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The Importance of Nutritional Strategies in the Management of Anxiety

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ABSTRACT: Anxiety disorders are a worldwide mental-health problem, and must be treated in a manner that is more than symptom management based. The nutritional intervention has gained interest because of various biological connections between metabolic regulation and nutrient availability, dietary pattern, gut microbial activity, inflammatory signaling, and synthesis of neurochemicals and stress and anxiety pathways. In the present paper, we present and test an evidence-informed framework that includes four complementary pathways for anxiety management, namely the management of metabolic state, nutritional supplementation, dietary modification, and public-health supplementation. A structured evidence synthesis was conducted, which included the use of recent systematic reviews, meta-analyses and randomized controlled trials, as well as authoritative health guidance. Key sources used to obtain quantitative evidence included dietary quality; dietary interventions; omega-3 fatty acids; probiotics; prebiotics; symbiotic and multiple health-behavior interventions. The evidence shows that there is a significant amount of heterogeneity present. There was no overall significant pooled improvement in adults with metabolic conditions with dietary interventions (overall standardized mean difference -0.05 [95% CI: -0.20 to 0.10; p=0.49]). The effects of hypocaloric and isocaloric dietary interventions were non-significant. A dose response meta-analysis, however, found a moderate reduction in anxiety symptoms with omega-3s (SMD −0.70 per 1 g/day; low certainty) and the greatest estimated benefit at 2 g/day. According to a meta-analysis of probiotics, prebiotics and symbiotic conducted in 2025, a significant decrease in anxiety symptoms was found: SMD −0.44 (95% CI −0.59 to −0.28; p<0.001), with considerable heterogeneity. The pooled effect of multiple health-behavior interventions was small but statistically significant for all studies (SMD −0.183, 95% CI −0.276 to −0.091), but not for the low risk-of-bias studies. The synthesis lends support to a differentiated model whereby nutritional intervention is seen as a complementary treatment to existing psychological and pharmacological treatments and not a substitute. Dietary modification alone is not as well supported by evidence as selected supplementation and interventions to the gut micro-ecology in specific metabolic populations. To develop clinically relevant protocols, nutrient status testing (clinically indicated), culturally sensitive dietary planning, and monitoring of anxiety outcome measures as well as long-term randomized control trials are needed.

1. INTRODUCTION

Anxiety disorders are one of the most common mental illnesses in the world. In 2021, the World Health Organization estimated that there were 359 million individuals with an anxiety disorder worldwide, making anxiety disorders the most prevalent type of mental disorder. Anxiety refers to an excessive fear and worry with cognitive, behavioural and physiological

symptoms that can disrupt aspects of social, educational, occupational and family functioning (Ruyi et al., 2026). Psychological interventions and pharmacological treatment is available, but treatment coverage is still low; WHO reported that around 27.6 % of people in need of treatment for anxiety disorders are treated. This treatment gap will necessitate the need for complementary strategies that can be integrated into prevention, primary care and multidisciplinary management without displacing the current clinical treatment.

Food consumption has become a critical issue in mental-health research due to the role of food as a substrate and regulator of metabolic, immune, endocrine, microbial and neural functioning. Nutritional psychiatry emerged from the idea that diet quality is a modifiable factor in mental health and that nutritional interventions can be used in conjunction with psychological and pharmaceutical interventions (Firth et al., 2019; Jacka et al., 2017). Observational studies, randomized interventions, nutraceutical trials, microbiome studies, and mechanistic studies are all evidence-based links between diet and mental health. The best evidence is not tied to any specific food or supplement. Rather, the domain of intervention is dietary pattern, nutrient adequacy, metabolic stability and quality of foods eaten are interwoven.

Conceptual model for the current paper is that nutrition intervention is placed above four operational pathways: the metabolic state, nutritional supplementation, dietary modification, and public health supplementation. All pathways are focused on anxiety management (Basiri et al., 2023). This framework aligns with the modern nutritional psychiatry concept, which proposes a complex interaction between metabolic regulation, nutrient availability, food quality, population nutrition and the microbiota-gut-brain axis and its psychological and biological influences on anxiety. The model also discriminates between clinical supplementation and population level supplementation as different approaches are required to solve different problems as compared to the clinical correction of a deficiency.

Evidence that anxiety is not the result of a single biological process adds to the importance of nutritional strategies. These factors may interact with each other, such as genetic susceptibility, exposure to stress, sleep, physical activity, social factors, inflammatory processes, endocrine regulation, gastrointestinal function and diet. There are thus several levels of potential value in dietary interventions. A diet with minimal excess free sugars, saturated fats and highly processed foods, with high nutrient density from minimally processed plant foods, whole grains, legumes, fruits, vegetables, nuts, seeds, fish and unsaturated fats can have beneficial effects on overall nutrient density. These changes may also impact the substrate for the gut microbiota and the production of metabolites important for immune and neural signalling.

The present paper reviews the role of nutrition strategies in anxiety management using a structured evidence synthesis (Ruyi et al., 2026). The analysis centers on four domains within the proposed framework: Metabolic-state regulation, Nutritional supplementation, Dietary modification and Public-health supplementation. The paper assesses the quantitative results, mechanisms, clinical utility, limitations, and avenues for future research. The goal is to develop an evidence-based model that can be integrated into standard care for anxiety disorders and be culturally and socio-economically adapted.

2. LITERATURE REVIEW

2.1 Nutritional Psychiatry and Anxiety

Nutritional psychiatry has shifted from being mainly a theoretical branch of science into one that is focused on intervention. Initial research has detected the following mechanisms that might connect nutrition and mental health: diet quality, inflammation, oxidative stress, neuroplasticity, and the gut microbiome. This model was extended to include microbial metabolites, intestinal permeability, immune activation, short-chain fatty acids, vagal signalling, hypothalamic-pituitary-adrenal activity and substrate availability for neurotransmitter synthesis (Merino del Portillo et al., 2024). Thus, diet acts directly on nutrient-related processes, in addition to broader ecological processes of microbial and metabolic systems.

Evidence specifically related to anxiety is more diverse than evidence related to depression. In a systematic literature review which included 132 studies, results were mixed, with some studies indicating an increased risk of anxiety with dairy intake and others indicating a decreased risk of anxiety with healthier diets, like the Mediterranean diet, vegetarian diet or higher-quality diets (Movva et al., 2023). Most of the studies are cross-sectional, precluding causal interpretation. A systematic review of systematic reviews and meta-analyses revealed consistent relationships between fruit and vegetable consumption, whole grain consumption, consumption of omega-3 fats, omega-6 fats, micronutrients, tryptophan, and antioxidants and anxiety. The lack of variability in these associations gives grounds for taking dietary quality into consideration in clinical practice, and reinforces the importance of controlled trials.

2.2 Metabolic State and Anxiety

Metabolic state is the first pathway in the conceptual model as nutrient intake impacts on glucose regulation, energy availability, lipid metabolism, inflammatory activity and endocrine responses. The metabolic environment can vary significantly, depending on irregular eating patterns, and periods of poor food consumption, overconsumption of rapidly absorbed carbohydrates, and poor diet quality. Additionally, anxiety symptoms may impact appetite, timing of eating, gastrointestinal function, and food selection, which creates a bidirectional relationship (Lu et al., 2024). When interpreting observational studies, this bidirectional relationship is crucial as anxiety may impact eating habits, and eating habits may impact anxiety.

A metabolic approach does not mean that anxiety is a result of blood glucose changes and metabolic imbalance alone. Instead, metabolic stability is a component of a wide-ranging health plan. Physiological stability can be provided by adequate energy intake, regular meals, sufficient protein, enough dietary fibre and nutrient-dense carbohydrate sources. Minimally processed and unprocessed foods are the building blocks of a healthy diet, which is based on the principles of adequate, balanced, moderate and diversified nutritions (WHO, 2026). These principles are a general nutrition base to help with managing anxiety but not a diet for anxiety.

2.4 Dietary Patterns and Depression

The evidence on dietary patterns is gaining in prominence, with more and more supporting the merits of a whole diet approach rather than a focus on individual foods. Mediterranean design features vegetables, fruits, legumes and whole grains, plus nuts, seeds, fish, olive oil and other unsaturated fats and polyphenols, and restricts highly processed foods. Biological relevance of this pattern: microbial metabolism with fibre, lower exposure to excessive free sugars, saturated fats, and higher levels of antioxidants, omega-3 fatty acids.

In 2023, Radkhah et al. conducted a randomized controlled trial (RCT) that included 60 adults suffering from stress, anxiety, and depression, and compared 12 weeks of Mediterranean-diet education to healthy nutrition education (Radkhah et al., 2023). The clinical significance of the reduction in stress, depression, and anxiety scores was reported as not being large, but significant nonetheless (Musa et al., 2022). The trial also found improvements in weight and BMI, although these were after adjusting for baseline weight and adherence. A second randomized study in 59 adults with IBS and mild or moderate levels of anxiety and/or depressive symptoms showed that Mediterranean-diet counselling was possible and had a beneficial effect on gastrointestinal and some psychological measures. Although these trials provide some evidence of feasibility and possible benefit, the study results are inconclusive in determining that the Mediterranean diet is a viable treatment for anxiety disorders by itself.

Dietary patterns have been recently highlighted by their negative effects. Increased odds of anxiety symptoms was found in a 2026 systematic review and meta-analysis about unhealthy dietary patterns, with a pooled odds ratio of 2.05 (95% CI 1.49–2.83) (Xiong et al., 2023). Fast-food consumption showed an odds ratio of 3.05 (95% CI 1.37–6.79), ultra-processed food consumption an odds ratio of 2.69 (95% CI 1.48–4.89), and Western dietary patterns an odds ratio of 1.30 (95% CI 1.08–1.56). There was high heterogeneity suggesting that the exposure, population, food assessment and anxiety measurement were widely different across studies. The association thus advocates for dietary risk reduction instead of a mere cause-and-effect assertion.

2.4 Nutritional Supplementation

Nutritional supplementation will assume a more limited role than whole diet manipulation, as it will be most defensible if there is a nutrient deficiency and/or a higher nutrient requirement within the diet or if there is a clinical deficiency of the diet. Omega-3 fatty acids, preparations with the help of magnesium and preparations, which are directed to the microbiome, have attracted attention especially in the context of anxiety. These interventions vary in evidence, and are affected by dose, formulation, baseline nutrition, clinical population, duration, and outcome measure.

EPA and DHA are the subject of much attention due to their role in cell-membrane structure, inflammatory signalling and neural function. Out of 23 randomized trials (Kelaiditis et al., 2023), 2,189 participants were included in a 2024 dose-response meta-analysis. The standardized mean difference for each additional 1 g/day of omega-3 supplementation was -0.70 (-1.17 to -0.22) for anxiety symptoms (Rashid et al., 2023). The nonlinear model suggested the largest improvement around 2 g/day, estimating the SMD to be -0.93 (95% CI -1.85 to -0.01). The authors indicated low or very low levels of certainty for the

main anxiety results. The results are consistent with the hypothesis that omega-3 may be helpful as an adjunct therapy, but not as a universal anti-anxiety agent.

The investigation of magnesium is based on its involvement in neuronal excitability, enzyme activity and neurotransmission. A previous systematic review looked at 18 studies (Boyle et al., 2017), and showed that some studies in anxiety vulnerable populations had positive findings, but results were not consistent. Five of seven studies on the effects of Mg supplementation on anxiety included in a 2024 systematic review found that anxiety-related parameters improved. Formulations, doses, added ingredients, and characteristics of participants varied making it difficult to make a strong clinical recommendation. It is, however, important to consider baseline magnesium status, the medical history, and formulation when giving magnesium supplements—not high doses for everyone and every situation.

2.5 Probiotics, Prebiotics, Synbiotics and the Gut-Brain Axis

The microbiota-gut-brain axis offers a mechanistic link (Foster et al., 2017; Ross et al., 2024) between diet and psychological symptoms. Microbial composition and activity can be affected by dietary fibre, fermented foods, prebiotics and probiotics. Short-chain fatty acids are metabolites of the gut flora that could affect intestinal barrier function, immune signaling, and neural communication. The relationship is bidirectional as psychological stress can also affect gastrointestinal function and microbiology.

The evidence for probiotics has evolved over the years (Reis et al., 2018; Zhao et al., 2023; Zhang et al., 2025). In a previous meta-analysis of 14 clinical studies (Reis et al., 2018) with 1,527 individuals, there was no statistically significant overall decrease in human anxiety symptoms (Hedges g = -0.12; 95% CI = -0.29 to 0.05) (Mishra et al., 2023). A subsequent meta-analysis of 29 randomized trials with 2,035 participants concluded that probiotics and synbiotics had significantly lower anxiety scores, but noted that the effect size was small and that more information about which strains, doses, and durations of treatment to use was lacking. To broaden the evidence base, a 2025 meta-analysis included 72 RCTs, with 49 assessing the effects on anxiety (Zhang et al., 2025). In both anxiety studies, probiotic, prebiotic and synbiotic interventions resulted in an SMD of -0.44 (95% CI: -0.59 to -0.28) although significant heterogeneity and methodological limitations were observed.

These results suggest that nutrition plans to help treat anxiety may be of benefit, but need further standardization to be used routinely. Results may be affected by strain specificity, host factors, baseline microbiota, diet, medication exposure, gastrointestinal conditions and/or intervention duration. There is thus a weaker recommendation to consume probiotics per se, in comparison to a more general recommendation to increase dietary fibre, plant diversity and fermented foods when tolerated.

2.6 Ultra-Processed Foods and Dietary Risk

Exposure to ultra-processed food is a nutrition risk marker. In a cross-sectional study of 17 observational studies with 385,541 participants, a systematic review and meta-analysis (Barbaresko et al., 2025) found that higher consumption of UFP was associated with greater anxiety symptoms (odds ratio: 1.48 (95% CI 1.37–1.59)). A different meta-analysis including 260,385 participants identified further evidence for depression as compared with anxiety, and suggested that there was significant heterogeneity in the results for anxiety (Ji et al., 2022). But these differences highlight the need to consider study design and dietary assessment when interpreting the evidence on ultra-processed foods. However, the direction of the evidence is in favor of a strategy of reducing energy-dense, nutrient low foods in the context of boosting overall food quality.

2.7 Public-Health Supplementation and Population Nutrition

There is a difference between public health supplementation and individualized supplementation. Fortification of foods which are widely consumed can decrease the micronutrient deficiency prevalence at the population level when the prevalence of micronutrient deficiencies is high. Food fortification strategies are recommended by WHO (2026) in situations with high prevalence of micronutrient deficiencies, and nutrients like iron, folic acid, vitamin A, iodine and zinc are suggested as fortification targets (Chib et al., 2025). The relevance to anxiety is indirect but significant because poor nutritional status may affect overall physiological function and may pose a barrier to mental-health care. Public-health nutrition thus provides a nutritional base for the individual anxiety-management practices.

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CONCEPTUAL FRAMEWORK

Figure 1 presents the conceptual model supplied for the paper. The model links nutritional intervention with metabolic state, nutritional supplementation, dietary modification, and public-health supplementation, with each pathway directed toward anxiety management.

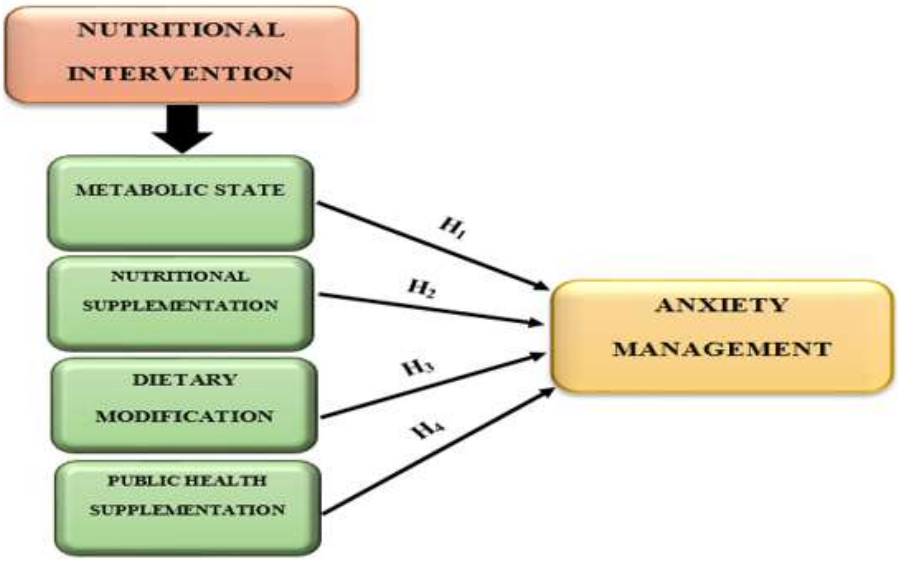


Figure 1. Conceptual framework linking nutritional intervention pathways with anxiety management.

3. METHODOLOGY

3.1 Study Design

A structured narrative evidence-synthesis design was used for the paper, and quantitative extraction of effect estimates was performed from systematic reviews, meta-analyses, and RTCs. Due to the heterogeneity of the interventions, populations, anxiety scales, exposure definitions, and study designs in the literature, it was decided to not attempt to pool studies in a single statistically valid estimate without making large methodological assumptions. The analysis therefore separates direct intervention evidence from observational association evidence and reports of published effect measures do not reflect a new pooled effect.

3.2 Search Strategy

Dietary pattern, nutritional intervention, omega-3 fatty acids, magnesium, probiotics, prebiotics, synbiotics (Ramadianto et al., 2022), gut-brain axis, and nutritional psychiatry were key concepts that emerged from the literature search.The key concepts obtained from the literature search were: dietary pattern, nutritional intervention, omega-3 fatty acids, magnesium, probiotics, prebiotics, synbiotics (Ramadianto et al., 2022), Mediterranean diet, ultra-processed foods, and the gut-brain axis. Emphasis was placed on evidence from PubMed database and authoritative guidance from the WHO. Recent systematic reviews and meta-analyses published up to 2026 were included, and further randomized controlled trials were included that directly addressed dietary interventions and anxiety-related outcomes. Key reviews were identified through reference lists and used as a source of influential previous evidence.

3.3 Eligibility and Evidence Classification

Studies were prioritized if they involved adults or mixed populations with measurable anxiety outcomes, assessed dietary patterns or nutritional supplementation, food exposure, or microbiome-directed interventions. Methodologic studies including systematic reviews, meta-analyses, randomized controlled trials and quality observational syntheses were included (Bie et al., 2024). Evidence was grouped in four categories, reflecting the conceptual model: metabolic state, nutritional supplementation, dietary modification and public-health supplementation. Evidence that included depression only was included only when it included mechanistic and/or contextual information relevant to nutritional psychiatry and was not considered evidence of anxiety efficacy.

3.4 Quantitative Synthesis

Where reported, published effect estimates were retrieved as standardized mean differences, mean differences, odds ratios, confidence intervals, and the number of participants as well as statistical significance. Standardized mean difference scores less than zero mean that the intervention group had lower anxiety scores. Odds ratios >1 suggest that the dietary exposure group with higher risk has greater odds of anxiety symptoms.Odds ratios >1 suggest that dietary exposure group with higher risk has higher odds of anxiety symptoms (Zhu et al., 2023). There was no pooled estimate for categories of intervention as a result of the diversity in outcomes and designs of the included evidence. Magnitude, direction and certainty of evidence were compared using descriptive tables and graphical displays.

3.5 Methodological Quality and Interpretation

Randomized controlled trials and meta-analysis of RCTs were given greater weight and cross-sectional associations were interpreted as non-causal. The interpretation was guided by the degree of heterogeneity, sample size, clinical population, duration of the intervention, composition of the intervention, and risk of bias. The analysis also provides for a separation between statistical significance and clinical significance (Crandon et al., 2024). A significant reduction in anxiety symptoms does not necessarily indicate a clinically relevant one, especially if the effect size is small and the confidence interval is large.

4. RESULTS AND ANALYSIS

4.1 Evidence Profile

There are several categories of interventions with varying levels of certainty, in the quantitative evidence base. Omega-3 supplementation is the strongest numerical sign for an individual nutrient, and the most recent microbiome-directed evidence suggests a small benefit is seen with probiotic, prebiotic and synbiotic interventions (Dakanalis et al., 2023). Evidence for dietary pattern supports a more comprehensive dietary approach, while the observational studies suggest that unhealthy dietary patterns might be related to significantly increased odds for anxiety symptoms. There is no evidence to support the use of nutrition as a replacement for psychotherapy or pharmacological treatments.

Table 1. Principal quantitative findings from selected evidence syntheses

Intervention/exposure	Evidence base	Effect estimate	95% CI	Interpretation
Omega-3 fatty acids	23 RCTs; n=2,189	SMD -0.70 per 1 g/day	-1.17 to -0.22	Moderate reduction; low certainty
Omega-3 nonlinear model	Dose-response analysis	SMD -0.93 at ~2 g/day	-1.85 to -0.01	Largest modeled response; low certainty
Probiotics/prebiotics/synbiotics	49 anxiety RCTs; n=3,912	SMD -0.44	-0.59 to -0.28	Small pooled improvement; heterogeneity
Unhealthy dietary patterns	2026 meta-analysis	OR 2.05	1.49 to 2.83	Higher odds of anxiety symptoms
Fast food	2026 subgroup	OR 3.05	1.37 to 6.79	Strongest unhealthy-pattern association
Ultra-processed foods	2026 subgroup	OR 2.69	1.48 to 4.89	Higher odds of anxiety symptoms

Western dietary pattern	2026 subgroup	OR 1.30	1.08 to 1.56	Modest but significant association
Mediterranean diet instruction	RCT; n=60	Adjusted $p < 0.001$	Not reported as SMD	Anxiety, depression and stress improved; clinical magnitude limited

Two directions are observed in the results. First, the standardized mean differences of the interventions to increase nutrient exposure or dietary quality tend to be negative, which corresponds to lower anxiety scores. Second, unhealthy dietary exposures have odds ratios greater than 1, which means that they have higher odds of anxiety symptoms (Kupcova et al., 2023). The directions are suitable for a model where the quality of the diet as a whole and nutrient adequacy are more relevant to the requirements of a food or supplement.

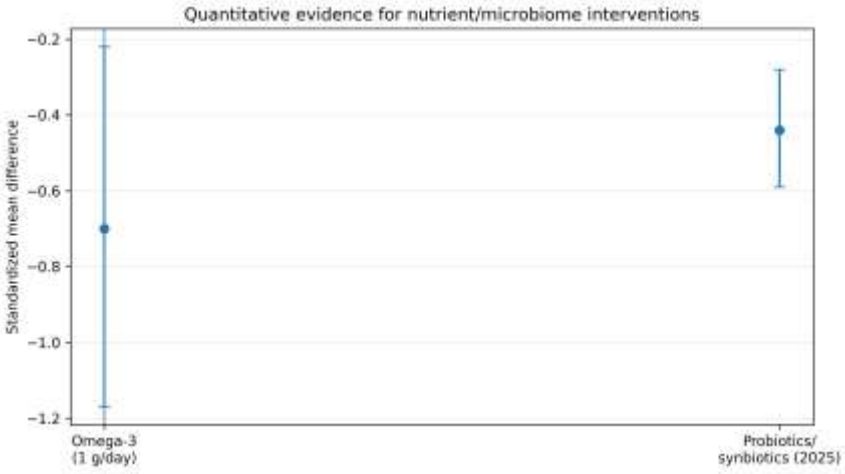


Figure 2. Published standardized mean-difference estimates for selected nutritional and microbiome-directed interventions. Negative values indicate lower anxiety scores.

4.2 Omega-3 Evidence

The evidence for the omega-3s is the most definitive quantitative signal of all the individual nutrients. The dose-response meta-analysis revealed an SMD of -0.70/1000 g/day supplementation based on 23 randomized controlled trials and 2189 participants (Liu, et al., 2023). The average reduction was significantly different from zero as shown by the 95% confidence interval of -1.17 to -0.22. The modeled optimum was around 2 g/day with an SMD of -0.93 and a range from -1.85 to -0.01, but with low certainty. Therefore, the result is taken as supportive and not definitive.

Table 2. Evidence-to-strategy matrix

Strategic domain	Primary target	Evidence signal	Clinical positioning
Metabolic state	Meal regularity, energy balance, fibre-rich carbohydrates, adequate protein	Mechanistic and general healthy-diet evidence	Foundation of nutritional care

Dietary modification	Mediterranean-style/high-quality dietary pattern	Randomized and observational evidence	Preferred first-line nutrition strategy
Nutritional supplementation	Omega-3 fatty acids	SMD -0.70 per 1 g/day; low certainty	Adjunct in selected patients
Nutritional supplementation	Magnesium	Mixed; 5/7 anxiety studies improved in 2024 review	Consider when intake/status warrants
Microbiome-directed nutrition	Probiotics/synbiotics/prebiotics	SMD -0.44 in 2025 meta-analysis	Promising adjunct; strain-specific uncertainty
Risk reduction	Ultra-processed/fast-food exposure	OR 2.69 and 3.05 in 2026 subgroup analyses	Reduce frequent intake
Public-health supplementation	Food fortification and deficiency prevention	WHO population-nutrition guidance	Population-level foundation

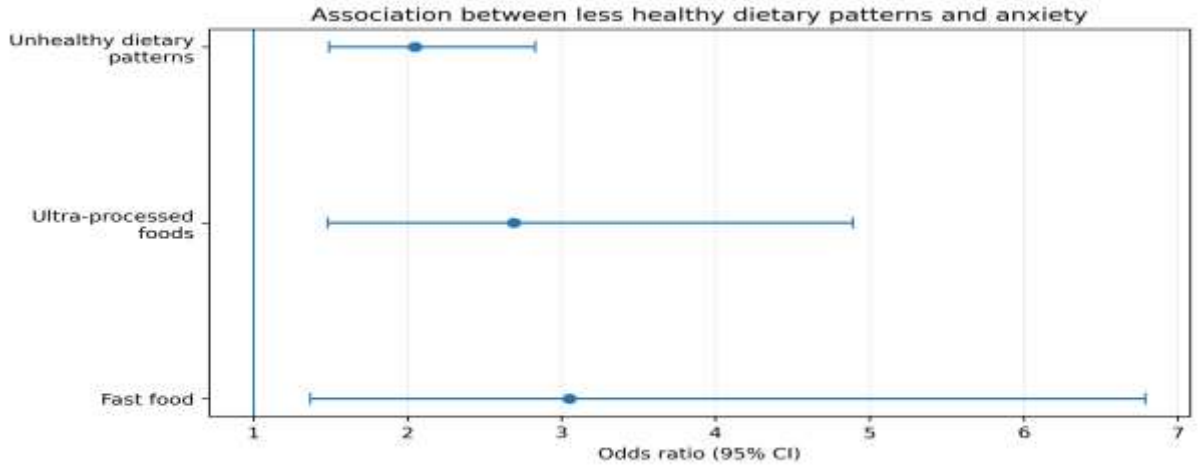


Figure 3. Odds ratios for selected unhealthy dietary exposures associated with anxiety symptoms in the 2026 systematic review and meta-analysis.

4.3 Probiotic and Synbiotic Evidence

These recent findings suggest a decrease in the inconsistency and a more positive pooled estimate. Gunasiri et al., (2022) have reported an anxiety SMD of –0.44 in 2025 meta-analysis from 49 studies involving 2124 participants in the intervention group and 1788 participants in the control group. The impact is less than the omega-3 estimate, and cannot be directly compared due to different intervention classes and structures of outcomes. Results vary substantially across the evidence base, suggesting

that strain, dosage, length of intervention, health status of participants, and pre-intervention gastrointestinal characteristics are important.

A previous meta-analysis in 2023 studied 29 randomized trials of probiotics, synbiotics, and prebiotics with 2,035 patients and reported a significant effect on probiotics and synbiotics, but not prebiotics. This pattern indicates that the microbiome-directed intervention is not a uniform therapy. Clinical effects can be influenced by effects of combinations of substrate, microbial strain, host diet, and physiological context (Verhoeven et al., 2023). The food-based microbiome approach goes beyond simple probiotics supplementation alone, as it involves an increased diversity of food.The food-based microbiome approach has a broader nutritional rationale than probiotic supplementation alone, because it involves increasing the diversity of food.

4.4 Unhealthy Dietary Patterns

The results from the 2026 systematic review and meta-analysis yielded an overall OR of 2.05 for unhealthy dietary patterns and anxiety symptoms. The strongest association was for fast food (OR = 3.05), followed by ultra-processed foods (OR = 2.69) and western dietary patterns (OR = 1.30). $I^2 = 95.49\%$ indicates that there is significant variation between studies. This high heterogeneity makes the use of a pooled estimate as a direct prediction for an individual patient limited. Although it does not indicate a strong signal to the public health community that dietary risk factors should be paid attention to in anxiety prevention and management, it does indicate a strong signal to the public health community that dietary risk factors should be paid attention to in anxiety prevention and management.

In cross-sectional studies, the OR for ultra-processed food consumption was 1.48 for anxiety symptoms, according to a separate meta-analysis (Luceño-Moreno et al., 2025). This estimate differs from the newer estimate of 2026 because of differences in the inclusion criteria, populations, definition of exposure, and analytical model. Such variation shows that the interpretation of the evidence of dietary exposure must be read as a pattern of association, not as an absolute risk coefficient.

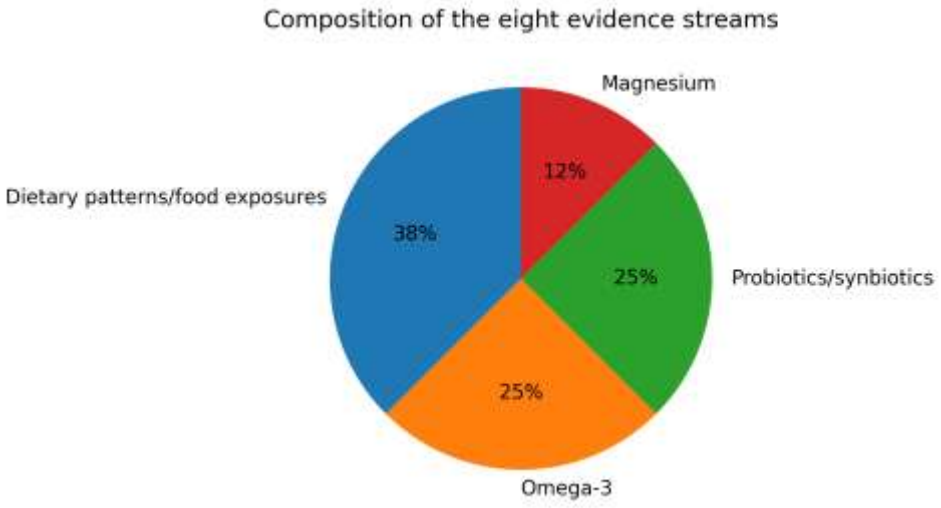


Figure 4. Composition of the eight evidence streams used for the descriptive quantitative synthesis.

4.5 Mediterranean Dietary Intervention

4.6 Magnesium Evidence

The evidence for magnesium doesn't seem as clear as the evidence for omega-3. Previous reviews reported positive results in some anxiety-prone populations, and a 2024 systematic review showed that positive results with respect to anxiety outcomes were observed in five of seven studies. There was a high degree of heterogeneity, and some trials included other active ingredients (Sun et al., 2024). The evidence does support an assessment of dietary adequacy and clinically relevant deficiency and not indiscriminate supplementation. It is possible to include magnesium-rich foods (legumes, nuts, seeds, whole grain foods, and leafy vegetables in a healthy dietary pattern without supplements.

The students will be able to interpret the Conceptual Framework into a story.

The four pathways in the conceptual model are presented as a multi-layered conceptual model. Metabolic state management ensures the physiology is stable and the nutrition is adequate. Dietary modification alters the pattern of food exposure and nutrient density (Kumar et al., 2023). Selected gaps in nutrition can be addressed by nutritional supplementation or adjunctive interventions for which there is emerging evidence. Food fortification and public health supplementation are used to correct nutrient deficiencies occurring in the population as a whole, which cannot be resolved through individual counselling. The pathways are thus complementary and not interchangeable.

5. DISCUSSION

The Mediterranean dietary pattern is the most well-defined food-based pattern. It includes main ingredients that are consistent with the recommendations for a healthy diet and could be made more locally appropriate. It is not mandatory that the model eat only one particular cuisine. For instance, in South Asian environments, whole grains, pulses, vegetables, fruits, nuts, seeds, fermented foods and fish can offer similar nutritional properties while maintaining cultural food habits (Freitas et al., 2023). Therefore, the clinical target should be based on the quality of the diet and its nutrient density, not on geographical authenticity of the diet.

The results from the omegas suggest that there is a case for targeted supplementation; however, the low certainty of evidence means that this should be carefully clinically positioned. While -0.70 per 1g/day is clinically interesting, the dose-response analyses are formulated differently and for different populations. It should not be offered as an alternative to standard therapy. Food-first approaches can deliver omega-3, protein, vitamin D, selenium and other nutrients, and supplementation may be considered when food consumption is inadequate or clinical assessment deems it appropriate.

The importance of methodological precision is demonstrated by the probiotic evidence. The shift from the previous estimate of non-significance to more recent estimates of significance could be due to more trials, other populations, formulations of the interventions, and other analyses (Heeren et al., 2023). No probiotic product may be used interchangeably with all other probiotic products. Results may vary depending on strain identity and viability, dose, duration, dietary conditions of the host and gastrointestinal status. It is then important to continue using a cautious and personal approach to clinical implementation.

There are some restrictions on the current synthesis. There is considerable heterogeneity in the evidence base with respect to the anxiety measures, populations, duration of the interventions, the type of supplements used and the comparator conditions used (İlçe et al., 2024). Most dietary-pattern research is observational and therefore not able to prove cause and effect. A few supplementation trials lack large sample size and/or include other active ingredients. Publication bias and selective reporting is still a potential source of bias. Numerical results are thus reported as evidence signals rather than as a universal clinical effect size.

6. CONCLUSION

There is a domain of nutritional strategies that are relevant for the management of anxiety disorders. There is no single dietary plan that is recommended for people with anxiety, nor is there a standard formula for taking supplements. A food-first strategy involving diet with emphasis on food adequacy, diversity, minimally processed food, fibre-rich plant foods, whole grains, legumes, nuts, seeds, fruits and vegetables, unsaturated fats and appropriate sources of omega-3 fatty acids is the most effective practical strategy. The excessive consumption of ultra-processed and fast foods should be limited within the context of a healthy diet in general.

There is quantitative evidence to support several components of this model. The effects of omega-3 on anxiety symptoms have been shown in randomized trials with moderate reduction, but with a low degree of certainty. Recent meta-analyses report small pooled benefits for probiotic, prebiotic, and synbiotic interventions, and there is significant heterogeneity. Randomized clinical trials (RCTs) have shown beneficial effects on anxiety-related outcomes in Mediterranean-style dietary interventions, and observational studies have correlated poor dietary patterns with much greater risk for anxiety symptoms. Evidence is not consistent enough for universal magnesium supplementation, although it may be beneficial in some populations especially where nutritional deficiencies exist.

The conceptual framework that links metabolic state, nutritional supplementation and dietary modification to public-health supplementation offers a practical framework for clinical and public-health interventions. Nutrition should be part of psychological, medical, physical exercise, sleep and social support. Nutritional care should be culturally tailored, adequate, personalized and monitored over time. Further studies are needed to determine which dietary pattern(s), nutrient(s),

microbiome-directed intervention(s), and patient characteristics yield the most enduring decreases in anxiety severity and functional impairment.

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