



Mental Health
Foundation

Food for thought:

Mental health and nutrition briefing



Key message



What we eat and drink affects how we feel, think and behave. With the recent Adult Psychiatric Morbidity Survey (APMS)ⁱ finding that one in six people have experienced a common mental problem such as anxiety or depression in the last week, the need for effective approaches to understanding and improving mental health has never been greater.¹ This briefing focuses on how nutrition can be effectively integrated into public health strategies to protect and improve mental health and emotional wellbeing. It discusses what we know about the relationship between nutrition and mental health, the risk and positive factors within our diets and proposes an agenda for action.

One of the most obvious yet under recognised factors in the development of mental health is nutrition. Just like the heart, stomach and liver, the brain is an organ that requires different amounts of complex carbohydrates, essential fatty acids, amino acids, vitamins, minerals and water to remain healthy. An integrated approach that equally reflects the interplay of biological factors, as well as broader psychological, emotional and social conceptions of mental health, is vital in order to reduce the prevalence and the distress caused by mental health problems: diet is a cornerstone of this integrated approach.

Dietary interventions may be significant to a number of the mental health challenges society is facing, but we need to know more. There is a lack of investment in research and the translation of knowledge into straightforward guidance about food production and consumption. Nutrition is more than the sum of individual choices and behaviours. Public policy is vital to ensuring that healthy food is understood, available and affordable for all.

The role of diet in the nation's mental health has yet to be fully understood and embraced. The messages about nutrition can appear to be changeable and contradictory, and shifts in policy and practice have been slow to materialise. A general lack of awareness of the evidence base, as well as scepticism about its quality, have limited progress in embracing the role of nutrition in people's mental health. However, this is beginning to change.

It is necessary for individuals, practitioners and policy makers to make sense of the relationship between mental health and diet so we can make informed choices, not only about promoting and maintaining good mental health but also increasing awareness of the potential for poor nutrition to be a factor in stimulating or maintaining poor mental health.

i. The Adult Psychiatric Morbidity Survey (2016) is a survey of mental health and wellbeing across the UK. It covers diagnosed mental health problems, substance dependence and suicidal behaviour, and their causes and consequences.



Key terms:

Diet: Usually refers to the kinds of food that a person habitually eats. In Western culture 'diet' is also often applied to the lifestyle changes used to lose weight. Although applied to the changes most often used to resolve a problem associated with being overweight or health issues, this may be more in line with the Latin origins of the word taken from the Greek 'diaita', meaning a 'way of life'.²

Balanced diet: Refers to eating a wide variety of foods in the right proportions and consuming the right amount of food and drink to achieve and maintain a healthy body weight (NHS Choices).³

Nutrition: Refers to the quality of the food we eat (for example, whether food is processed or fresh), the kind of food we eat (for example, whether foods are vitamin and mineral rich; or how many calories they contain), how we chose to eat (quantity, timing, motivation for eating different types of food) and how the food has been produced (for example, has it been treated with pesticides?).



Nutrition and mental health: why is the relationship important?



Integrated mind-body approaches to supporting mental health have increased in popularity in recent years, with studies supporting the links between exercise,⁴ sleep,⁵ mindfulness,⁶ and acupuncture⁷ and mental health. There is a growing body of evidence indicating that nutrition may play an important role in the prevention, development and management of diagnosed mental health problems including depression, anxiety, schizophrenia, Attention Deficit Hyperactivity Disorder (ADHD) and dementia.

It is common knowledge in the UK that there is a well-established link between diet and physical health, especially for

non-communicable diseases such as Type 2 diabetes, Coronary Heart Disease and some cancers. Less understood is the contribution made by diet to mental health. This is due in part to the complexity of the relationship, and the need to take into account the effects of other factors. Research has already provided evidence that there is a strong relationship between physical health and mental health, such as the increased incidence of depression in those with heart disease, establishing that there is an indirect link.⁸ The evidence is now building about the direct association between what people eat and how they feel.



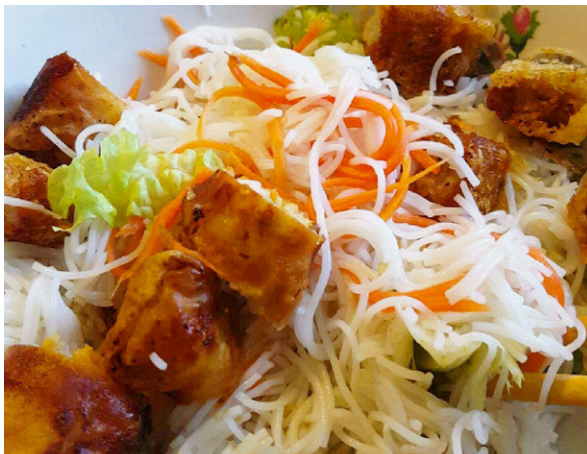


Dietary Recommendations:

The UK government's dietary recommendations are put together with the guidance and advice from the Committee on Medical Aspects of Food and Nutrition Policy (COMA) and its successor since 2000, the Scientific Advisory Committee on Nutrition (SACN).⁹

Eatwell, the government's food consumption guidelines, provide the most up to date overview of which food groups should be consumed on a daily basis, and in which proportions, to achieve a healthy diet.¹⁰ It outlines the proportions of the main food groups that form a healthy, balanced diet:

- Eat at least 5 portions of a variety of fruit and vegetables every day
- Base meals on potatoes, bread, rice, pasta or other starchy carbohydrates; choosing wholegrain versions where possible
- Have some dairy or dairy alternatives (such as soya drinks); choosing lower fat and lower sugar options
- Eat some beans, pulses, fish, eggs, meat and other proteins (including 2 portions of fish every week, one of which should be oily)
- Choose unsaturated oils and spreads and eat in small amounts
- Drink 6-8 cups/glasses of fluid a day. If consuming foods and drinks high in fat, salt or sugar have these less often and in small amounts



Protective factors for mental health



Feeding the brain with a diet that provides adequate amounts of complex carbohydrates, essential fats, amino acids, vitamins, minerals and water can support healthy neurotransmitter activity. It can protect the brain from the effects of oxidants, which have been shown negatively to impact mood and mental health. Evidence of nutrition's protective qualities can be identified across the life course.¹¹

From a young age, good nutritional intake has been linked to academic success, with a number of studies reporting that providing children with breakfast improves their academic performance.¹² A number of published studies have shown that hungry children behave worse in school, with reports that fighting and absence are lower and attention increases when nutritious meals are provided.¹³

As we age, the protective effect that diet has on the brain is evidenced in research findings that a diet high in essential fatty acids and low in saturated fats slows the progression of memory loss and other cognitive problems.¹⁴

Fruit and vegetables

A study conducted by Stranges et al. (2014), in England, found that vegetable consumption was associated with high levels of mental wellbeing. Along with

smoking, the study found that of those examined, the behavioural risk factor most consistently associated with both low and high mental wellbeing in across both sexes was the individual's fruit and vegetable consumption.¹⁵

Vitamins, minerals and acids

Vitamins and minerals (called micronutrients) perform a number of essential functions, including assisting essential fatty acids to be incorporated into the brain and helping amino acids convert into neurotransmitters.ⁱⁱ They play a crucial part in protecting mental health due to their role in the conversion of carbohydrates into glucose, fatty acids into healthy brain cells, and amino acids into neurotransmitters.

Deficiencies in micronutrients have been implicated in a number of mental health problems. Unequal intakes of omega-3 and omega-6 fats in the diet, for example, are implicated in a number of mental health problems, including depression, and concentration and memory problems; and studies have shown that increased consumption of these fatty acids can be helpful in the control of bipolar depressive symptoms.¹⁶ Reports suggest that these fatty acids have an association with better mental health even after adjustment for other factors (income, age, other eating patterns), and a reduced risk of cognitive impairment in middle age.¹⁷

ii. They are termed 'essential' as they cannot be made within the body, so must be derived directly from the diet.



Table 3: Table of essential vitamins and minerals, the effects of various and where to find them¹⁸

Nutrient	Effect of deficiency	Food sources
Vitamin B1	Poor concentration and attention	Wholegrains Vegetables
Vitamin B3	Depression	Wholegrains Vegetables
Vitamin B5	Poor memory Stress	Wholegrains Vegetables
Vitamin B6	Irritability Poor memory Stress Depression	Wholegrains Bananas
Vitamin B12	Confusion Poor memory Psychosis	Meat Fish Dairy products Eggs
Vitamin C	Depression	Vegetables Fresh fruit
Folic acid	Anxiety Depression Psychosis	Green leafy vegetables
Magnesium	Irritability Insomnia Depression	Green vegetables Nuts Seeds
Selenium	Irritability Depression	Wheat germ Brewer's yeast Liver Fish Garlic Sunflower seeds Brazil nuts Wholegrains
Zinc	Confusion Blank mind Depression Loss of appetite Lack of motivation	Oysters Nuts Seeds Fish

Risk factors for mental health



Broadly speaking, there are two groups of foods that can have a negative effect on brain function. One group trick the brain into releasing neurotransmitters that we may be lacking, thereby creating a temporary alteration in mood (for example caffeine and chocolate); and one group damages the brain by preventing the necessary conversion of other foods into nutrients the brain requires (for example, saturated fat such as butter, lard and palm oil).

Consuming processed foods and additives

A systematic review conducted by O'Neil et al. (2014) showed that unhelpful dietary patterns (including

higher intake of foods with saturated fat, refined carbohydrates and processed food products) are linked to poorer mental health in children and adolescents.¹⁹ Beyer and Payne (2016) found that people with a diagnosis of bipolar disorder tend to have a poorer-quality diet, which is high in sugar, fat and carbohydrates.²⁰

A study looking at the changing diets of people living in the Arctic and Sub-Arctic regions found that levels of depression were rising at the same time that traditional diets, which were high in Essential Fatty Acids, were being abandoned and replaced by more processed foods.²¹

Sugar consumption:

The World Health Organization's guidance on free sugars intake recommends:

- a reduced intake of free sugars throughout the life course (strong recommendation).
- in both adults and children, reducing the intake of free sugars to less than 10% of total energy intake² (strong recommendation).ⁱⁱⁱ
- further reductions of the intake of free sugars to below 5% of total energy intake (conditional recommendation).^{iv, 22}

iii. Strong recommendations indicate that "the desirable effects of adherence to the recommendation outweigh the undesirable consequences". WHO handbook for guideline development, 2nd edition. (2014). Geneva: World Health Organization.

iv. Conditional recommendations are made when there is less certainty "about the balance between the benefits and harms or disadvantages of implementing a recommendation". WHO handbook for guideline development, 2nd edition. (2014). Geneva: World Health Organization.

The role of food in preventing mental health problems



As well as the links between diet and positive mental health, including healthy brain development, there is emerging evidence that good quality nutrition may play a role in contributing to the prevention of mental health problems and in the management and recovery from these when and if they do occur.

There are a range of inequalities that can contribute to the development of mental health problems, including the heightened risk associated with poor physical mental health and socio-economic factors such as poverty. Both these inequality factors have also been shown to have a complex relationship with poor nutrition as described below. The emerging science looking at syndemics (synergistic epidemics) considers 'co-morbid health conditions that are exacerbated by their socio, political, environmental and political milieu'.²³ This provides a conceptual framework which may help us to understand the 'synergy' between the 'epidemics' of obesity and mental health problems and the actions that we need to take to shift the conditions that are currently allowing these to become significant public health challenges.

Poor physical health

Poor physical health is a risk factor for developing mental health problems. Changes in food production techniques, such as processing, the use of additives and industrialised farming have all been directly attributed to serious physical health problems including

coronary heart disease, some cancers, osteoporosis and dental diseases.²⁴

Poverty

A multitude of psychological, social, cultural and economic factors create the context for our choices about what and how we eat. Poverty is a key risk factor for both mental health and diet.²⁵ The complex and cumulative impacts of poverty and mental health problems on quality of nutrition are affected by: income, knowledge and skills, availability and quality of food as well as time, health and convenience.

The quality of an individual's, household's and community's diet has a socioeconomic gradient. While higher-quality diets are associated with greater affluence, energy-dense diets that are nutrient-poor are more frequently consumed by persons of lower socioeconomic status and of more limited economic means.²⁶





Household income and socio-economic status influence decisions about what people eat, with this becoming an increasingly important factor as household income decreases. People living in households in receipt of statutory benefits consume fewer portions of fruit and vegetables than those in non-benefit households.²⁷ Numbers of those admitted to hospital with malnutrition rose to more than 5,400 in 2012, at the same time as the number of people fed by food banks went to 347,000 in the same year.²⁸ The impact of nutritional challenge on mental health status in these groups needs to be investigated.

Co-morbidity

Obesity

The relationship between obesity and mental health problems is complex. Results from a 2010 systematic review of longitudinal studies found two-way associations between depression and obesity, finding that people who were obese had a 55% increased risk of developing depression over time, whereas people experiencing depression had a 58% increased risk of becoming obese.²⁹

Although obesity can be the result of poor diet, there are a number of demographic variables that could affect the direction and/or strength of the association with mental health including severity of obesity, socioeconomic status and level of education, gender, age and ethnicity.³⁰

It has been argued that psychosocial factors in childhood obesity are more important than functional limitations, and that children who are obese might be better helped by providing social support, rather than to focus on the child's diet and exercise levels.³¹ This topic is discussed in more detail in 2011 National Obesity Observatory 'Obesity and mental health report'.³²

Alcohol

Alcohol and mental health have a complicated relationship. Mental health problems can not only result from drinking too much alcohol, they can also contribute to people drinking too much. In short, alcohol has a depressant effect and can lead to rapid deterioration in mood. Alcohol interferes with sleep patterns which can lead to reduced energy levels. Alcohol depresses the central nervous system, and this can make our moods fluctuate. It can be used by some to help 'numb' emotions, to help people avoid confronting difficult issues. Alcohol is also associated with disruptive sleep patterns, dietary changes and nutritional deficiencies. The impact of nutritional changes on mental health resulting from alcohol intake has yet to be fully understood however studies have shown the importance of vitamin B in preventing alcohol related dementia (Korsakoff's Syndrome).

This is discussed in more detail in our online A-Z on our website.

The role of diet in relation to specific mental health problems



There is growing evidence that diet plays an important contributory role in a number of diagnosed mental health problems. This section presents the evidence for the links between diet and depression, schizophrenia, dementia and Attention Deficit Hyperactivity Disorder (ADHD).

Depression

Depression is the most common mental health problem in the UK. Talking Therapies and Self-Management approaches such as Mindfulness have been building in popularity as self-chosen alternatives or complements to anti-depressant medication. Interventions that focus on the mind/body link such as exercise either prescribed or as a self-help technique³³ and emerging areas like acupuncture³⁴ are also gathering momentum. Diet has emerged as another therapeutic approach seen directly in the work of Adult Mental Health Dietitians, who work with people who experience mental health problems to improve knowledge and awareness of nutrition.

A number of large studies have linked the intake of certain nutrients with reported prevalence of different types of depression. A recent study exploring the correlation between low intakes of fish by country and high levels of depression among its citizens found that those with low intakes of folate, or folic acid, were significantly more likely to be diagnosed with depression than those with higher intakes.³⁵

Similar conclusions have been drawn from studies looking at the association of depression with low levels of zinc and vitamins B1, B2 and C, as well as studies looking at how standard treatments have been supplemented with micro-nutrients resulting in greater reduction in symptoms in people with a diagnosis of depression and bipolar disorder.³⁶

Schizophrenia

Although a complex area some studies have illustrated that diet can be associated with the onset and development of schizophrenia. The Dutch Famine Study and 1960s Chinese famine, found that severe famine exposure in early pregnancy lead to a two-fold increase in the diagnosis of schizophrenia requiring hospitalisation in both male and female children.^{37, 38}

Studies have found that people with schizophrenia have lower levels of polyunsaturated fatty acids in their bodies than the general population, and that antioxidant enzymes are lower in the brains of people with schizophrenia. Further research is now being undertaken in this area to identify specific mechanisms through which diet can work alongside other treatment options to prevent or alleviated the symptoms of schizophrenia.³⁹

Dementia

Many studies have shown a positive association between a low intake of fats, and high intake of vitamins and minerals in the prevention of certain forms of



dementia. One study looking at the total fat intake of 11 countries found a correlation between higher levels of fat consumption and higher levels of dementia in the over 65s age group.⁴⁰ A long-term population based study found that high levels of vitamin C and E were linked to a lower risk of dementia, particularly among smokers, with similar findings in other studies focused on different population groups.⁴¹

Attention Deficit Hyperactivity Disorder (ADHD)

ADHD occurs in approximately 1 in 10 (9.7%) of adults in the UK.⁴² Rates of ADHD appear to decrease with age,

with the highest rates of those screening positive for ADHD recorded in those aged 16–24 (14.6%).⁴³

Clinical research has reported the benefits of essential fatty acids and minerals such as iron. Deficiencies in iron, magnesium and zinc have been found in children with symptoms of ADHD, and studies have consistently shown significant improvements with supplementation when compared with placebo, either alongside normal medication or as stand-alone treatments.^{44, 45, 46}

Eating disorders

An individual's relationship with food can develop into a negative coping mechanism to handle emotional distress. Rather than behaviours manifesting because of the food itself, the relationship is based more upon the notion of controlling one's weight in response to a range of possible triggers, for example, neurochemical changes, genetics, lack of confidence or self-esteem, perfectionist personality trait, problems such as bullying, or difficulties with school work.

Food can play a big part in an individual's eating disorder, but the realities of eating disorders are often much more broad and complex as the pre-occupation with food is only the outward sign of a desperate inner turmoil.⁴⁷

This is discussed in more detail in our online A-Z on our website.

Discussion



There are emerging but in some cases clear links between diet, access to good quality nutrition and mental health status. Just as the association between diet and physical health took some time to understand and embrace, there has been a similar pattern for nutrition and mental health. Clinical studies point to the importance of diet as one part of the jigsaw in the prevention of poor mental health and mental health problems and the promotion of positive mental health and brain development. However, there remain gaps in the evidence base that need to be addressed if the relationship between nutrition and mental health are to be effectively reflected in policy.

There are two main issues with the current evidence base. First, that it remains challenging to establish a causal (that is a direct) relationship rather than simply a correlation; and second, there is a lack of studies examining the contribution of combined nutritional supplements with individual nutrients usually examined in isolation. Further, due to the methodological variation in studies, comparison of results is challenging. The focus on single nutrients means that the effects of whole-of-diet interventions are not well evidenced.

Although good nutritional intake alone may not significantly reduce the overall prevalence rates of mental health problems, diet plays a contributing role and is a modifiable risk factor that can be targeted by low cost, low risk interventions.⁴⁸ Good diet has the added benefit of counteracting the adverse physical health effects associated with

many mental health problems and some treatments. For example, strategies that focus on enhancing an individual's self-worth and development of self-efficacy can help overweight patients to improve both their emotional wellbeing and sustain weight loss.

Nutrition has moved up the agenda for policy makers, although attention has been focussed mainly on addressing obesity, as has been seen in England, Wales and Scotland. This said, the Framework for Preventing and Addressing Overweight and Obesity⁴⁹ in Northern Ireland encouragingly recognises nutrition, obesity and mental health as interlinking, presenting recommendations that accurately reflect the evidence base. The emerging framework of syndemics (synergistic epidemics) may offer a starting point to understanding the complex relationship between contextual factors operating across society and the growing public health challenges and personal distress caused by increasing rates of obesity and mental health problems.

There is an urgent need for policy-makers, practitioners, industry, people who experience mental health problems and the wider public to recognise and act on the role that nutrition plays in mental health. To achieve parity between mental and physical health, it is vital that the public are informed about the type of diet that will promote their mental health in the same way food is promoted for physical health reasons. Of equal importance will be understanding the mediating role that mental health plays in our lifestyle choices, including our diet. However wider impact can be achieved by national and local policy, well beyond individual actions.

Policy recommendations



1. Promote community level schemes to provide access to affordable nutritious food, particularly in communities at higher risk of developing mental health problems.
2. Improve nutritional literacy (embedded as part of a national mental health literacy programme) by ensuring evidence based programmes/initiatives are publicly available. There should be a particular focus on education in schools with practical food skills, including cooking and growing, reintroduced as a part of the national curriculum for all students.
3. Extend schemes such as Healthy Start⁵⁰ across the country to ensure all children, throughout their development, have access to appropriate levels of micronutrients.
4. GPs should be encouraged and supported to test people for nutritional deficiencies if they suspect that their mental health problems could be linked to poor diet, and to prescribe supplements if there is a deficiency.
5. Introduce regulation to support the promotion of healthy food to children, and to protect them from the marketing of unhealthy foods.
6. The Department for Environment, Food and Rural Affairs (DEFRA) needs to ensure that agricultural policy reflects the evidence base on healthy and mentally healthy food production. Specifically, support should be increased for the growth and availability of affordable organic produce, fruit and vegetables, other micro-nutrient rich food and for alternative sources for omega-3 fats, given the global shortages of oily fish.
7. National NHS bodies need to ensure mental health multidisciplinary teams have routine access to dieticians to prevent people with mental health problems developing physical health conditions and to support them to manage the impact of medications on physical health.
8. National Health Education and Public Health bodies need to include nutrition within professional training curricula for health, social care and educational professionals to help them identify where poor nutrition may be a factor in mental ill health, and to help people understand how to improve their mental health through making dietary changes, providing guidance on eating well at low cost.
9. Prioritise and invest in a mental health and nutrition research agenda through public health research bodies and programmes, to improve the quality of and access to evidence on what works.

Additional Mental Health Foundation resources



Feeding Minds: The impact of food on mental health
<https://www.mentalhealth.org.uk/publication-download/feeding-minds>

A-Z Pages

Diet and mental health
<https://www.mentalhealth.org.uk/a-to-z/d/diet-and-mental-health>

Alcohol and mental health
<https://www.mentalhealth.org.uk/a-to-z/a/alcohol-and-mental-health>

Anorexia nervosa
<https://www.mentalhealth.org.uk/a-to-z/a/anorexia-nervosa>

Attention deficit hyperactivity disorder (ADHD)
<https://www.mentalhealth.org.uk/a-to-z/a/attention-deficit-hyperactivity-disorder-adhd>

Bipolar disorder
<https://www.mentalhealth.org.uk/a-to-z/b/bipolar-disorder>

Bulimia nervosa
<https://www.mentalhealth.org.uk/a-to-z/b/bulimia-nervosa>

Dementia
<https://www.mentalhealth.org.uk/a-to-z/d/dementia>

Depression
<https://www.mentalhealth.org.uk/a-to-z/d/depression>

Mealtimes and mental health
<https://www.mentalhealth.org.uk/a-to-z/m/mealtimes-and-mental-health>

Schizophrenia
<https://www.mentalhealth.org.uk/a-to-z/s/schizophrenia>

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