

Can dietary intervention assist in the mitigation and recovery of traumatic stress?

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Abstract

Currently, in the United States, it is estimated that over 70% of the population has experienced a traumatic event that resulted in traumatic stress (Sidran Institute, 2012). Of that 70%, approximately 67% have or will develop symptoms of PTSD. At present, in the United States, an estimated 7.7 million people have been diagnosed with PTSD, with approximately 31.3 million more suffering from traumatic stress and comorbid disorders. The impact and burden of undiagnosed, untreated, and unmitigated traumatic stress on self and society are significant and far-reaching (Kessler, 2000).

Currently, The National Institute of Mental Health identifies pharmacological and psychotherapeutic interventions as the most effective treatments for traumatic stress and PTSD (National Institute of Mental Health, 2012). Both of which can be costly and not, in many instances, ultimately sustainable for the health and well being of the individual. This paper explores the concept of food as medicine in relation to recovery from PTSD, suggesting beneficial impact that dietary intervention could have on managing and mitigating traumatic stress and PTSD. Specifically, this paper explores whether if by identifying a trauma-specific diet and implementing this dietary strategy, individuals could recover more quickly from traumatic stress and/or manage the symptoms of PTSD more effectively and holistically?

Keywords: Traumatic stress, nutrition, dietary intervention, ptsd,

Introduction

In 2011 over 7.7 million people of all ages, genders, and ethnicities were diagnosed with posttraumatic stress disorder (PTSD) in the United States (Anxiety and Depression Association of America, 2012). Unfortunately, this number does not adequately illustrate the actual percentage of the population affected by traumatic stress who remain either undiagnosed or misdiagnosed. This estimate is closer to 31.3 million. The psychological and sociological impact of traumatic stress is far-reaching on both the individual and societal level. In 2008 the Rand Corporation released data estimating that the economic impact of PTSD on the healthcare system from the military alone was \$6 billion and increasing yearly (Rand Corporation, 2008). The Sidran Institute estimates a more significant impact from society at large to be around \$42.3 billion (Sidran Institute, 2012). Current strategies identified by the National Institute of Mental Health (NIMH) to more aggressively treat and prevent traumatic stress and PTSD appear only to add to the economic burden currently experienced with the focus being on increasing technology and pharmacological research (2012). There seems to be very little research centered on more economical and straightforward interventions such as lifestyle changes, including dietary choices.

While statistics vary, approximately 77-90% of Americans eat what is considered the Standard American Diet (SAD) or an equally related combination of poor dietary choices (Center for Disease Control, 2015; Consumer Reports, 2012). These numbers suggest that it could be reasonable to assume that a large portion of the aforementioned individuals suffering from traumatic stress or PTSD are included in this percentage and consuming a diet lacking in nutrient density. The SAD is identified as consisting of roughly 53% refined food, 43% conventional animal products, and only 5% produce (Grotto & Zeid, 2010). This lack of

nutritional support could have a significant impact on an individual's ability to manage their symptoms of stress, not only disrupting their ability to heal and recover but further exacerbating their symptoms and dissociative tendencies.

Traumatic Stress

Stress is identified as anything that places undue pressure on an organism. For humans, this can occur emotionally as well as physically and trigger psychophysiological reactivity designed to help regulate the response to the perceived stressor. If a chosen coping strategy is effective, the body returns to a state of homeostasis. If coping is ineffective or the stressor is prolonged, the system is unable to regulate, and the individual begins to suffer the consequences of chronic stress. Traumatic stress is a result of experiencing an event that one perceives as life-threatening. At the outset, an individual who has experienced a traumatic event can find themselves suffering from shock and feeling disconnected from life or emotionally numb. They can also experience extreme emotions and mood swings as a result of the initial shock. These are typical responses, and frequently, if effective coping strategies are implemented, can resolve relatively quickly with little or no after effect in the long term (American Psychological Association, 2012; Kloet, Joels, & Hoelsberg, 2005). If coping strategies are not adequate, traumatic stress can develop into posttraumatic stress disorder.

The Diagnostic and Statistical Manual of Mental Disorders, or DSM-IV-TR, defines trauma as:

“involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one’s physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of

another person; or learning about unexpected or violent death, serious harm or threat of death or injury experienced by a family member or other close associate. The person's response to the event must involve intense fear, helplessness, or horror (or in children, the response must involve disorganized or agitated behavior) (American Psychiatric Association, 2000, p 463)".

Being the victim of even a single event and having the inability to develop effective coping mechanisms can elicit prolonged traumatic stress and cause significant disruptions in an individual's life. The DSM-IV-TR continues to further define posttraumatic stress or PTSD as "occurring when an individual has been exposed to trauma and continues to re-experience the trauma in a variety of ways, including intrusive images, nightmares, and in essence, re-living the event as if it were occurring in the present moment."

It is not uncommon for individuals who have PTSD or traumatic stress to engage in behaviors that help them avoid stimuli that may evoke feelings and sensations similar to the state experienced during the traumatic event or continued traumatic stress. For this reason, in many cases, co-morbid mood disorders such as depression and anxiety disorders, substance abuse, and/or eating disorders can accompany the symptoms of PTSD. These comorbid disorders can become unconscious coping mechanisms and strategies in an attempt to help mitigate the systemic agitation and emotional re-experiencing that can occur as a result of traumatic stress (Dennis, 2010). This process of developing or unconsciously sustaining a comorbid disorder as a coping mechanism is one of the many factors that can present pharmacological and more mainstream therapeutic interventions with a significant challenge for effective treatment (Corrigan, Fisher, & Nutt. 2010).

Some of the physiological markers relevant to the discussion of PTSD and dietary intervention are increased activity in the hypothalamus-pituitary (HPA) axis, elevated plasma cortisol levels, and other corticosteroids found in the blood (Kloet, et al., 2005). It has also been identified that traumatic stress results in compromised immune function due to T cell suppression stimulated by an invasion of suppressor cells that converge on the spleen (Makarenkova, Bansal, Matta, Perez, & Ochoa, 2006). Additionally, the low-grade elevation of C-reactive protein has been consistently identified in individuals with PTSD (Spitzer, Barnow, Völzke, Wallaschowski, John, Freyberger, & Grabe, 2010). The implications of these markers will be discussed in further detail as dietary interventions are identified following the literature review.

Literature Review

There is a small but hopefully growing body of literature that identifies the role of nutrition, dietary choices, and supplementation on the effects of PTSD. It is becoming scientifically validated that nutrition can help or hurt one's chances of development and recovery of PTSD. Following is a sampling of some of the current data, all of which suggest a further course of study for PTSD and nutritional intervention.

A recent study by Hirsch and colleagues (2011) identified a positive association with unhealthy diet and dieting behaviors and PTSD in young women. They observed that the young women with a history of traumatic stress and symptoms of PTSD were more likely to consume larger amounts of unhealthy foods, such as sugary drinks and high calorie, high fat fast foods. In conclusion, they suggest further study on the relationship between PTSD and food choices.

A study conducted on soldiers exposed to survival school stress suggests that intensive carbohydrate supplementation could help mitigate the impact of acute and traumatic stress. Morgan and colleagues identified that acute stress degraded cognitive function and physical performance as well as suppressed immune function (2009). In a placebo-controlled, double-blind study, they observed that administering high-quality complex carbohydrates in the form of liquid supplementation helped with more rapid and sustained recovery of the stress-induced imbalances of cognitive function. Their conclusion suggests that further study of the benefits of nutritional supplementation on individuals in combat operations could help mitigate stress and optimize cognitive function and problem-solving capabilities.

Hou, et al. (2010) identify that severe trauma can result in an imbalance of endocrine function and contribute to negative nitrogen imbalance, which contributes to dysfunction of the intestinal wall, increasing the possibility of bacterial translocation and exacerbating the potential for a systemic inflammatory response. Their study conducted on rats identified the potential of utilizing dietary fiber after a significant or severe traumatic incident to alleviate the impact of the stress response to the intestinal barrier. Their findings suggest that dietary fiber appears to regulate immunological response, and in conclusion, they suggest further study in clinical settings to identify the potential of this dietary intervention.

A study conducted at Maastricht University in the Netherlands identified that not only acute stress but even mild stress seems to reduce the food reward signaling mechanism in the brain. This reduction appears to lead or contribute to an increase in eating even with the absence of hunger and the consumption of higher calorie-dense foods. It is hypothesized that stress contributes to obesity via this mechanism and conversely, leads to other physiological and emotional ailments. They concluded with a call for further study on the mitigation of stress and

the food reward signal (Born, Lemmens, Rutters, Nieuwenhuizen, A. G., Formisano, Goebel, & Westerterp-Plantenga, 2010).

Furthermore, a review of literature by Ronald Duman (2005) at Yale University School of Medicine suggests that stress not only contributes to atrophy of the hippocampus and loss of limbic brain function but also decreases neurotrophic factor levels. Brain-derived neurotrophic factor levels play an essential role in nervous system function and balance. Duman suggests that intervention via lifestyle, including managing dietary choices and intake, could help mitigate the loss of neuronal activity and contribute to nervous system health.

Lastly, it is essential to note this call to action by Dr's Bracha & Chronicle (2005) for the further study of the impact of dietary free glutamate (DFA) on individuals with traumatic stress and PTSD. Bracha and colleagues suggest that DFA consumption could contribute to the development of PTSD due to the impact that DFA has on the nervous system. They further suggest that individuals with the potential for psychiatric disorders that respond to Glutamate release inhibitors (GRI) would be at a higher risk for PTSD when consuming foods containing dietary free glutamate and monosodium glutamate. They call for further research into this possibility citing the increased consumption of DFA containing foods by members of the military, especially in combat settings.

Dietary Intervention

Taking the physiological markers for traumatic stress, the reviewed literature, and current knowledge of dietary wellness into account, it becomes possible to identify dietary interventions that could be of optimal benefit for individuals suffering from traumatic stress or PTSD. As a practitioner, my first suggested intervention would be to pay attention to the distribution

macronutrients. The stress response is a process of sympathetic nervous system activation. Chronic perceptions of stress continue the activation of the sympathetic system and end up generating a dominance of sympathetic response. Therefore it could be useful to choose a macronutrient distribution that aims to encourage para-sympathetic dominance. The macronutrient category is comprised of proteins, carbohydrates, and fats. These foods are related to energy input and output, as well as nutrient balance and assimilation. Macronutrients impact the nervous system differently, thus supporting the theory that identifying an appropriate distribution of macronutrients may go a long way in assisting with management of the stress response (Cotter, Simpson, Raubenheimer, & Wilson, 2011; Kaufman, Young, & Landsberg, 1986).

One way that macronutrient distribution helps manage the body's autonomic nervous system function is by the impact they have on our neurotransmitters. Neurotransmitters are responsible for nervous system communication, including but not limited to mood and cognitive functioning. As demonstrated by various studies carbohydrates consumption, especially complex carbohydrate, increases serotonin release and stimulate glucose production (Laugero, 2001; Sheard, et al, 2004; Wurtman & Wurtman, 1995). In the right balance and with the right kind of carbohydrates, this can help regulate para-sympathetic response and enhance mood and cognitive function (Morgan, Hazlet, Southwick, Rasmusson, & Lieberman, 2009). Proteins, on the other hand, tend to be more stimulating for sympathetic function. Protein increases metabolism and can also help with mental focus and the feeling of alertness (Dopart & Batchelor, 2010). Protein also helps regulate hormone function and provide an increased sense of satiety. Fats, again in the right amount and the right type, are essential for nervous system balance, influencing not only brain health but also the gut microbiota. The right kind of fat and

the appropriate distribution of fat can contribute significantly to the regulation of CRP and cellular function, which in turn will optimize immune and endocrine function. In short, complex carbohydrates help encourage a sense of calm, proteins encourage alertness and increase metabolism, fats contain essential fatty acids that contribute to biochemical balance, energy production, and the reduction of inflammation. Because an out of control stress response is also implicated in decreasing nutrient assimilation, it is critical to pay attention to the consumption of high-nutrient rather than high-calorie foods (Hyman & Liponis, 2003; Loucks, 2009). The foods that are highest in nutrient to calorie density would be the “right” choices for dietary intervention, while eliminating any foods or food products that are low nutrient to calorie density. This translates at the simplest level to healthy fats and proteins, vegetables and fruits in their most natural state, and whole grains and legumes appropriately prepared.

An excellent example of a healthy dietary intervention for the average person or mild cases of stress would be the Mediterranean diet. The Mediterranean diet emphasizes consuming healthy fats in the form of nuts, olives, and olive oil and plant foods in the form of vegetables, fruits, beans, whole grains, along with some cheese, yogurt, fish, poultry, eggs, and even minimal consumption of wine. Due to the dysregulation of the nervous system function in people experiencing symptoms of traumatic stress or PTSD, the most beneficial approach would be one that is individualized, taking into account a person's environment and ancestry. Beginning from a foundation that focuses on guidelines closer to a combination of a diet with anti-inflammatory emphasis and what would be considered Vata pacifying qualities in the school of Ayurvedic Medicine (Challem, 2010; Ogden, Minton, & Pain, 2006; Tiwari, 1995). An anti-inflammatory diet, while still focused on consuming mainly plant-based foods and healthy fats, also focuses on eliminating foods that appear to increase or encourage CRP. Eliminating wheat,

conventional dairy, poultry, corn, and other foods that have the potential to increase CRP production could help regulate inflammation and therefore encourage nervous system balance. Reference to a Vata Pacifying diet is included in this discussion of an anti-inflammatory approach because it is less severe in its elimination and recognizes that appropriate choice has more to do with the type and condition of food than with the elimination of particular food groups. In Ayurvedic Medicine, foods, spices, and herbs are the first line of intervention to keep a body type balanced. Vata is one of the recognized body types. With this in mind, below are some potential guidelines for cultivating dietary intervention that may help manage traumatic stress:

Carbohydrate	Protein	Fat
<p>Vegetables</p> <p>Organic vegetables, when possible, are the best choice to eliminate the potential for increased stress to the system as the body tries to deal with any additives, pesticides, or other toxins.</p> <p>Eat a rainbow of vegetables and be sure to include cruciferous vegetables like broccoli, kale, brussels sprouts. Cruciferous vegetables are packed with fiber, phytochemicals, and vitamins.</p> <p>Vegetables should be a good portion of one's daily intake of food.</p>	<p>Fish and seafood are the forerunners for choices of protein. Salmon, sardines, anchovies, cod, and tuna. Cold water fishes have higher omega 3 fatty acids. Wild-caught and fresh are the best options.</p> <p>Meat</p> <p>Avoid conventional meats for a number of reasons. Hormones, antibiotics, higher nitrogen, they are fed GMO corn. Wild game or grass-fed is the best option. The same goes for chicken.</p>	<p>Healthy Fats</p> <p>Avocado, nuts, seeds, olives, and olive oil. Sesame oil, ghee, flax, hemp, and fish oils.</p>

<p><u>Fruit</u></p> <p>Organic when possible. A rainbow of fruits. Berries are great. They are high in fiber and vitamins and minerals. They boost immune function with antioxidants.</p> <p>Be sure to eat fresh fruit rather than cooked or dried fruit.</p>	<p><u>Dairy and Animal Products</u></p> <p>There is much controversy about dairy and inflammation. However, in a Vata Pacifying diet, organic/raw dairy is very pacifying to the nervous system. Warmed with ghee and other spices, it nourishes the body/mind/spirit and helps balance. Organic yogurt, raw cheeses, goat, and sheep cheeses are all good forms of animal products that contribute to protein and fat intake. Organic eggs, especially if they are poached or soft boiled offer a good source of protein as well.</p>	<p><u>Sweets</u></p> <p>For the most part, sugar and manufactured "sweets" should be avoided; however, raw, unpasteurized honey is viewed as supportive of nervous system function and Vata Pacifying. Sweeter fruits like organic cherries and other berries can be very good for the sweet tooth. Small amounts of dark chocolate, over 70% dark with minimal other ingredients, can be acceptable but not daily.</p>
<p><u>Grains/Beans/Legumes</u></p> <p>Whole grains such as kamut, quinoa, millet, and whole kernel barley would be good first line grains. Secondary choices could be oats, rice, and rye.</p> <p>Avoid wheat and processed flours. Especially avoid foods containing enriched or isolated added gluten.</p> <p>Organic beans and legumes. If from a can avoid cans that are lined with BPA's.</p>	<p><u>Nuts and seeds</u></p> <p>Are proteins but also fats. Eaten in moderation, they provide fiber, healthy fats, and many micronutrients. Avoid raw almonds as they contain high amounts of phytic acid, which can cause digestive upset and interfere with nutrient absorption. In small amounts, phytic acid can act as an antioxidant. Almonds are best soaked almost to sprouting and then dried or dehydrated to help make them more nutritionally sound.</p>	<p><u>Herbs and Spices</u></p> <p>For stress management, the use of herbs and spices can be very beneficial. Garlic boosts immune function and makes food more palatable. Turmeric, cinnamon, ginger, rosemary, etc. all have not only a flavor-enhancing effect but also a medicinal quality that supports the system. When possible, avoid salt (unless consuming higher fat and lower carbohydrate) and use herbs instead.</p>

The purpose of a diet such as this one would be to calm and nourish the nervous system and ease the requirements of the digestive system so the body has a chance to repair itself. While not the

topic of this paper, how you eat, when you eat, and how you prepare your food, also become important factors in dietary intervention. To that end, it could be beneficial just to note these few guidelines as an example. It is important to make sure foods are easily digestible, room temperature or warmer, but not overcooked. If possible, cook meats at low temperatures taking longer and leaving them on the bone with cartilage intact. This increases collagen content, which also can help cellular repair and immune function (Shanahan, 2009). Avoid salads and similar cold, raw foods unless served with healthy fat and allowed to reach room temperature. As mentioned, these are just some sample guidelines, and a full mind-body approach and dietary outline would be much more inclusive of all aspects of food consumption.

Implications for MindBody Medicine and Conclusion

The implications of helping people manage their traumatic stress symptoms and even recovery and heal from PTSD through dietary intervention are far-reaching. This is true not only for the field of MindBody Medicine but of healthcare at large. With the current economic burden to the healthcare system estimated at \$44 billion and growing and the projected budget increases deemed necessary to implement the research strategies highlighted by the NIMH (2012), it makes sense that finding a way to mitigate costs would prove beneficial. Helping individuals access a more holistic approach that includes dietary intervention, as well as other lifestyle-related changes not highlighted or discussed in this paper, could prove highly useful for the individual and society at large.

From an individual perspective, pharmacological intervention typically creates an imbalance in other areas, even though the intention is to correct an exhibited symptom. Pharmacological interventions for depression, anxiety, blood pressure, high cholesterol, digestive issues are the

front line interventions for many individuals with PTSD or traumatic stress. While these interventions may help in the short term, over the long-range they interrupt nutrient absorption and imbalance other aspects of health and wellness. Utilizing a dietary approach to adjust mood, anxiety, digestion, cholesterol, is friendly to the individual pocketbook and mind, body, and spirit. Food is Medicine (Hyman, 2012).

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