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Bites: Psychoeducational handouts on nutrition for students in a depression group

Caitlin P. Powell
James Madison University

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Caitlin Powell

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Committee Chair: Lennis Echterling

Committee Members/ Readers:

Debbie Sturm

Jennifer Cline

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Abstract

The following paper describes psycho-educational techniques that focus on nutrition as a complementary self-care intervention integrated to a group for students struggling with depressed mood. Included is a review of nutrition literature as a complement to counseling in general and six nutrition “bites” with handouts that accompanied six out of eight group sessions. The impressions of group leaders and responses of group members conclude the research and provide evaluations that support such inclusion as well as recommendations for enhancement of this material.

Nutrition and Depression

Literature examining the connection of nutrition and depression suggests the strength of incorporating nutrition education in the therapy room. It also demonstrates the need of mental health professionals to view treatment from a holistic stance and incorporate the many aspects of human health into counseling. The nutrients and food individuals consume can either exacerbate or decrease depressive symptoms. Nutrition can also play a role in prevention and treatment of depression. Since many studies have found this relationship extensive, it is important to acknowledge it as a part of treatment for clients. While much of the connection between nutrition and depression is still widely unknown and under-researched, that does not diminish its significance in the field. Food can be a form of self-care for clients and participating in healthy eating habits as well as learning about specific vitamins and nutrients that can improve mood may be a very important implementation in the treatment of depression.

A few studies have demonstrated results for incorporating nutritional components into mental health treatment. In one study by Beylerian (1993), freshman female college students had learned that using food was a proper way to cope with and to avoid anger. Providing nutrition education to these students was found to be an important way to normalize eating behaviors and to acknowledge healthier patterns of dealing with depressed feelings. Previously, many students had to turn to food in order to deal with negative feelings (Beylerian, 1993). In a similar study conducted with children in New Zealand, Utter, Simon, Lucassen, and Dyson (2015) developed research that examined the relationship between cooking, mental well-being, family relationships, and diet quality. Utter et al. (2015) posited that teaching adolescents how to cook might put them

on the right track to developing a healthy relationship with food and better emotional well-being. This study suggested that families who spent time teaching children how to cook and make meals had better nutrition and improved mental health.

While seemingly limited, there are programs and treatments that have been developed in order to enhance diet and nutrition for the purpose of decreasing the rate of depression. Nijamkin, Campa, Nijamkin, and Sosa (2013) introduced a nutrition education program known as Comprehensive Behavioral Motivational Nutrition Education designed to improve depression in patients following bariatric surgery. The findings indicated that this nutrition education program resulted in a decreased risk for depression while also continued to help keep weight under control. Those who participated in the intervention had lower test scores on Beck's Depression Inventory than those only receiving the standard care (Nijamkin et al., 2013). The correlation of nutrition education and lowered depression was also found using a Mindfulness Eating and Food Education Program (Miller, Kristeller, Headings, & Nagaraja, 2014).

In a study designed to reduce depression in those with diabetes, Miller et al. (2014) found that teaching patients to interrupt mindless and stress-related eating behaviors while incorporating natural processes of eating regulation led to a decrease in depressive symptoms. Providing a healthier relationship to food and further education about food consumption were proven to be effective in reducing feelings of depression (Miller et al., 2014). Melnyk, Jacobson, Kelly, Belyea, Shaibi, Small, and Marsiglia (2015) found similar results in their study of overweight teens in high school. Their program called 'COPE healthy lifestyles TEEN program' is one intervention attempting to address issues of nutrition, health, and depressive disorders. The research found that

many of the teens who were overweight had a higher likelihood of depressive disorders (Melnyk et al., 2015). This again illustrates a significant relationship between nutrition and mood disorders and highlights the importance of considering how we think about nutrition, the importance of food education, and how it affects our mental health, specifically depression.

The following research seeks to address, the various nutritional components of food education, specifically in a college setting. This involves a thorough review of the literature on nutrition and depressive symptoms coupled with the creation of a series of educational handouts to provide to clients within a group or individual setting. These handouts are known as “nutrition bites” and stand to demonstrate the importance of self-care with food when treating depression. In a university counseling center, these bites (see appendix) were introduced to a process group to provide a psychoeducational component on nutrition in addition to group therapy treatment. The purpose of this intervention was to see a measured decrease in depression symptoms not just through talk therapy but by shaping and changing one’s diet and overall health.

Since there is still so much to learn about the effects of implementing specific diet changes into therapy, this research aims to demonstrate what the incorporation of food education into counseling might look like. Specifically, the research that follows includes information regarding six topics: neurotransmitters, meals overall, sugar, B vitamins, vitamin D, omega 3, and liquids. The bites are created using this research to deliver comprehensive, informative pieces of material to discuss with clients in group and individual treatment.

Nutrition Bites

Neurotransmitters

In order to fully comprehend the relationship between nutrition and depression, one has to have a basic understanding of the impact that food consumption has on the brain and neurotransmitters. Mood in many ways, is affected by the daily intake of nutrients. The brain is supplied with certain substances as they make their way past the blood brain barrier (Dinan, 2008). The nutrients consumed (or not consumed) have various effects on the increasing or decreasing of certain neurotransmitters and their influence on the brain. Specifically, serotonin and noradrenalin (dopamine) are two neurotransmitters that are known to be sensitive to food intake, be made directly from food components, and be disrupted based on poor food choices causing poor sleep, mood swings, food cravings, and emotional issues (Somer, 1999).

Skipping meals and a lack of protein consumption contribute to reduced intake of amino acids. Protein, or the make-up of amino acids, is incredibly important to brain development and neurotransmitter activity. The lack of two specific amino acids, tryptophan and tyrosine, which make up serotonin and dopamine neurotransmitters, may lead to issues with depression. The brain has a limited capacity to store tryptophan and requires daily intake from one's diet. Tryptophan depletion has been shown to result in the reversal of clinical efficacy and the return of depressive symptoms in those suffering from depression (Dinan, 2008). Specifically, the lack of tryptophan leads to decreased dopamine and serotonin which is known to decrease mood and increase aggression in individuals (Sathyanarayana Rao et al., 2008).

The importance of serotonin and dopamine with regard to mood and depressive symptoms has been demonstrated in many studies. Holford (2003) posited that lack of the amino acids, tryptophan and tyrosine, can lead to imbalances that are known to worsen mood and motivation. When referring specifically to serotonin, one may note that it is an important neurotransmitter involved in regulation of multiple components of mood found not only in depression but also anxiety and aggression. Mood may improve with increased levels of serotonin in the brain (Liu, Xie, Chou, Koprowski, Zhou, Palmer, Sun, Guo, Duan, Sun, & Johnson, 2007). On the flip side, depleted levels of serotonin can lead to insomnia, depression, food cravings, increased sensitivity to pain, aggressive behavior, and poor body temperature regulation (Somer, 1999).

Various contributors impact the lack of serotonin in the brain such as low levels of estrogen or testosterone, low levels of light, little exercise, lack of vitamins/minerals, and high levels of stress (Holford, 2003). Low levels of estrogen mean serotonin deficiency which then lowers mood as estrogen blocks the breakdown of serotonin. Consequently, women are more prone to depression during menopause (and beyond) and at the time of menstruation. Reactions to low serotonin levels differ for women, in that it is associated with an increased experience of depression and anxiety. For men, low serotonin levels may be related more to aggression and alcoholism (Holford, 2003). Additionally, low light levels also impact both estrogen and serotonin and the lack of light has a direct impact on serotonin production. Stress also reduces serotonin levels which makes obtaining physical exercise, especially during times of stress, particularly important as it often improves the stress response and reduces the impact stress has on serotonin levels (Holford, 2003). Finally, recognizing the specific vitamins such as

vitamins B and D as well as omega-3 fatty acids which all impact serotonin, is very important when choosing certain foods to consume in one's daily diet.

Food consumption with regard to serotonin levels can be tricky. Often times, food that increases serotonin is also found to be high in carbohydrates leading to a temporary increase in serotonin and unfortunately more fat and sugar. Food such as candy, pastries, white flour, and those high in fat and sugar may be responsible for raising serotonin temporarily, however in the long run can lead to feeling even more depressed, lessening pain tolerance, and sleeping less soundly (Somer, 1999). Instead, one should lean towards a high fiber, vitamin rich substitute to increase serotonin. These are foods such as multigrain breads (not white bread), certain seeds, beans, and vegetables which provide not only better options for serotonin but also stabilize blood sugar (Somer, 1999). This also calls into question the concept of dieting as Beylerian (1993) discussed the failures of dieting and how it only increases the caloric need of the individual for vital nutrients. This leads into the next important nutrition segment which discusses general nutritional habits that can offer important information especially when teaching college age students how to eat properly when dealing with stress and depression (Beylerian, 1993).

Meals

The nutritional benefits conducive to alleviating depression come not only from eating suitable foods but also appropriate nourishment of the body with general wellness habits such as eating proper meals, consuming real foods, and using food as self-care. Wellness nutrition means making adequate food choices, acquiring the knowledge for what essential nutrients the body needs, and understanding how to get those nutrients from daily food sources. Nutritional components are ones such as carbohydrates,

proteins, lipids (fats), vitamins, minerals, and water. These nutrients provide energy, body process regulation, and aid in the growth and repair of body tissues (Grodner, Escott-Stump, & Dorner, 2016). It is essential to obtain these nutrients given that depressive symptoms and negative mood will most likely increase without them.

Acquiring adequate nutrients starts as soon as the sun comes up. In order to refuel the body, work with the body's natural rhythms, and begin an energizing day, one needs to eat a well-balanced breakfast. Unfortunately, breakfast is often skipped which only exacerbates depressive symptoms. Those who eat breakfast are found to be more motivated, less depressed/fatigued, more alert, and have more energy throughout the day (Somer, 2009). Eating breakfast is similar to filling a car with gas before a trip. One to three servings of high-fiber carbohydrates, two servings of fruits or vegetables, and one protein source are vital components of an energizing, mood enhancing breakfast (Somer, 2009). Additionally, Ansari, Adetunji, and Oskrochi (2014) found that adolescents participating in health-promoting eating behaviors such as eating breakfast and lunch experienced a decrease in depressed mood.

Eating at every meal time and insuring a proper breakfast, only do so much if the food is not authentic. When deciding what to consume for each meal, one must recognize the difference between real food and processed/unnatural foods. Real foods are those that lack a long ingredients list, have ingredients that are easily pronounced, grow on natural food sources, (i.e. trees, bushes, or vines etc.) or have two to four legs/fins (Somer, 2009). These real foods are also those that are naturally filled with essential nutrients. Additionally, it is better to eat an assortment or variety of foods from every food group in order to consume all these various nutrients. A limited selection of foods may not provide

adequate or balanced nutrients (Grodner, Escott-Stump, & Dorner, 2016). This balance of nutrients can significantly affect symptoms of depression (Vass, 1983). Ansari et al. (2014) found that "individuals with the highest intake of 'whole food' were least likely to be depressed compared to those with the lowest adherence to such diet…and diets rich in processed food may increase the risk of depression" (p. 91). Foods that are as close to their original form as possible as well as rich in what mother nature designed for them are those to be considered "real" foods (Somer, 2009). Many websites such as eatwellguide.org and localharvest.org can assist students and others struggling with depression to pick out more natural foods to add to their daily diets.

Eating breakfast and consuming more natural foods are just two ways to use food as self- care. Skipping meals and significant dieting can lead to lower blood sugar, increased weakness, increased irritability, more fatigue, and lower amounts of energy throughout the day (Somer, 2009). As one may take medications or receive talk therapy for depressive symptoms, one may use food as another form of care to combat depressive symptoms. When cutting back on processed foods, one is decreasing the potential for disease and increasing elevations in mood (Somer, 2009). Self-care can include many elements including mind set. Knowing and understanding what one deserves from food can be one way to begin the healthy food process. Beck (2007) suggested "giving yourself credit today and continue to give yourself credit whenever you engage in a helpful eating behavior" (p. 75). Habits and mindsets take time to form and to change which is even more reason to invest in acceptance and compassion for oneself during setbacks or struggles with food.

Sugar

After being educated on a broad spectrum regarding food effects on the brain and how to consume nutrients on a daily basis, one starts to look at more specific food groups and their effects on depressive symptoms. Starting with sugar allows one to address the number one comfort food that many people seek in times of distress or low mood. The human body is designed to love sweets, however, too much sugar in a diet can, in some cases, be as addictive as cocaine (Somer, 2009). Naturally including small amounts of sweets can increase mood. The problem is that much of the time sugar is obtained in very high quantities which counteract any increase in mood that may occur.

Students under stress with an increase in appetite are far more likely to turn to many types of sweet foods rather than healthier foods (Ansari et al. 2014). Ansari and colleagues (2014) stated that "a diet in refined carbohydrates and sugars is common in depressive illness" (p. 91). This is similar to what Liu et al. (2007) find as people tend to use food not only to nourish the body but also to manage various stressors and tensions. Specifically, Liu and colleagues (2007) stated that "a few studies have revealed that people increase carbohydrate intake in an attempt to self-mediate against negative mood" (p. 752). It is understandable then that students and people around the world will want to turn to that number one comfort food in order to cope with symptoms of depression. Somer (2009) reiterated the relationship between nutrients and serotonin stating that sugar releases endorphins into the brain while also increasing serotonin and inducing a calm feeling during stressful times. Dinan (2008) also mentioned that chocolate brings about the release of endorphins but is a poor treatment for depression.

Sugar at times also induces a “sugar high” which the brain wants to repeat by releasing dopamine. With this short-lived boost in mood, one can easily mistake sugar as a solution to depressive symptoms. However, high sugar intake eventually leads to low blood sugar causing a chain reaction in the body which then leads to low energy and irritability (Somer, 2009). Symptoms of impaired blood sugar control include “fatigue, irritability, dizziness, insomnia, excessive sweating (especially at night), poor concentration, and forgetfulness, excessive thirst, depression, crying spells, digestive disturbances, and blurred vision” (Holford, 2003, p. 9). Sugar is considered a “downer” in the long run as it is a poor substitute for complex carbohydrates which help lower depression instead of aggravating it like sugar (Somer, 2009).

In one study, those suffering with clinical depression found a significant improvement in energy levels after eliminating added sugar from their diet for two to three weeks (Somer, 2009). Additionally, other studies demonstrate that “sugar has been implicated in aggressive behavior, anxiety, hyperactivity, attention deficit, depression, eating disorders, fatigue, and learning disabilities” (Holford, 2003, p. 9). These studies demonstrate the need to educate students and adults suffering from depressive symptoms about what sugar does to their mind and body and what to look for when creating a healthy diet. For instance, many people do not know the vast amount of sugar types that can be found in food, especially processed food. “Fructose, invert sugar, rice syrup, corn sweetener, fruit juice concentrates, maltose, sucrose, corn syrup, glucose, malt syrup, sugar, crystalline fructose, high-fructose corn syrup, molasses, syrup, dextrose, honey, raw sugar, and brown sugar” are the multiple names one can see that represent sugar on an ingredient list (Somer, 2009, p. 126).

Beyer and Payne (2016) stated an increase in sugar, high fats, and carbohydrates can lead to not only poor physical health but mental health as well. Educating students about nutrition is a way to normalize eating behaviors and to acknowledge healthier patterns of dealing with depressed feelings. In fact, most people are unaware that eleven teaspoons of sugar is the maximum amount of added sugar approved by the World Health Organization (WHO) and the daily allowance can be found in one twelve ounce can of soda (Somer, 2009). Furthermore, Somer (2009) cited that on average, people in the United States consume thirty teaspoons of added sugar a day. This is almost three times the recommended amount per day recommended by the WHO. The high daily sugar intake is incredibly important to bring into the awareness of those in a depression group especially noting the relationship it has with depressive symptoms. It is also helpful to provide ways one can reduce sugar in their diet such as cutting out foods that have sugar as one of the top three ingredients, or foods with sugar mentioned multiple times on the ingredients label, or foods with labels such as “reduced-fat” or “sugar/fat free” as many of these items have an additional ingredient added to make it sweet (Somer, 2009).

With this knowledge, one can be better informed about what they buy to create their meals. However, sugar facts are often widely unknown or hidden from daily sight. Hidden in every day breakfast, lunch, and dinner foods such as white bagels, pizza, and canned chili. One does not need to look far for the hidden added sugars in their foods or liquids. They simply have to look at their sports drinks, coffee beverages, and condiments to see where their daily intake of sugar is hiding (Somer, 2009).

Finally, sugar not only influences mood and depression by increasing blood sugar levels but it also hinders mood by disturbing the vitamin content in the body. Holford

(2003) found that excessive sugar consumption "uses up the body's vitamins and minerals and provides next to none…every teaspoon of sugar uses up B vitamins for its catabolism, thereby increase demand" (p. 9). As previously mentioned, and as Ansari and colleagues (2014) stated, nutrients (such as B vitamins) are vital to produce neurotransmitters which in turn manages the symptoms of depression. These nutrients are found in whole foods such as "whole grains, eggs, yogurt, beans, green leafy vegetables and corn…[those] with the highest intake of 'whole food' were least likely to be depressed compared to those with the lowest adherence to such diet…" (Ansari et al., 2014, p. 91). This brings about the next nutrition bite, Vitamin B, as this vitamin is vital for maintaining mood and impacting neurotransmitter activity (Holford, 2003).

Vitamin B

When studying the links between food sources and depression, one study stated that inadequate amounts of vitamins B6 and B12 may lead to high rates of depression ("A Food and Mood Connection," 2010). Holford (2003) found that lack of B vitamins, including folate, are connected to worsening mood and lack of motivation. In fact, low amounts of vitamin B intake increases the potential for depression by upwards of sixty-seven percent (Somer, 2009). Somer (2009) also noted that "more than one in four people with depression are deficient in vitamin B6" (p. 210). Both vitamin B6 and B12 are vital from a mental health and nutrition stand point and both contribute to the mind and body.

Specifically, obtaining vitamin B6 also known as "the good mood vitamin" may assist in stress reduction and lead to better management of stress (Somer, 2009). B6 vitamins are important for amino acid metabolism. Amino acids contribute to building protein and glycogen which are two ingredients that lead to energy storage in the body.

Essential sources of vitamin B include beans, peas/chickpeas, meats (beef and chicken breast), fish (tuna), poultry, potatoes, pork loin chips, prune juice, some fruits such as oranges and bananas, and leafy vegetables like broccoli and spinach ("A Food and Mood Connection," 2010).

Finding natural sources of B12 happens only when consuming some products of animal origin. These include meat (beef and lamb), fish (clams, oysters, trout, shellfish, king and blue crab), milk products (milk and yogurt), eggs, cottage cheese, Wheaties, and Whole grain TOTAL. Consuming these foods or a B12 multivitamin facilitates "the creation of red blood cells and the essential fatty layer of nerves, which allow proper transmission of nerve impulses, and without which the brain cannot properly function" ("The Food and Mood Connection," 2010, p. 2). Vitamin B12 provides "maximum brain support" and ensures the brains ability to send messages back and forth (Somer, 2009). In those people without depression, lower vitamin B12 tends to increase depressive feelings. Those with lower B12 status also demonstrate a decline in mental functioning at younger ages as compared to those who have a more optimal level of B12 vitamins (Somer, 2009). Additionally, B12 along with B6, play a vital role in neurotransmitter functioning especially in regards to serotonin.

Ansari and colleagues (2014) reported that the production of neurotransmitters needed for management of depression require nutrients such as amino acids, minerals, and B vitamins. Holford (2003) also agreed that B vitamins are key factors influencing enzymes which control production and balance of various neurotransmitters. Deficiencies in either B6 or B12 vitamins can inhibit neurotransmitter production which means that "both of these vitamins are essential for the creation of neurotransmitters [specifically]

dopamine and serotonin, which are chemicals that are known to affect mood" ("A Food and Mood Connection," 2010, p. 1). In addition to B vitamins, folate is also important in the enzyme process of serotonin. Deficiency in folate is known to be very common in patients with depression and people with lower levels of folate "had more melancholic depression and were less likely to improve when given antidepressant drugs" (Holford, 2003, p.13). Medication may be more effective when combined with vitamins B6 and B12 rather than just using antidepressant medication alone (Somer, 2009).

Including vitamin B supplements into one's food intake may not only help influence the effects of medication but also help those who eat a more restrictive diet such a vegans and vegetarians ("The Food and Mood Connection," 2010). Including these additional supplements into daily diet and aquiring adequate amount of B vitamins will lead to feeling better, thinking faster, and increasing energy levels (Somer, 2009). This is especially important for those with mental illness who need more than a normal amount of vitamin B 12 despite any obvious signs of deficiency (Holford, 2003). Similarly, Sathyanarayana Rao and colleagues (2008) found that vitamin and nutritional deficiencies are found more so in individuals with mental disorders. These nutrients include B vitamins, omega-3 fatty acids, minerals, and amino acids. This leads to the next important nutrition bite, "Vitamin D and Omega 3," as B vitamins are not the only nutrient to be aware of when discussing the role of nutrition and depression.

Vitamin D and omega 3

Obtaining essential vitamins is key when combating depression and trying to improve mood. Vitamin D and omega-3 fatty acids are noted to be two very important nutrients not only for overall health and wellness but for helping to decrease depressive

symptoms. A recent study by Tolppanene, Sayers, Fraser, Lewis, Zammit and Lawlor (2012) found that there is an association between depression and 25(OH)D concentrations. These concentrations are a reliable indicator of the status of vitamin D within humans and they can capture the vitamins intake through diet and through absorption into the skin. Somer (2009) noted that this skin absorption can be disrupted by the use of sunscreen which while using this product helps protect the skin, it can also block the ability of the skin to take in and make vitamin D. It is also important to acknowledge that skin color may affect the skin's ability to produce D vitamins from sunlight. Those with more melanin in their skin may have a higher likelihood of vitamin D deficiency than those with fairer skin (Somer, 2009).

Vitamin D levels in humans may be an important variable to consider when looking at lowering levels of depression. Tolppanene and colleagues (2012) found that lower levels of 25(OH)D may indicate a higher risk of depression in older individuals. In children, results suggest that there is a relationship with vitamin D concentrations and depression. Somer (2009) also stated that as age increases, the ability to manufacture vitamin D decreases. Additionally, Somer (2009) noted that vitamin D is not only for strong bones but for prevention of diabetes, cancer, multiple sclerosis, and overall brain function which includes mood and thinking. Those suffering from Seasonal Affective Disorder may be lacking in vitamin D and those individuals have demonstrated an improvement in mood when given an extra dose of vitamin D (Somer, 2009). This is further supported when seeing lower levels of vitamin D in those individuals living more north (Somer, 2009).

Considering location, skin pigment, and age, one may also look at those with psychiatric issues as Tolppanen and colleagues (2012) found that historically this population often has lower 25(OH)D3 levels. Their findings suggest increasing or supplementing vitamin D can work to improve symptoms of depression, however further research is required. It is also important to recognize that finding natural food sources for vitamin D may be more difficult as it is only found naturally from the fat of animal related foods such as butter, egg yolks, fatty fish, and liver (Grodner et al., 2016). Many food sources are those that have been fortified with vitamin D, such as milk (Nix, 2005). Grodner and colleagues (2016) suggested that those on a vegan or vegetarian diet who consume little animal foods may require supplements or regular sun exposure and should consult with their doctor or dietician. Somer (2009) reminded those supplementing with vitamin D that more is not always better as the body stores this vitamin for future use and does not get rid of it which can lead to high build ups. It is important to have a doctor or physician measure vitamin D levels in the blood to make a more informed decision whether supplementing would be a good choice.

Consulting and asking a doctor or dietician about nutritional supplementation is very important for any vitamin or nutrient that one may want to add to their diets. This includes omega-3 nutrients which multiple studies have cited as important in the relationship of food and depression. Dinan (2008) cited that one study in 2002 found that omega-3 fatty acids in addition to talk therapy had highly significant benefits for treatment of depression as compared to a placebo. Holford (2003) also noted that taking a highly concentrated form of omega-3 fats versus a placebo is more effective in treating severe depression and individuals demonstrated an improvement in mood within three

weeks of taking the omega-3 supplement. Sathyanarayana Rao and colleagues (2008) agreed that a decrease in omega-3 fatty acids may lead to heightened depressive symptoms. Similarly, Beyer and Payne (2016) found that omega-3 fatty acids are helpful as a supplement to aid in symptoms of bipolar depression.

Somer (2009) found that omega-3 fats are the "most outstanding brain-boosting nutrient around…the more of the omega-3 fat DHA you eat, the more it is incorporated into brain cells, the more flexible your brain cell membranes become, and the better you think, the more you remember and the happier you are" (p. 175-176). DHA or docohexaenoic acid, accounts for 75% of the omega-3 fats in the brain. The benefits of omega-3 and DHA are seen in studies that demonstrate lower levels of DHA in women with postpartum depression. As DHA levels drop, there is a lowering in levels of serotonin which leads to a worsening in depressive symptoms (Somer, 2009). Additionally, the American Psychiatric Association released a statement in 2006 that supported omega-3s in the treatment of depression and potentially the treatment of drug and alcohol addiction. The APA also saw a reduction in anger and anxiety with inclusion of omega-3 in one's diet (Somer, 2009).

Even slight increases in omega-3 levels can produce changes in mood (i.e. 1% to 5%). Countries that are found to be devoid of omega-3 have a relationship with high rates of heart disease, depression, and postpartum depression. Countries in dark, colder climates, may explain some of their lower rates of depression by the inclusion of omega-3 (Somer, 2009). Other studies have suggested lower rates of depression in countries that consume higher amounts of fish (Dinan, 2008). Holford (2003) agreed that those who incorporate fish into their diets are less prone to depression and that omega-3 fats have

influence on serotonin in reception and production activity. If one does choose to incorporate a higher level of fish into their daily diet in order to increase omega-3, it is important to note that not all fish are created equal in regard to health benefits (Somer, 2009). For example, tilapia and catfish are higher in fat and omega-6 (a nutrient providing less benefits and flexibility for the brain than omega-3). Fish such as salmon, herring, lake trout, anchovies, and sardines may be better dietary options. In order to receive the most nutritional benefits from fish, it is important to bake, broil, or poach the fish so as to not add unhealthy components that may come in other ways of cooking such as frying. In addition, paying attention to the mercury levels in fish to avoid high metal intake is necessary when incorporating fish into a diet. Avoiding swordfish, albacore, ahi tuna, shark, mackerel, and tilefish will help decrease potential high mercury levels (Somer, 2009). Again, consulting with a doctor and nutritionist/dietician is vital to making healthy and beneficial choices of fish when trying to increase omega-3 nutrients.

While many studies cite a relationship between increased omega-3 consumption and decreased depressive symptomology, it is necessary to address the findings in Ansari and colleagues (2014) as they found that some research suggests a beneficial association between fish consumption and depression, however other research did not support such findings. One study showed “a positive association between the consumption of fish/sea food and depressive symptoms in males only… [Ansari et al. agree that they] found no relationship between stress and fish/sea food for both sexes; and no relationship between fish/sea food and depressive symptoms in females” (Ansari et al., 2014, p. 95). Instead, what Ansari and colleagues (2014) cited is that depressive symptoms are in association with health-compromising behaviors and depressive symptoms may relate to a decrease

in health-promoting behaviors. Ansari and colleagues (2014) found that in adolescents, there is a "significant negative relationship between depressed mood and health promoting eating behaviors, e.g. eating breakfast and lunch…" (p. 95). Overall, it appears that a deficiency in vitamins and nutrients is linked to those who are said to have a mental disorder. These nutrients include B vitamins as well as omega-3 fatty acids (Sathyanarayana Rao et al., 2008). One must also look to the nutrients they consume in liquid form when addressing depressive symptoms.

Liquids

Drinking habits such as excessive alcohol use, diminished water intake, and more than one sugary beverage a day can affect many body functions including mood (Somer, 2009). Alcohol specifically can undermine mood by disturbing nutrients such as Vitamins B, C, and A as well as zinc and calcium. These nutrients become flushed out of the body and can leave one drained and feeling down. Drinking in access can lead to feelings of depression and fatigue. It is also important to be aware of the effect that alcohol can have on medication such as a prescription for depression or anxiety. The effects can either be to enhance the drug's action or lessen the effectiveness of the drug. This can be a dangerous game when taking daily medication for depression and can potentially lead to toxic chemicals damaging tissue in the body (Somer, 2009).

Awareness of alcohol intake may be just as important as recognizing the need for water intake. Grodner and colleagues (2016) believed that "the need for water is more urgent than the need for any other nutrient" (p. 10). Water provides transportation for the nutrients in the body and enables them to travel from cell to cell. Many people do not drink enough water to meet the daily needs of the body. One should consume an average

of nine to thirteen cups of water a day which includes water found in food (Grodner, et al., 2016). Water is necessary to maintain almost all bodily functions including that of mood and memory. It helps to ward off fatigue and headaches and improves attention (Somer, 2009).

Attending to the body's thirst response may not be the best way to recognize when one should start drinking water. Nix (2005) stated that "the thirst response is not present until approximately 0.5% total body weight loss. Such is the reason why relying solely on thirst for an indication of fluid needs is not always the most sensitive indicator. By the time you are thirsty, you have already lost precious body water" (p.165). Primary sources of water should come from the liquids we consume that does not include coffee, tea, alcohol, or soft drinks. These liquids have the opposite effect and not only introduce access sugar into the body but can cause an increase in water loss through the kidneys (Somer, 2009). Water supplies with added vitamins, minerals, and herbs are not necessary (Grodner, et al., 2016). Some vitamin water can have the same amount of calories as a can of soda and most bottled teas are loaded with sugar (Somer, 2009). It is also important to recognize that sometimes hunger can be mistaken for thirst and can lead to an intake of sugary snacks when a glass of water may do the trick (Somer, 2009). These liquid habits help to maintain and influence one's mood and health.

The Program

Neurotransmitters, meal consumption, sugar, B vitamins, vitamin D, omega 3, and liquids are all components that contribute to depressive symptoms and affect mood and overall mental wellbeing. The purpose of these nutritional segments or "bites" is to highlight and demonstrate the importance of nutrition to those clients or individuals

suffering from depressive symptoms. Specifically, these bites were implemented and received during a group treatment program for college students with depression. The group met a total of eight times and had five group members and two co-facilitators.

The purpose of the group was to combat depressive symptoms using CBT and interpersonal process interventions. The nutrition "bites" were used to supplement treatment as a psychoeducational component demonstrating how self-care with nutrition may influence one's mood and energy levels. This particular segment of the group meeting lasted no longer than five to ten minutes at the start of group after each group member checked in. Each handout was supplied with information, graphics, and references. The co-facilitator explained the information and provided suggestions. It was also emphasized that each member schedule an appointment with an individual health care provider (i.e. medical doctor, nutritionist) to get more individualized treatment and information regarding supplementation (i.e. vitamins, omega 3). The first group meeting entailed general information about the implementation of this psychoeducational component and the following six groups contained specific nutrition bites for the group members to take home. The final group contained a qualitative survey for group members to provide reactions and feedback of the bites.

Group Feedback

At the end of the process group, data was collected based on a five-question qualitative survey with questions such as, "what were some reactions you had to the nutrition bites, what was most helpful about this segment, what suggestions do you have for future segments, what were some of the influences to your self-care that you noticed, and any additional comments you would like to provide." Group members had various

reactions to the bites such as they were interesting, they allowed for realization of current "bad" diet habits, they tied nutrition facts already known to symptoms of depression, and they were surprising and helpful. Additionally, group members found that the most helpful parts of the segments were that they provided information on how much of one thing to consume, they suggested tips for a healthy diet, they had credible sources, and they enabled one to gain knowledge on nutrition.

Regarding suggestions for the bites, the group provided feedback about the possibilities of connecting depressive symptoms with different diets (i.e. paleo or vegan) and providing more information on how to promote serotonin levels. The group also asked for the bites to give information on organic foods vs. non-organic, provide options for those on a budget, and to be shorter to leave more time for group. Feedback on how the bites influenced self-care was also received. Group members noticed changes such as being less tired/cranky on days where better habits were implemented, being more focused on eating better, sleeping better at night especially when drinking less coffee, and continuing to incorporate components already known while adding more information to their knowledge base. One group member noted that even though the bites provided knowledge, they also led to feelings of guilt and shame regarding an unhealthy diet which led to a decrease in motivation to change habits.

Overall, it appeared that nutrition bites were well received with additional feedback included that of enjoyment and appreciation of the co-facilitator for implementing the bites. This feedback allows not only for recognition of the helpfulness of the bites but also entails information that may lead to potential limitations and future suggestions of the nutrition bites.

Limitations

While this research suggests that without proper nutrition, depressive symptoms are likely to develop or worsen; more research is needed to make more precise conclusions. This is especially true when talking about nutritional education and current programs. More research is needed with regard to specific interventions to put into clinical practice. This implementation was just one out of the many potentials.

It is important to acknowledge that the research used for the nutrition bites were not just based on college students but various other populations as well. While the bites were implemented on a college student population, one must be aware of the potential characteristics of certain populations such as age and gender that could hinder the overall effectiveness of the bites. In addition, individuals vary in many ways from level of depression to genetic make-up. The bites provide a general knowledge and would prove more effective if individuals and clients see a certified nutritionist or dietician to meet their specific needs. These bites are not a substitute for doctor's recommendations and one should consult with their doctor before adding any supplements or making drastic changes to their diet. Effectiveness may also be limited depending on the level of depression the client demonstrates. The student in the group who had the highest score on the Beck Depression Inventory stated that the bites may have led to an increase in guilt and a lack of motivation to change.

Additionally, nutritional research is always developing and growing. These nutrition bites were developed from information found before and up to the year 2016. Recognizing changes and various impacts of future research when using the bites is important to providing up to date information and suggestions to clients. Finally, due to

time constraints of the process group in a college setting, the bites were limited. The group met for a total of eight sessions and with introduction and feedback this only left room for discussion of six topics. These topics also had to be shortened to include five to ten minutes worth of information. Future implementations may do well to expand on the current topics and provide further nutritional components.

Future Considerations

In the future, these bites have the potential to be expanded on and developed. The materials used can be revised based on age, gender, diet restrictions etc. of the client or group. In addition, these bites are not just for a group setting but can be used as a self-care initiative for individual counseling with clients suffering from depression. Self-care with nutrition is also an idea that those with other mental illnesses such as anxiety, bipolar, or developmental disorders can benefit from if properly integrated into their daily routine. These bites were developed to manage symptoms of depression and to promote positive well-being in college students. This holistic approach to treatment may serve many clients and providing information on healthy nutrition is not only a way to influence well-being and self-care, but also a way to ensure continued health throughout the entire body, including the mind. Thus, nutritional psychoeducation is vital in the therapy room not just for group treatment with college students but all types of mental health prevention and promotion throughout various populations.

Conclusion

As referenced above, nutrition matters. Therefore, in order to work as a fully informed clinician as well as increase awareness of all the various treatment possibilities for clients, it is important that the relationship between nutrition and depression be

properly researched and implemented. Since the research has proven that nutrition can in fact impact depression in multiple ways, it may be considered unethical not to acknowledge its potential and incorporate it into practice with clients. Providing a client with a simple nutrition bite may produce significant benefits and lead to better treatment of depressive symptoms.

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Appendix

Nutrition Bite: Neurotransmitters & Depression

Nutritional Habits
- Skipping Meals
- Eating Sugar
- Drinking Caffeine

→ **Negative Mood** →
- Self medicating with food
- Cravings

Serotonin and noradrenaline (dopamine)

- Sensitive to food intake
- Made in the body directly from food components
- Poor food choices can lead to disruption of these chemicals causing ***poor sleep, mood swings, food cravings, emotional issues.***

⇒ ↑ Serotonin: regulates sleep and mood leading to calm and contented, higher pain tolerance.

⇒ ↓Serotonin: Insomnia, depression, food cravings, increased sensitivity to pain, aggressive behavior and poor body temperature regulation

⇒ Lack of Serotonin can be due to:

⇒ Low levels of estrogen in women and testosterone in men

⇒ Low levels of light

⇒ Little or no exercise

⇒ Not enough vitamins and/or minerals

⇒ High levels of stress

⇒ Protein intake (important) = amino acids competing serotonin levels stay the same

⇒ High Carbohydrate intake = temporary ↑in serotonin

⇒ ***However,*** consuming large amounts of carbs such as candy, pastries, sugar, white flour and fat ***isn't*** the solution for raising serotonin as it leads to feeling ***more*** depressed, lessening pain tolerance, and sleeping less soundly in the long run.

⇒ Choose high fiber (i.e. multigrain bread over white bread) vitamin-rich snacks instead to increase serotonin after protein (this also keeps blood sugar stable)

Common imbalances connected to nutrition known to worsen mood/motivation:

- Blood sugar imbalances (excessive sugar & stimulant intake)
- Lack of amino acids (tryptophan-tyrosine; serotonin & noradrenaline)
- Lack of B vitamins (B_6, folates, B_{12})
- Lack of essential fats and Omega-3

Sources: *Food and Mood,* Elizabeth Somer; *Depression: The Nutrition Connection,* Patrick Holford; *Food and Health in the New Millennium,* Rossana Salerno-Kennedy and Claudia Savina

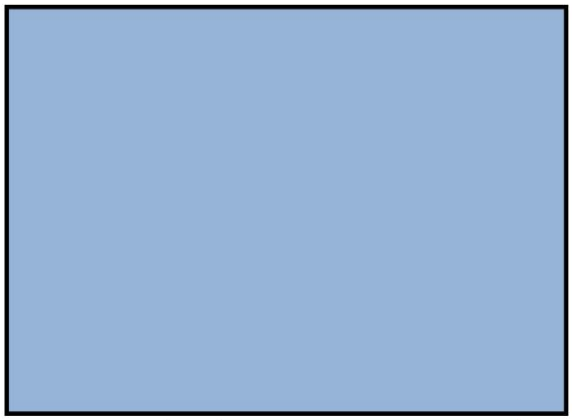
Nutrition Bite: General Nutritional Habits

"Wellness Nutrition approaches food consumption as a positive way to nourish the body."

Nutrient Components

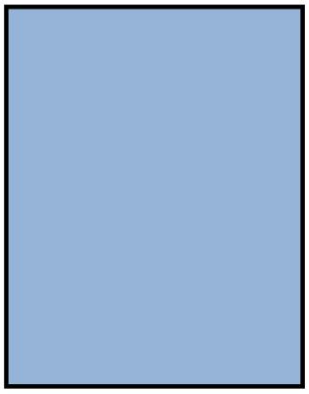
- ⇒ Carbohydrates
- ⇒ Proteins
- ⇒ Lipids (fats)
- ⇒ Vitamins
- ⇒ Minerals
- ⇒ Water*

These essential nutrients provide: energy, body process regulation, and aiding in the growth/ repair of body tissues.
*9-14 cups a day from foods/beverages



Check in on your daily food intake:

How many meals per day?
What the meals contain in each?



1. **Eat Breakfast!** (Like filling up a car with gas before a trip)
   a. To refuel
   b. To work with body's natural rhythms
   c. To kick start an energizing day (use the 1-2-3 rule)
      1-3 servings of high-fiber carbs
      2 servings of fruits/vegetables
      1 protein
2. **Eat Real Food!**
   a. Foods that are authentic – as close to their original form as possible
   b. Foods rich in what mother nature designed for them
   c. Naturally filled with essential nutrients
   d. Real Foods – lack a long ingredients list, have ingredients you can pronounce, grow on trees, bushes, or vines, have 2 to 4 legs or fins
   e. Check out – eatwellguide.org, localharvest.org, back of this handout
3. **Use Food as Self Care!**
   a. Those who eat breakfast found: more motivation, less depressed mood, more energy throughout day, more alertness, less fatigue
   b. Skipping meals/dieting = lower blood sugar, increased weakness, increase irritability, increased fatigue, lower energy
   c. Cutting back/cutting out processed foods = decrease in disease, increase in mood
   d. Know you deserve it and understand it "takes time to change mindsets [and habits] that took years to form" in the first place
   e. Include acceptance/compassion for self during setbacks

Sources: *Nutritional Foundation & Clinical Application,* Grodner, Stump, & Dorner (2016); *Eat Your Way to Happiness,* Elizabeth Somer M.A., R.D. (2009); *The Beck Diet Solution,* Judith S. Beck, Ph.D (2007)

Nutrition Bite: General Nutritional Habits

"Wellness Nutrition approaches food consumption as a positive way to nourish the body."

Clean-Eating Foods List

Choose foods with healthy ingredients like whole grains and healthy fats and those low in added sugar and salt. Here are some tips to help you stock your kitchen with foods that make it easier to eat clean.

Clean Fruit:
- Any fresh fruit
- Canned fruit with no added sugar
- Frozen fruit with no added sugar
- Dried fruit with no added sugar
- 100% fruit juice (limit) – They still don't contain beneficial fiber and add more calories than whole fruit

Vegetables
Some vegetables, such as potatoes and winter squash, are starchy. You don't have to limit them, just be aware they are higher in calories and carbs.

Clean Vegetables:
- Any fresh vegetable
- Frozen vegetables with no sauce or added salt
- Canned vegetables with no sauce or added salt

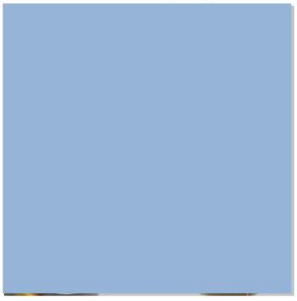
Whole Grains
Be sure that whole-wheat flour is the first ingredient and there isn't sugar in the ingredient list.

Clean Whole Grains:
- Single-ingredient grains, such as farro, millet, oats, barley, quinoa, brown rice, etc.
- Whole-wheat pasta
- Popcorn – buying the kernels and popping them over a stove keeps away additives
- Sprouted whole-grain bread and English muffins (with no added sugar)
- Whole-wheat pizza dough

Dairy
Choose plain yogurt (either regular or Greek) over vanilla and fruit-flavored yogurts, which are usually high in sugar, to clean up your diet.

Clean Dairy Foods:
- Plain yogurt
- Milk
- Cheese
- Unsweetened non dairy milks

Protein
Eating clean means avoiding processed foods, so steer clear of bologna, salami, pepperoni and hot dogs. These—and other processed meat products—are usually high in sodium and may contain artificial colors as well as preservatives.



Clean Proteins:
- Single-ingredient meats: chicken breast, chicken legs, ground beef, etc.
- Seafood (choose sustainable options, such as wild salmon and Pacific cod)
- Eggs
- Unflavored nuts (e.g., almonds, cashews, hazelnuts, walnuts)
- Plain nut butters (no added sugar)

By Lisa D'Agrosa, M.S., R.D., March 25, 2016
http://www.eatingwell.com/blogs/health_blog/stock_these_healthy_foods_to_eat_clean

Nutrition Bite: Sugar

SUGAR FACTS

30 teaspoons: the average daily intake of added sugar for people in the United States

11 teaspoons: maximum amount of added sugar allotted by the World Health Organization

16 calories: in one teaspoon of sugar

10 to 11 teaspoons: amount of added sugar found in a 12oz can of soda

Sugar added by nature =

Sugar added by people =

LOOK FOR:

1. Sugar as one of the top three ingredients in a food
2. Several mentions of sugar throughout the ingredients list (see examples on back)
3. Foods that say "reduced-fat," "reduced/low sugar," or "sugar/fat free." Often means there was something else added to make it sweet.

WHY IS THIS IMPORTANT YOU ASK???

1. Sugar is the #1 comfort food and we are designed to love sweets. However sugar in high amounts has been found to be as addictive as cocaine in some cases.
2. Sugar releases endorphins in the brain ("sugar highs") and it also increases serotonin while additionally calming us during stressful times. This leads to the improper use of food in order to self-medicate.
3. Sugar is a poor substitute for complex carbohydrates. It can boost serotonin similarly but only as a short-term fix. In the long run, it is considered a "downer." Quality grains help lower depression while sugar tends to aggravate it.
4. High sugar food intake eventually leads to low blood sugar (see back of handout for effects of low blood sugar) as insulin overreacts and removes too much sugar from the blood converting it to fat and causing low energy and irritability.
5. Studies on those with clinical depression found that there was a significant improvement in energy levels within 2-3 weeks of eliminated added sugar from their diet.
6. Studies have found that "sugar has been implicated in aggressive behaviors, anxiety, hyperactivity, attention deficit, depression, eating disorders, fatigue, and learning difficulties."
7. Attraction to chocolate may be due to the release in endorphins however chocolate is no recipe for the treatment of depressive symptoms.

Fun Fact:

A bran muffin and Grande Mocha Frappuccino that you may find at your local café add a total of 18 teaspoons of sugar to your daily intake which is 2 times more than your day's sugar quota.

Sources: *Eat Your Way to Happiness* (2009) by Elizabeth Somer; *Depression: the Nutrition Connection* (2003) by Patrick Holford; *Food and Mood* (2008) by Timothy G. Dinan

REMEMBER ....

Check out your real foods list when trying to eliminate processed foods (aka added sugars)

Sweets are one of life's best natural highs ~ It is simply an issue of how much and how often it is consumed.

Sugars often found in processed food ingredients:

Fructose, invert sugar, rice syrup, corn sweetener, fruit juice concentrates, maltose, sucrose, corn syrup, glucose, malt syrup, sugar, crystalline fructose, high-fructose corn syrup, molasses, syrup, dextrose, honey, raw sugar, brown sugar.

Tips to help cut out added sugar:

1. Focus on the foods that are the biggest offenders i.e. soda, fruit drinks, candy, cookies, muffins, ice cream etc.
2. Purge the kitchen of items with sugar in the first three ingredients or multiple sugars on the ingredient's list
3. "Desweeten" recipes by reducing the amount of sugar added by either ¼ or 1/3
4. Control temptation by trying not to bring trigger foods into the house
5. Don't become overly hungry. Be sure to eat breakfast and bring snacks with you through-out the day
6. Stretch out the sweet treat and savor the experience by eating slowly and focusing on the flavor
7. Split your desserts with others
8. Never consume sugar on an empty stomach as it will have dramatic effects on blood sugar which can hurt your mood
9. Boost serotonin levels with quality carbs such as a whole-grain English muffin with honey or a toasted cinnamon bagel with jelly
10. Purchase unsweetened versions of your favorite foods, then sweeten them at home ex. plain yogurt with honey
11. Pamper yourself: Before getting stressed, try to add in self-care actions such as meditating, going on a walk, listening to calming music etc.
12. Give yourself 10 minutes before indulging in the sweet treat. The cravings may pass you by after you step back for a period of time

Low Blood Sugar Effects

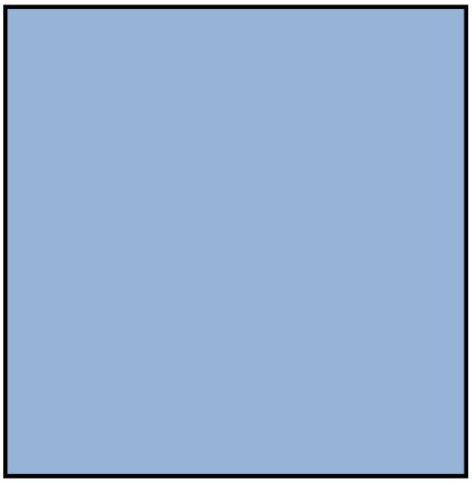
Blood sugar has probably dropped if any of these symptoms follow within one hour of eating a sugary snack:

- Shaking
- Sweating
- Anxious
- Dizziness
- Hunger
- Fast Heartbeat
- Impaired Vision
- Weakness/Fatique
- Headache
- Irritable

Coming Up: Next nutrition bite on Vitamin B. Every teaspoon of sugar uses up vitamin B nutrients which are vital for maintaining mood.

Nutrition Bite: Vitamins B6 & B12

- B vitamins are ***essential for production of dopamine and serotonin neurotransmitters*** (chemicals that affect mood)
- Including a good amount of B Vitamins in your diet will lead you to ***thinking faster, feeling better, and having more energy***.
- Studies published in 2010 demonstrate that ***insufficient amount of B6 and B12 vitamins correlate to higher prevalence of depression***
- ***Lower levels of folate, B12, and B6*** vitamins were seen with more 'melancholic' depression and were less responsive to antidepressants
- Combining B6 and B12 along with antidepressant medication proves ***more effective then medication alone.***



B6: The Good Mood Vitamin

Best sources of Vitamin B6: Beans, peas, meats – fish/poultry, green leafy vegetables (broccoli, spinach), some fruits (oranges), chickpeas, tuna (yellowfin-cooked), potato (baked with skin), pork loin chips, prune juice, bananas, beef, chicken breast (roasted), red pepper.

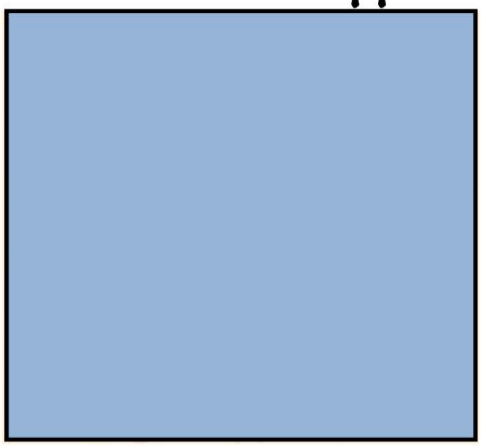
Deficiency in Vitamin B6 occurs in more than 1 out of every 4 people with depression.

B12: Maximum Brain Support

Best sources of Vitamin B12 *(Only found naturally in foods of an animal origin*)*: Meat-fish (clams, oysters, king/blue crab, trout)/poultry/beef/lamb, milk products, eggs, (with shellfish, fish, beef, and lamb containing the higher amounts), whole grain TOTAL, cottage cheese, yogurt (plain)

Without Vitamin B12, the brain begins to shut down.

Risk for Vitamin B12 deficiencies (which means lower mood and drop-offs in mental functioning i.e. ability to think, remember, and react) slowly increases with age.



**Vegetarian/Vegan diets may want to consult with a nutritionist for a B12 supplement as B12 is not available in many vegetarian food sources. Talk with your doctor/nutritionists to consider Vitamin B supplements if you feel you do not get enough from your real foods.*

Sources: *A Food-Mood Connection: B Vitamins and Depression*, Weill Cornell Medical College Food & Fitness Advisor 2010; *Depression: the nutrition connection,* Patrick Holford 2003 ; Eat Your Way to Happiness by: Elizabeth Somer M.A., R.D. 2009

Nutrition Bite: Liquids...It's Not Just About Food

Drinking habits such as excessive alcohol use, diminished water intake, and more than one sugary beverage a day can affect many body functions, including mood.

Alcohol

- ***Mood.*** The average drink such as a glass of wine, shot of liquor, or bottle of beer can contain 150 calories. While indulging in a drink every so often is okay, this habit could also undermine mood. Drinking in excess can disturb mood-boosting nutrients (B Vitamins, vitamins C and A, zinc, calcium etc.) by flushing them out of the body leaving you feeling mentally drained and "down in the dumps."
- ***Health and quality of life*** can all be affected by too much drinking. It can leave one feeling depressed and fatigued.
- ***Medication.*** Be aware of alcohol's affects on medication. Alcohol can either enhance a drug's action or lessen the drug's effectiveness. This can be dangerous since alcohol has the potential to convert medications to toxic chemicals damaging tissue in the body.

Water

The most important nutrient in our diets. After oxygen, it is the second most important component to life.

"The perfect beverage", water is needed to maintain almost all body function, including mood and memory, and helps ward off fatigue and improve attention. Even mild dehydration can result in headaches, fatigue and weakness. Thirst response does not present itself until a loss of 0.5% body weight. Therefore, relying solely on thirst is not always a reliable indicator of fluid needs as you are already thirsty by the time you have lost precious body water.

Recognize that hunger may be mistaken for thirst. Try drinking a glass of water when tempted to reach for a sugary snack.

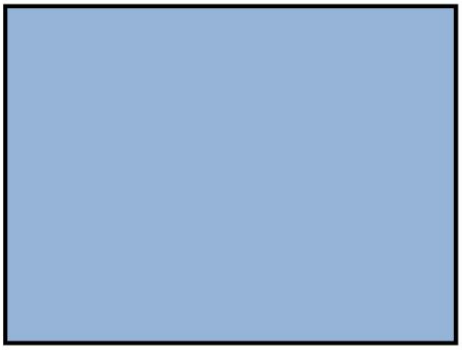
Our bodies need about 2.5 liters of water per day. Primary sources should come from the liquids we drink, not including coffee, tea, alcohol, and soft drinks. Though they contain water, these liquids can act as diuretics, causing an increase in water loss through the kidneys.

Sugary Drinks

- Watch out for water with additives such as flavorings, herbs, or vitamins. Some vitamin water can have the same amount of calories as a can of soda.
- Avoid most bottled teas as more often than not they are loaded with sugar and lack the antioxidant components found in home brewed tea.
- Drinking a gallon of sugar-filled drinks a week or more than 1 alcoholic beverage a day (the average in America) falls outside the boundary of what will work for your mood & health.

Sources: *Basic Nutrition & Diet Therapy* (2005) , Staci Nix ; *Eat Your Way to Happiness*, Elizabeth Somer M.A., R.D. 2009; *Nutritional Foundations and Clinical Application* (2016), Grodner, Escott-Stump, and Dorner.

Nutrition Bite: Vitamin D & Omega 3



Four factors effect vitamin D:

- ***Age:*** as age increases, the ability to manufacture decreases
- ***Location:*** lower levels of vitamin D found in those living more north
- ***Skin color:*** more melanin (pigment giving skin color) means darker skin, reducing skin's ability to produce vitamin D from sunlight (African Americans with a high level of melanin in their skin are more likely to be vitamin D deficient than those with fairer skin)
- ***Sunscreen:*** the need to use sunscreen (which is good) can block skin's ability to make vitamin D

Few natural sources for vitamin D = from the fat of animal-related foods such as butter, egg yolks, fatty fish, and liver – also fortified milk and body synthesis (i.e. sunlight). Regular food sources are those that have been fortified with Vitamin D. Those consuming no animal foods (i.e. vegans) may require supplements or regular sun exposure.

No longer just for strong bones but for prevention of diabetes, cancer, multiple sclerosis, and depression/anxiety. Vitamin D is critical for brain function in general including mood and thinking.

Mood worsening during the winter? It may be Vitamin D is lacking. Research demonstrated mood improvement in those suffering from Seasonal Affective Disorder when given extra doses of Vitamin D.

Some is good, but more is not better. The body does not get rid of it, but rather stores it for future use which could lead to high build up.

Have your vitamin D measured next time you have blood drawn (ask for testing for 25-hydroxy Vitamin D) and have it in November as you may be low then and consult with physician/dietician to see if a supplement is necessary.

Omega 3

Omega-3 and the Brain

- DHA/Omega-3 fats- "most outstanding brain-boosting nutrient around" - they are very flexible and help membranes move messages, nutrients, and toxins in and out of cells. DHA (docohexaenoic acid) accounts for 75% of the omega-3 fats in the brain.
- Omega-3 fatty acids, in addition with therapy, were found in one study in 2002 to have highly significant benefits as compared with a placebo – specifically at 1 gram per day.

- Benefits to the heart and brain are seen by taking omega-3s in general or only the omega-3 DHA.
- Improve SAD – significant levels of omega-3s could explain why those living in cold dark climates (i.e. Iceland) still have low depression rates.

Omega 3 con't.

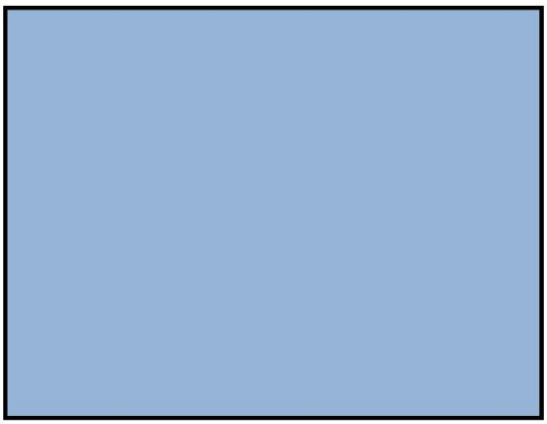
Omega-3 and Depression

- According to Dr. JR Hibbeln – those who eat fish were less prone to depression - omega-3 fats had influence on serotonin in reception and production activity. The study also found to have an effect for severe depression – taking a highly concentrated form of omega-3 fat vs. a placebo showed improvement in mood in three weeks on those taking the Omega-3 supplement (i.e. ethyl-EPA)
- Many studies demonstrated those with depression and women with postpartum depression had much lower DHA levels, which in turn drops serotonin levels, effecting severity as well. Omega-3 levels drop = worsening depressive symptoms.
- Diets that are devoid of omega-3s (Western style diets) show increased rates of heart disease, depression, and postpartum depression.
- Countries that consume high amounts of fish show lower rates of depression.
- DHA often recommended along with antidepressant medications as depression and feelings of despair are linked with DHA deficiency
- Omega-3s are even useful to reduce anger and anxiety as seen in American Psychiatric Association 2006 statement that omega-3s are important when treating depression and may be useful in drug and alcohol treatments.
- Even a slight increase of omega-3s (i.e. 1% to 5%) can produce significant changes

Not all omega-3s are created equal – some do more for heart disease (ie. flaxseeds, walnuts, canola oil, leafy greens) but not much for mood

Seafood and Omega-3s

- Most research uses either fish or supplements
- EPA (eicosapentaenoic acid) and DHA are very important omega-3s – fatty fish being the best dietary source (i.e. salmon, herring, lake trout, anchovies, and sardines)
- Not all fish is good for you - tilapia and catfish are higher in fat and omega-6 (less benefits than omega-3 and less flexible for brain)
- It is important to bake, broil, or poach the fish and be aware of mercury/metal intake (i.e. choosing salmon and light tuna) avoid others (i.e. swordfish, albacore, ahi tuna, shark, mackerel, and tilefish)
- www.seafoodwatch.org – safe seafood guide



Sources: Info From – *Food and Mood* (2008), Timothy G. Dinan; *Basic Nutrition and Diet Therapy* (2005), Staci Nix; *Nutritional Foundations and Clinical Applications* (2016); Michele Grodner, Sylvia Escott-Stump and Suzanne Dorner; *Depression: The Nutrition Connection* (2003) by Patrick Holford; *Eat Your Way to Happiness* (2009) by Elizabeth Somer

TABLE 7–2 Significant Food Sources of Vitamin D

Food item	Quantity	Vitamin D (μg)
BREAD, CEREAL, RICE, PASTA		
Corn flake cereal	1 cup (1 oz)/28 g	1
Granola	¼ cup (1 oz)/28 g	1.23
Raisin and bran cereal	½ cup (1 oz)/28 g	1.23
VEGETABLES		
This food group is not an important source of vitamin D.		
FRUITS		
This food group is not an important source of vitamin D.		
MEAT, POULTRY, FISH, DRY BEANS, NUTS		
This food group is not an important source of vitamin D.		
EGGS		
Egg, whole	1 large/50 g	0.68
Egg yolk	Yolk of 1 large egg/17 g	0.68
MILK, DAIRY PRODUCTS		
Evaporated milk, vitamin D–fortified	½ cup (4 fl oz)/126 g	2.50
Milk, whole or nonfat, vitamin D–fortified	1 quart/960 g	10
Milk, whole or nonfat, vitamin D–fortified	1 cup (8 fl oz)/240 g	2.50
FATS, OILS, SUGAR		
Margarine	1 Tbsp	1.50
Fish oil	1 Tbsp	34

A Sampling of Foods Fortified with DHA

- Bellybar nutrition bars, shakes and chews
- Most infant formulas (check labels)
- Beech-Nut® DHA plus Baby Food
- Stremick's Heritage Foods Little Einstein's Milk with DHA
- Silk soy milk Plus DHA
- Minute Maid® Enhanced Pomegranate Blueberry Juice
- Soy on the Go™ soy milk
- Rachel's Wickedly Delicious® Yogurt
- Gold Circle Farms® Eggs
- Fujisan Sushi
- Cabot 50% Reduced Fat Cheddar Cheese with DH
- Oroweat 9 Grain Bread with DHA
- Mission Life Balance Flour Tortillas
- Healthy 10™ Kefir beverage
- Crisco® Puritan® Canola Oil with Omega-3 DHA
- Pompeian OlivExtra® Plus

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