscle loss (Lonnie et al., 2018). In adults, fat should be between 20-35%, carbohydrates between 45-65%, and protein between 10-35%. A consistent intake of 5-10% of energy from n-6 PUFAs and 0.6-1.2% from n-3 PUFAs is also recommended for all age groups. These guidelines help ensure a healthy nutritional balance to support the development and maintenance of health (Institute of Medicine (US) Committee to Review Dietary Reference Intakes for Vitamin D and Calcium, 2011).

In a balanced diet, proteins, carbohydrates, and lipids play distinct and complementary roles, being essential for maintaining health and supporting metabolic processes. Although dietary proteins contain 4 kcal of energy per gram, lipids, and carbohydrates are considered more efficient sources of energy. The main role of dietary proteins is to provide amino acids, which, in turn, provide nitrogen, hydrocarbon structures, and sulfur. In the human body, amino acids are used for mechanical and structural functions, contributing to the synthesis of enzymes, hormones, antibodies, cytokines, transporters, and neurotransmitters. Ingestion of dietary protein increases the availability of amino acids, stimulates protein synthesis, inhibits protein catabolism, and helps regulate whole-body protein balance (Espinosa-Salas & Gonzalez-Arias, 2023). Protein intake below the recommended dietary allowance (0.8 g/kg/ body weight) may lead to muscle loss, and higher intakes (≥1.1 g/kg/ body weight) are associated with better maintenance of lean body mass (Lonnie et al., 2018).

Carbohydrates are an important source of dietary energy, providing 4 kcal of energy per gram, and their intake increases blood glucose levels and stimulates insulin secretion, promoting glucose uptake into tissues and glucose storage as glycogen. Furthermore, carbohydrates play an important role in gut health and immune function. An example of carbohydrates is fiber, which has a role in promoting satiety, improving gastrointestinal function, and reducing cholesterol levels (Espinosa-Salas & Gonzalez-Arias, 2023).

Lipids are the most energy-dense macronutrient, providing 9 kcal of energy per gram. They are essential to produce sex hormones, maintenance of cellular structure, storage of energy as body fat, protection against physical trauma, and absorption of fat-soluble vitamins A, D, E, and K. Triglycerides, phospholipids, sterols, and fatty acids are dietary fats (Espinosa-Salas & Gonzalez-Arias, 2023). In addition to macronutrients, micronutrients play a crucial role in preventing nutritional deficiencies and supporting normal physiological functions. In patients with traumatic brain injury (TBI), malnutrition is associated with increased mortality and adverse neurological outcomes. Appropriate nutritional therapy, initiated promptly, is essential to improve the prognosis of these patients. In this context, micronutrient depletion can worsen the clinical condition, and adequate provision of micronutrients in parenteral nutrition regimens becomes a priority. Trace elements considered essential for human health include metals, the metalloid selenium, and the non-metallic iodine. Ensuring an adequate intake of these elements contributes to supporting metabolic processes, tissue repair, and reducing the risks associated with nutritional deficiencies (Lee & Oh, 2022).

Calculating the energy needs of patients is an essential component of nutritional support, and the use of the Harris-Benedict equation to estimate the basal metabolic rate (BMR) is a common method (Houmøller et al., 2024). The energy requirement is approximately 40% higher than the value estimated by this equation.

For men, the equation is: *BEE = 66.5 + (13.75 x weight in kg) + (5.003 x height in cm) - (6.775 x age in years)*

For women, the equation is: *BEE = 655.1 + (9.563 x weight in kg) + (1.850 x height in cm) - (4.676 x age in years).*

However, critically ill patients, such as those with a very low Glasgow Coma Scale score, have significantly higher energy requirements, as can be seen from the relationships mentioned for estimating resting metabolic expenditure. This increase reflects the intense metabolic activity associated with critical conditions, suggesting the importance of an accurate assessment of resting metabolic expenditure (Clifton, Robertson, & Choi, 1986). In this context, IC is considered the gold standard for determining energy needs, providing a non-invasive method that allows for the personalisation of nutritional support and improved clinical outcomes (Delsoglio et al., 2019). Recent developments allow for accurate and easy measurement of IC in patients, promoting its use in routine clinical practice.

In addition to energy requirements, protein and amino acid metabolism play a crucial role in maintaining body homeostasis, especially in critically ill patients. Protein contributes to energy expenditure (12–15% of total daily expenditure in the postabsorptive state) by releasing amino acids after proteolysis. This process can occur directly (e.g., the utilisation of branched-chain amino acids in muscle) or indirectly, through gluconeogenesis and ketogenesis (Weijs et al., 2014). Branched-chain amino acids (BCAAs), including leucine, isoleucine, and valine, are essential, with metabolic benefits and implications for central nervous system health. Emerging research suggests that BCAA metabolism may influence neurotransmitter synthesis and neuronal health, potentially contributing to mechanisms involved in neurodegenerative diseases such as Alzheimer's, Parkinson's, and amyotrophic lateral sclerosis (Yoo, Shanmugalingam, & Smith, 2022).

Nutritional support, either enteral or parenteral, is a core intervention in critically ill patients. This includes enteral nutrition (by oral ingestion or administration through a tube into the gastrointestinal tract) and parenteral nutrition (intravenous administration), which has evolved significantly in recent decades. Enteral nutrition is preferred to maintain intestinal function and prevent increased permeability to toxins. It is recommended to initiate enteral or parenteral nutrition within the first 24–48 hours after admission to the intensive care unit to prevent malnutrition, infectious complications, and increased mortality (de Aguilar-Nascimento, Bicudo-Salomao, & Portari-Filho, 2012). Especially in patients with TBI, initiating nutritional support within the first 72 hours is crucial to improve survival (Meinert et al., 2018). Administration of protein in the form of peptides can improve their absorption and utilisation, and medium-chain triglycerides can support faster recovery of patients (Tsuji et al., 2001; Yamamoto et al., 2020). In implementing nutritional support, a multidisciplinary approach plays a vital role, and effective communication between patients, their families, and their caregivers is essential. Dietary advice should be tailored according to the stage of the disease, prognosis, and needs of the patient, considering social, physical, psychological, and cultural aspects. Careful monitoring of blood glucose and appropriate adjustment of insulin therapy are critical aspects for optimising nutritional support, contributing to a faster and more effective recovery (de Aguilar-Nascimento, Bicudo-Salomao, & Portari-Filho, 2012; Porter et al., 2021). More than 90% of physicians and dietitians strongly recommend initiating enteral or parenteral nutrition within 24–48 hours of patient admission to an intensive care unit (de Aguilar-Nascimento, Bicudo-Salomao, & Portari-Filho, 2012).

3. Methodology

This was a cross-sectional, observational, and exploratory study based on self-reported data, aiming to investigate the perceptions of patients and professionals regarding the influence of nutrition on mental health.

3.1. Participants

The sample included 264:

1. *Patients* (n=264): Diagnosed with neuropsychiatric disorders, such as depression (n=89), anxiety (n=102), and bipolar disorder (n=73).

2. *Professionals* (n=40): Psychiatrists, clinical psychologists, and nutritionists.

Participants were selected based on inclusion criteria that targeted age (18-65 years), clinically confirmed diagnosis for patients, and relevant professional experience for professionals. Participants who reported diagnosed eating disorders or other serious medical conditions that could influence responses were excluded from the study.

A perception based on methodology was considered suitable given the objective nature of dietary experiences and beliefs, particularly in the context of mental health. At this early stage of investigation, the study aimed to identify trends and generate hypotheses to guide future experimental or longitudinal studies involving biochemical validation.

3.2. Instruments

The Scale for Evaluation of the Importance of Nutrition in Neuropsychiatric Manifestations (SENM) was used for data collection. This is a self-report scale, comprising 20 items rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree), that measures perceptions of the impact of diet on mental health. To test the convergent validity of SENM, the Pearson correlation coefficient was calculated between SENM and the Eating Disorder Inventory (EDI). The results showed a significant positive correlation between the two scales ($r = 0.72$, $p < 0.01$), suggesting that SENM measures a construct similar to that of EDI and is a valid tool for evaluating perceptions of nutrition in a neuropsychiatric context. To assess the reliability of the scale, Cronbach's Alpha coefficient was calculated, which measures the internal consistency of the items in the questionnaire. A value above 0.7 is considered acceptable, while a coefficient above 0.8 indicates high internal consistency. The analysis results showed that SENM has a Cronbach's Alpha coefficient of 0.9, suggesting excellent reliability. This indicates that the scale items consistently measure the intended construct. However, as the data were collected using self-report instruments, the findings reflect subjective perceptions rather than objective clinical or biochemical measures. The data were processed using Microsoft Excel and statistically analysed in SPSS to assess the scale's internal consistency, convergent validity, and factor structure. Statistical methods such as Cronbach's Alpha coefficient for reliability, exploratory factor analysis to identify the latent structure of the scale, and Pearson's correlation (Gibson, 2006). An exploratory factor analysis was conducted to determine the latent structure of the scale and validate the factors measured by SENM. The Kaiser-Meyer-Olkin (KMO) test was used to verify the sample's adequacy, and the analysis revealed a value above 0.8, indicating good data suitability for this method.

3.3. Procedure

Data were collected through questionnaires distributed both physically and electronically. Each participant completed the SENM scale, and patients provided information about their current eating habits and symptoms. Specialists assessed the importance of nutrition education in psychiatric treatments.

3.4. Statistical Analysis

Descriptive statistics: to summarise the general characteristics of the sample and the responses from participants. This method was chosen to provide an overview of data, such as demographic information, means, and standard deviation, which helps in understanding the distribution and central tendency of the variables. Descriptive statistics are essential for presenting the data in a simplified form, making it easier for readers to understand the key features of samples, especially for those unfamiliar with the more complex aspects of the analysis.

Pearson correlations: to explore the relationship between nutritional deficiencies and symptom severity in neuropsychiatric disorders. This method was selected because it is ideal for examining the linear relationship between two continuous variables. In this study, the variables were nutritional deficiencies and severity of symptoms. Pearson's correlation is widely used in similar research to understand how one variable may relate to or predict another. Before conducting Pearson correlation analyses, the data distribution was evaluated through visual inspection of histograms and found to be approximately normal, justifying the use of parametric methods. Each correlation includes the Pearson coefficient (r) and associated p-value, allowing interpretation of both strength and statistical significance.

Independent samples t-tests were used to compare responses across genders. This statistical technique was chosen because it is specifically designed to compare the means of two independent groups – in this case, male and female participants. The independent samples t-test is appropriate for comparing continuous outcomes between two distinct groups, which is what we needed to assess potential gender differences in perceptions regarding the impact of diet on mental health.

Cronbach Alpha coefficient: was used to assess the internal consistency of the SENM scale. This measure was selected because it evaluates how consistently the items within the scale measure the same underlying construct. In our case, it was important to verify that the 20 items on the SENM scale were consistently capturing participants' perceptions of the relationship between nutrition and mental health. A high Cronbach alpha value would indicate that the items on the scale are reliable in measuring this construct.

Statistical analysis was performed using SPSS software, version 26. The statistical significance level was set at $p<0.05$. A p-value below 0.05 indicates that the probability of observing the results by chance is less than 5%, which supports the reliability of our findings.

The study will involve a sample of 264 subjects, including patients diagnosed with neuropsychiatric disorders (depression, anxiety, bipolar disorder) and mental health and nutrition specialists (psychiatrists, psychologists, nutritionists). Each participant was administered the SENM, a self-report scale that assesses perceptions of the impact of diet on mental health. The data were statistically analysed to identify trends and correlations between perceptions and demographic factors, as well as the type of disorder.

Preliminary analysis indicated that 76% of patients believe that their diet has a direct impact on their mental state. Of these, 65% reported that symptoms of anxiety and depression were reduced with the adoption of diets rich in essential nutrients. Specialists also highlighted a correlation between nutritional deficiencies and the worsening of neuropsychiatric symptoms. Both groups emphasised the need to integrate nutrition education into neuropsychiatric treatments.

The study demonstrates a widespread perception of the importance of nutrition in the management of neuropsychiatric manifestations, both among patients and specialists. The results suggest that nutrition could be a valuable adjunct to mental health treatments, highlighting the need for further research and the implementation of nutrition education programmes in practice. The SENM scale proved to be an effective tool for measuring perceptions and can be used in future longitudinal studies to investigate the long-term impact of diet on neuropsychiatric health.

This report presents the results of a statistical analysis conducted to assess the relationship between diet and mental health. Data were collected through a Likert-type questionnaire, and the analysis included descriptive statistics, correlations, t-tests, and assessment of scale consistency using the Cronbach Alpha coefficient.

The data set includes responses from 264 participants to a questionnaire investigating the influence of diet on mental health. The analysis focused on:

a) Descriptive statistics to summarise the data.
b) Correlations to identify relationships between variables.
c) T-tests to compare differences by gender.
d) Evaluation of the internal consistency of the scale using Cronbach Alpha.

4. Results

4.1. Descriptive Statistics

Of the total participants, 144 were female (54.5%) and 120 were male (45.5%). The mean age was 38.7 years (standard deviation = 9.4). Most patients (76%) reported that they perceived their diet as having a direct impact on their mental health.

4.2. Correlations

Correlation analysis revealed the following:

B complex vitamin deficiencies (B6, B9, B12) were significantly correlated with the severity of depressive symptoms ($r = 0.48$, $p < 0.001$).

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Low levels of omega-3 fatty acids were associated with worsening anxiety symptoms ($r = 0.42$, $p < 0.01$). Diets high in processed foods were negatively associated with reported emotional stability ($r = -0.36$, $p < 0.05$).

4.3. Gender Differences

Independent samples t-tests showed no significant gender differences in perceptions of the impact of nutrition on mental health ($p > 0.05$).

4.4. Internal Consistency of the SENM Scale

The Cronbach Alpha coefficient calculated for the SENM scale was 0.998, indicating excellent internal consistency and validity of its use in this context.

65% of patients reported a significant reduction in symptoms of anxiety and depression after adopting diets rich in essential nutrients.

85% of specialists emphasised the importance of integrating nutritional education into neuropsychiatric treatment plans.

Descriptive statistics for the variables studied are presented concisely in Table 1. Each variable represents a specific measure or parameter analysed in the research, and the corresponding values are presented along with the standard deviation (SD) and median. The standard deviation is a measurement related to the median, which suggests that if the standard deviation is large, the data points are far from the median, and if the SD is small, it indicates that they are closely grouped around the median.

In Table 1, we observe that the standard deviation (SD) values vary slightly across items, ranging from **0.816840** to **0.919444**, suggesting a moderate degree of variability in participants' responses regarding their perception of the relationship between diet and mental health.

Table 1. Descriptive statistics including: Variable, Standard Deviation, and Median

Variables	***Median***	***SD***
1. I believe that a balanced diet helps me better manage my anxiety.	0,278952275720777	0,919444479705275
2. A diet rich in essential vitamins and minerals positively influences my mental health.	0,278952275720777	0,919444479705275
4. I notice an improvement in my mood when I adopt a balanced diet.	0,247822748718449	0,816839574675653
5. I notice an improvement in my symptoms of depression when I adopt a balanced and healthy diet.	0,254292796090749	0,838165263181052
6. I believe that mental health can be significantly influenced by my daily diet.	0,252461131459023	0,832127979814353
7. Frequent consumption of processed foods negatively affects my emotional state and energy level.	0,320259986092493	1,0555973258235
8. During times of stress, a balanced diet helps me maintain my emotional stability.	0,212538368244295	0,700540007794707
9. Regular consumption of foods rich in Omega-3 helps me maintain my emotional balance.	0,273350253904272	0,900979858755096
10. A sufficient intake of complex carbohydrates helps me better manage my anxiety symptoms.	0,244997571239483	0,807527609643246
11. I believe that nutrition has no real impact on my mental health.	0,260898903880313	0,859939415493515
12. Changes in my diet have no effect on my mood.	0,397233623745259	1,30930734141595
13. I see no connection between what I eat and my anxiety levels.	0,397233623745259	1,30930734141595
14. An unhealthy diet does not significantly affect my mood.	0,397233623745259	1,30930734141595
15. Eating processed foods does not affect my emotional state at all.	0,397233623745259	1,30930734141595
16. I do not believe that a balanced diet helps me manage symptoms of depression or anxiety.	0,397233623745259	1,30930734141595
17. No matter what I eat, my mental health does not change.	0,397233623745259	1,30930734141595
18. Nutritional deficiencies have no influence on my mental state.	0,397233623745259	1,30930734141595
19. My stress level is not influenced by the foods I eat.	0,397233623745259	1,30930734141595
20. Foods rich in Omega-3 do not affect my emotional balance at all.	0,397233623745259	1,30930734141595

SD – standard deviation

This variation indicates that while many participants may share similar views, there is still some diversity in individual opinions. Notably, two of the items show the highest SD value of **0.919444**, which may suggest a slightly wider range of perspectives or uncertainty about those specific statements. On the other hand, the lowest SD of **0.816840** indicates more agreement among participants for that particular item.

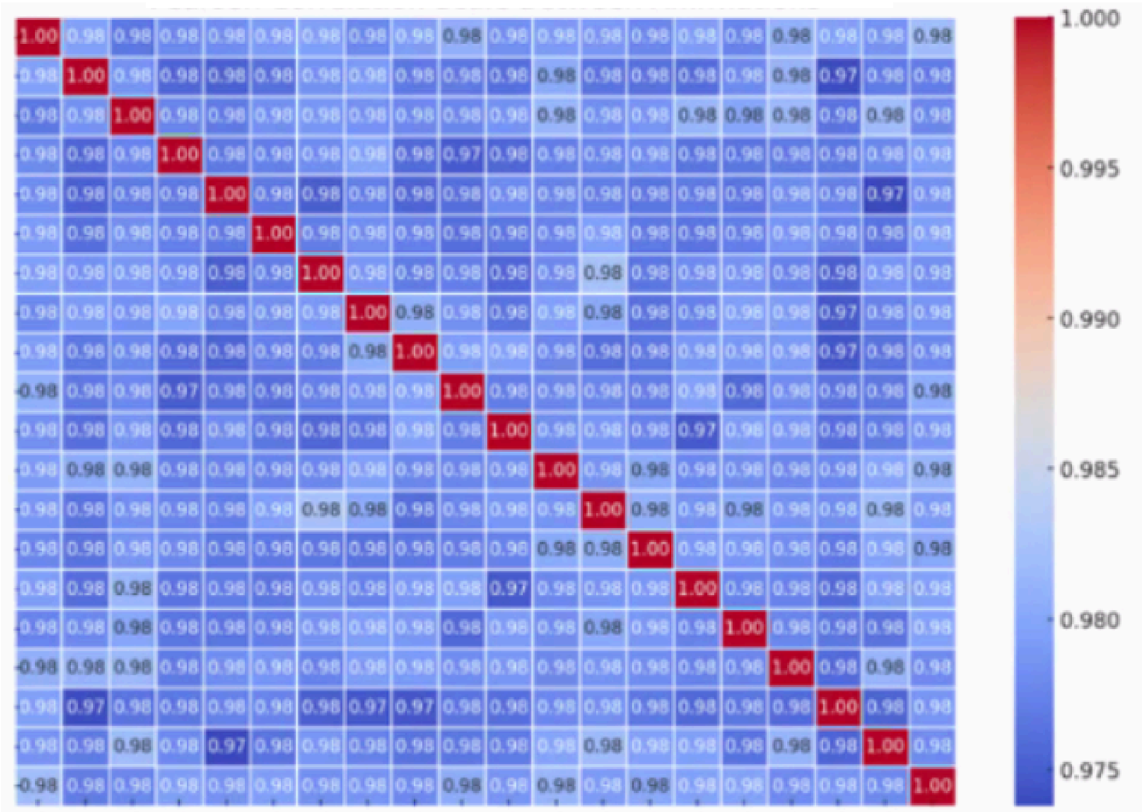

Figure 1. Analysis of Person correlations between statements

4.5. Correlations

The Pearson correlation coefficient (r) is the most common way to measure a linear correlation. It is a number between -1 and 1 that measures the strength and direction of the relationship between two variables. When one variable changes, the other variable changes in the same direction. Figure 1 shows the analysis of the correlations between the statements, namely how the participants perceive the links between the different nutritional and psychological aspects.

4.6. T-tests

The t-test is a statistical test used to compare the means of two independent groups and determine whether there is a significant difference between them.

4.7. Significant Differences between Genders

There are no significant differences between genders in the statements made - the difference between the mean values is not statistically significant ($p > 0.05$).

4.8. Group Statistics

According to Table 2, there are no significant differences between men and women in their perception of the link between nutrition and mental health, given that the means for each statement are very close (3.73 for men and 3.64 for women), and the differences between the means are not statistically significant ($p > 0.05$). These values suggest that both groups have a similar view of the impact of a balanced diet on their mental state.

Table 2. Significant differences between genders

	Gender (1M2F)	n=	Mean	SD	SEM
1. I believe that a balanced diet helps me better manage my anxiety.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
2. A diet rich in essential vitamins and minerals positively influences my mental health.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
4. I notice an improvement in my mood when I adopt a balanced diet.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
5. I notice an improvement in my depression symptoms when I adopt a balanced and healthy diet.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
6. I believe that mental health can be significantly influenced by my daily diet.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
7. Frequent consumption of processed foods negatively affects my emotional state and energy level.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
8. During times of stress, a balanced diet helps me maintain my emotional stability.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
9. Regular consumption of foods rich in Omega-3 helps me maintain my emotional balance.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
10. A sufficient intake of complex carbohydrates helps me better manage my anxiety symptoms.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
11. I believe that diet has no real impact on my mental health.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
12. Changes in my diet have no effect on my mood.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
13. I see no connection between what I eat and my anxiety levels.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
14. An unhealthy diet does not significantly affect my mood.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
15. Eating processed foods does not affect my emotional state at all.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
16. I do not believe that a balanced diet helps me manage symptoms of depression or anxiety.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
17. No matter what I eat, my mental health does not change.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
18. Nutritional deficiencies have no influence on my mental state.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
19. My stress level is not influenced by the foods I eat.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074
20. Foods rich in Omega-3 do not affect my emotional balance at all.	1	144	3.73	.750	.063
	2	119	3.64	.810	.074

SD – Standard Deviation; SEM - Standard Error Mean

4.9. Independent Samples Test

The independent samples t-test (Table 3) compares the means of two independent groups to determine whether there is statistical evidence that the associated population means are significantly different. The Levene test evaluates the hypothesis that the variances of the two groups are equal. In this case, the p-value associated with the Levene test is 0.175 for each of the statements analysed, which is much higher than the significance threshold of 0.05. This suggests that there are no significant differences between the variances of the two groups. The results of the t-test for each statement suggest that the differences between the means of the two groups are not significant. The p-value for each of the t-tests is 0.348, which is much higher than the significance threshold of 0.05. This result indicates that the differences between the groups are not statistically significant.

The mean differences between the groups are also very small, approximately 0.091, and the confidence interval for the mean difference ranges from -0.099 to 0.280, including zero. This confirms that there is no significant difference between the groups. Thus, the results indicate that there are no significant differences between men and women in terms of perceptions related to the influence of a balanced diet on mental health, anxiety management, mood, and depressive symptoms.

Table 3. Independent samples test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
1. I believe that a balanced diet helps me better manage my anxiety.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
2. A diet rich in essential vitamins and minerals positively influences my mental health.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
4. I notice an improvement in my mood when I adopt a balanced diet.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
5. I notice an improvement in my depression symptoms when I adopt a balanced and healthy diet.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
6. I believe that mental health can be significantly influenced by my daily diet.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
7. Frequent consumption of processed foods negatively affects my emotional state and energy level.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
8. During times of stress, a balanced diet helps me maintain my emotional stability.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
9. Regular consumption of foods rich in Omega-3 helps me maintain my emotional balance.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
10. A sufficient intake of complex carbohydrates helps me better manage my anxiety symptoms.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
11. I believe that diet has no real impact on my mental health.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282

12. Changes in my diet have no effect on my mood.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
13. I see no connection between what I eat and my anxiety levels.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
14. An unhealthy diet does not significantly affect my mood.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
15. Eating processed foods does not affect my emotional state at all.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
16. I do not believe that a balanced diet helps me manage symptoms of depression or anxiety.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
17. No matter what I eat, my mental health does not change.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
18. Nutritional deficiencies have no influence on my mental state.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
19. My stress level is not influenced by the foods I eat.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282
20. Foods rich in Omega-3 do not affect my emotional balance at all.	Equal variances assumed	1.850	.175	.939	261	.348	.091	.096	-.099	.280
	Equal variances not assumed			.932	243.522	.352	.091	.097	-.101	.282

4.10. Cronbach's Alpha

The calculated Cronbach's Alpha coefficient is 0.9989 for a set of 20 items, indicating an extremely high level of internal consistency among the items. This suggests that the items are highly dependable and measure the same underlying construct effectively.

5. Discussions

The study highlighted a common perception of the importance of nutrition in the management of neuropsychiatric manifestations. Previous studies have shown that there is a significant correlation between diet, stress susceptibility (Adan et al., 2019), metabolism and neuropsychiatric diseases, including schizophrenia, anxiety and depression (Vasile et al., 2024). Furthermore, our research confirmed some of the conclusions already obtained in the specialised literature, such as the essential role of nutrition in improving neuropsychiatric symptoms and increasing the quality of life of patients (Granero, 2022). In their study, Adan et al. (2019) provide an overview of the emerging field of nutritional psychiatry, exploring the scientific evidence that emphasises the importance of a balanced diet for mental health (Adan et al., 2019). Both patients and specialists noted the benefits of balanced diets on symptoms of anxiety and depression. These results support the integration of nutritional interventions into conventional mental health treatments.

The results of this study highlight a widespread perception of the importance of nutrition in the management of neuropsychiatric symptoms, both among patients and specialists (Grosso et al., 2014). The significant correlations between nutritional deficiencies and the severity of anxiety and depression symptoms support existing hypotheses in the specialised literature regarding the role of nutrition in mental health (Grosso et al., 2014; Levant, 2013). These findings are in line with previous studies demonstrating the benefits of nutrient-rich diets in reducing systemic inflammation and supporting the gut-brain axis (Aziz et al., 2024).

However, it is important to consider potential confounders that could influence the observed correlation. While the study shows a clear connection between nutritional deficiencies and neuropsychiatric symptoms, external factors such as stress levels, lifestyle choices, and genetic predispositions may also contribute significantly to the severity of symptoms and the effectiveness of dietary interventions (Migliore & Coppedè, 2009). For example, environmental exposures like pesticides, herbicides, metals (including manganese and lead), and tobacco use have been associated with increased risk of neurodegenerative diseases. Lifestyle habits such as caffeine intake and physical activity may reduce this risk, while stress and poor dietary patterns could exacerbate symptoms, further emphasising the importance of considering these factors in clinical settings (Migliore & Coppedè, 2009). Furthermore, physical activity, sleep patterns, and general health habits could have a direct impact on both mental health and how individuals respond to nutritional changes (Giuntella et al., 2021; Walsh, 2011). Stress is another crucial factor that can exacerbate neuropsychiatric symptoms, potentially influencing both the severity of these symptoms and the role that nutrition plays in their management (Bremner et al., 2020). Chronic stress can affect metabolism, hormone levels, and inflammation, all of which may contribute to mental health outcomes (Marin et al., 2011). Thus, while this study focused primarily on the perception of nutrition's role, a more comprehensive understanding would require considering these external factors.

Furthermore, the observation that many participants (76%) perceived diet as having a direct impact on mental health underlines the importance of nutritional education in neuropsychiatric treatments. Furthermore, the positive feedback from specialists supports the integration of nutrition as an adjunct intervention. Another relevant aspect is the absence of significant gender differences, indicating a generalised perception of the importance of nutrition, regardless of demographic differences. This suggests that nutritional interventions can be applied universally, with personalised adaptations. It should also be emphasised that this study focused on perceptions and self-reports, without including objective clinical measurements, such as nutritional biomarkers. It is important to note that this study relied on self-reported data without biochemical validation, which may introduce response bias. Therefore, the findings demonstrate associations rather than causality between nutrition and neuropsychiatric symptoms. Therefore, future research should include longitudinal and clinical studies with objective biochemical analyses to better clarify the causal links between nutrition and neuropsychiatric symptoms.

The gut microbiota plays a critical role in maintaining the integrity and normal functioning of the human gut. Certain dietary factors can influence the gut microbiome, which can lead to altered nutrient absorption, weakening the intestinal barrier against toxins and bacteria, causing chronic inflammation, and activating neural pathways that directly affect the functioning of the central nervous system (Grosso et al., 2014). Thus, the concept of the "gut-brain axis" emphasises the essential interconnection between the microbiome and emotional balance. The gut microbiota is a complex component of the gastrointestinal tract and is composed of over 100 trillion microorganisms. In health, the interaction between the host and the gut microbiota is symbiotic because it is essential in maintaining the host's internal functions, such as digesting metabolites and protecting the gastrointestinal barrier. The gut microbiota not only influences the brain but is also actively involved in behaviour, through the synthesis of neurotransmitters, the control of inflammation, and the modulation of the immune system. These limitations highlight the necessity for future longitudinal and interventional studies incorporating objective biomarkers to better understand and establish causal relationships.

Recent studies suggest that dysbiosis may significantly contribute to the development of neuropsychiatric disorders, but also other metabolic disorders and pathological processes such as inflammatory bowel disease, obesity, metabolic syndrome, autism, and certain types of cancer (Aziz et al., 2024; Behera et al., 2020). Studies have shown the implications of gut microbiota in lipid and energy metabolism through the production of SCFA, phenolics, and other molecules. Dysbiosis of gut microbiota initiates and exacerbates SCFA-related pathways and can induce the development of diseases, such as metabolic syndrome (Sarafian et al., 2017). One mechanism by which microbiota may influence mental health is the vagus nerve, which plays a key role in two-way communication between the gut and the brain. It transmits important signals about gut health, inflammation, and satiety, with significant impacts on central nervous system function. Research also suggests that a balanced microbiome, supported by nutritional interventions, may improve mental health by reducing inflammation and improving communication between the gut and the brain (Aziz et al., 2024).

Based on these premises, the present study assesses patients’ and professionals’ perceptions of the role of nutrition in the management of neuropsychiatric disorders, using the SENM scale. The results provide a unique perspective on the potential of nutrition as an adjunct strategy in mental health treatments. There is growing evidence to suggest that nutrition plays a critical role in mental health, ameliorating the occurrence and severity of neuropsychiatric symptoms.

Based on our findings, significant correlations were observed between deficiencies in B vitamins (B6, B9, B12) and omega-3 fatty acids and the severity of depressive and anxiety symptoms. Specific nutritional interventions could include vitamin supplementation to reduce depressive symptoms, particularly in individuals with deficiency (Grosso et al., 2014) and increasing omega-3 intake through fatty fish or supplements, which has shown benefits for anxiety and depression (Magzal et al., 2023). Existing programmes that integrate nutritional counseling for patients with anxiety and depression have demonstrated significant improvements in well-being. Additionally, the Mediterranean diet has been associated with reduced risks of depression and improving mental health (Altun et al., 2019). Personalised nutritional interventions can improve symptoms of conditions such as depression and anxiety (Magzal et al., 2023). In addition, nutritional education integrated into psychiatric treatments provides patients with additional tools for managing their mental state (Mudd & Angelotta, 2024). There is also evidence to suggest that specific diets, such as the Mediterranean diet, may reduce the risk of depression (Altun et al., 2019). The Mediterranean dietary pattern is derived from leafy green vegetables, fruits and nuts, legumes, olive oil, cereals, red wine, fish, and low dietary intakes of meat and dairy products. This dietary pattern has been associated with reduced cognitive decline, improved cognitive performance, and fewer depressive symptoms, and mitigates the risks associated with the development of neurodegenerative and mental health disorders (Altun et al., 2019). This is supported by research suggesting that personalised nutritional interventions that focus on supporting the gut microbiota can improve symptoms of neuropsychiatric conditions (Magzal et al., 2023). Nutritional interventions that promote microbiota health, such as consuming fermented foods, may have beneficial effects on mental health (Nithya et al., 2023).

Furthermore, there is evidence that anti-inflammatory diets, such as the Dietary Approaches to Stop Hypertension (DASH) or Mediterranean-DASH Diet Intervention for Neurodegenerative Delay (MIND) diet, have positive effects on mental health, reducing the risks associated with depression and neurodegenerative disorders. The DASH diet, originally designed to control blood pressure, is effective in reducing the risk of depression due to its emphasis on plant-based foods. The MIND model, which is a combination of the Mediterranean diet and the DASH diet, has also been developed and may protect the brain and prevent dementia (de Crom et al., 2022; van den Brink et al., 2019). The ketogenic diet, characterised by a low-carbohydrate, high-fat diet

(McGaugh & Barthel, 2022), is being investigated for its neuroprotective, antioxidant, and anti-inflammatory effects, and the potential to reduce symptoms of anxiety and depression (Brietzke et al., 2018). Intermittent fasting is proposed to elicit similar beneficial effects to caloric restriction, including regulating energy metabolism and reducing oxidative stress (Mohr et al., 2021), and has promising implications for mental health, given its neuroprotective effects (Diab et al., 2024). These dietary regimens emphasise the importance of a high intake of plant-based foods and anti-inflammatory nutrients, which can protect cognitive functions and contribute to better mental balance (de Crom et al., 2022; van den Brink et al., 2019).

Another important mechanism involved in mental health is the reduction of systemic inflammation, which is a major trigger of many neuropsychiatric disorders, including depression (Bauer & Teixeira, 2019). Nutrients such as green tea polyphenols and curcumin have shown beneficial effects in reducing inflammation and inflammatory markers, having a positive impact on mental health (Panahi et al., 2016; Truong & Jeong, 2022). Thus, nutritional interventions that promote the reduction of inflammation may play an important role in the management of mental disorders. In this context, it is essential to understand how the metabolic response to stress and how it affects energy metabolism can influence mental health. Chronic stress, by increasing cortisol levels, can lead to metabolic changes that negatively affect mental functioning, contributing to the development of conditions such as metabolic syndrome or obesity (Russell & Lightman, 2019). Nutritional balance and stress management through diet can reduce the adverse effects of stress on the body and improve recovery from neuropsychiatric disorders. In the context of trauma or surgery, specific metabolic changes, such as hypermetabolism and increased protein and energy consumption, can amplify the risks of complications, affecting the recovery process. Also, protein malnutrition and insufficient management of the inflammatory response can negatively affect the body's ability to fight infections and restore the energy balance necessary for recovery (Şimşek Şimşek, & Cantürk, 2014).

The human stress response has evolved to maintain homeostasis under conditions of real or perceived stress (Russell & Lightman, 2019). The metabolic response to stress is mediated by catabolic hormones such as glucagon, catecholamines, and corticosteroids, and by insulin resistance. Cytokines, oxygen radicals, and other local mediators are also involved in this process. They have both anabolic and catabolic effects (Şimşek Şimşek, & Cantürk, 2014). In cases of severe stress, such as surgical trauma, endocrine, metabolic, and immunological changes occur, the catabolic response is amplified, which can lead to increased protein and fat consumption, as well as fluid and electrolyte conservation (Cuthbertson & Zagreb, 1979). These changes have a major impact on the body's metabolic balance, including the metabolism of amino acids, lipids, and carbohydrates, which underlines the importance of adequate metabolic and nutritional support during the recovery period (Şimşek Şimşek, & Cantürk, 2014). A key aspect of this process is nitrogen balance, which is the net result of protein anabolism and catabolism. This balance is influenced not only by protein intake, but also by protein quality and energy balance, and its assessment must also consider the overall energy balance of the body (Hambræus, 2014). Thus, in patients suffering from trauma or going through periods of hypermetabolism, such as those caused by severe burns or sepsis, metabolic changes can lead to a significant decrease in muscle mass and reduced immunity, increasing the risk of infections (Şimşek Şimşek, & Cantürk, 2014).

An essential element of managing the metabolic response is glucose control, which helps reduce proteolysis and preserve muscle mass, especially during periods of intense stress, such as trauma or severe burns. This process is linked to cortisol levels and the response of the hypothalamic-pituitary-adrenal axis, which regulates the secretion of this hormone in a circadian pattern. Chronic stress and prolonged exposure to cortisol can affect metabolism and increase the risk of developing chronic conditions, including mental health because it influences energy metabolism, appetite, and body fat accumulation (Russell & Lightman, 2019). Thus, balancing the metabolic response and appropriately managing stress through nutritional interventions can significantly contribute to the prevention and recovery from neuropsychiatric disorders and to supporting better overall health. Immunonutrition interventions, such as supplementation with omega-3 fatty acids and glutamine, have been proposed to support recovery from major trauma, but the timing and manner of administering these supplements remain subjects of ongoing research (Hasenboehler et al., 2006).

Based on the study findings, clinicians could encourage patients to adopt a balanced diet rich in essential nutrients to support mental health. It may also be useful to collaborate with nutritionists to customise meal plans tailored to patients' individual needs. In addition, patients should be informed about the importance of a healthy lifestyle, which includes proper nutrition, exercise, and quality sleep, as an integral part of treatment for neuropsychiatric disorders.

6. Conclusions

The study suggests that nutrition may play a role in improving neuropsychiatric symptoms and enhancing patients' quality of life. Integrating nutrition education into conventional mental health treatments could potentially provide a holistic, personalised, and sustainable approach. The Scale for Evaluating the Importance of Nutrition in Neuropsychiatric Manifestations proved to be an effective tool for assessing perceptions of the impact of nutrition and can be used in future longitudinal studies to explore the long-term impact of balanced diets on mental health. Preliminary results indicate that nutrition might be a valuable adjunct to mental health treatments. Future research should focus on standardising specific nutritional interventions within psychiatric care to optimise mental health outcomes. Additionally, longitudinal studies are needed to explore how individualised dietary strategies can be integrated into treatment protocols and their effects on patient outcomes over time.

7. Limitations and Future Directions

This study has several notable limitations: data was collected through self-reports, which may introduce response bias, and there is a lack of biochemical analyses or intervention studies to objectively validate nutritional deficiencies. However, it is important to emphasise that these results show only association, not causality. Correlations suggest a relationship between variables, but they cannot definitively establish cause and effect. Furthermore, we recommend longitudinal studies to assess the impact of nutritional interventions on mental health, inclusion of biomarkers for more precise measurements, and investigation of the specific role of certain diets (e.g., Mediterranean, ketogenic) in reducing neuropsychiatric symptoms. Future research should include clinical analyses and experimental or longitudinal designs to validate causality between nutrition and neuropsychiatric symptoms. Moreover, emerging technologies such as artificial intelligence may offer future opportunities to analyse complex interactions between nutrition, metabolic response, and mental health, by identifying predictive patterns and enhancing personalised intervention strategies.

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