

Refined Carbohydrates and Psychopathology:

A Behavioral Nutritional Perspective

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Abstract

Refined carbohydrates have taken the top seat on the food pyramid with regard to the percentage of caloric intake Americans have had over the past three decades and this has had a negative impact on overall health issues. The central issue of this paper is to prove or disprove, via a literature review, the hypothesis that eating a diet high in refined carbohydrates may result in an increase in symptoms of various psychopathologies such as depression, anxiety and panic disorders, eating disorders, and autism, and this will be reflected using a variety of peer-reviewed journal articles. In most instances, excluding anorexia nervosa the preponderance of the literature concurs that consuming excessive refined carbohydrates has a negative impact on the associated symptoms of the psychopathologies discussed.

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Introduction

The goal of this paper is to perform a limited literature review to explore if there is a relationship between high consumption levels of refined carbohydrates and increased symptomology of anxiety and panic disorders, autism, depression, and eating disorders. Research that might suggest that complex carbohydrates are the cause of these disorders are not going to be included; rather research regarding diet and symptomology in those who are suffering from these various psychopathologies are the focus of the literature review.

This topic is important because there are many individuals in the United States who suffer from anxiety and panic disorders, autism, depression, and eating disorders who are not managing their nutritional intake properly (McDonald & Power, 1993). Reducing the consumption of refined carbohydrates may be in the control of the individual suffering from a disorder or in the control of their support network and, if this pattern of nutritional behavior is proven to be negative, it may be able to be controlled and changed. There is also an underlying opportunity for social change with regard to understanding this topic. Those who have a low socioeconomic status often eat simple and refined carbohydrates as a staple in their diet and raising awareness of the negative impact to mental health for this group would be positive for society as a whole (Cox, Carpenter, Bruce, Poole, & Gaylord, 2004).

Literature Review

The literature review process consisted of researching key words associated with the topic of refined carbohydrates and general concerns with consuming excessive

refined carbohydrates and the impact of consumption on psychopathologies such as anxiety, panic attacks, obesity, anorexia nervosa, bulimia nervosa, autism and related learning disorders, and depression. An overview of the amount of peer reviewed literature available was mainly theoretical and speculative. However, there was statistical information available in multiple cited studies for specific neurological and biochemical reactivity with refined carbohydrates.

The manner in which literature was obtained was by utilizing Questia Database peer reviewed journal articles, CINAHL Plus with Full Text, Health Source: Nursing/Academic Edition, MEDLINE, Mental Measurements Yearbook, PsycARTICLES, PsycINFO, and SocINDEX with Full Text databases. The selection of literature was limited in that it could not include other interactions with poor diet or nutritional behaviors outside of the consumption of refined carbohydrates as to the amount of broadly scoped studies that incorporated excessive variables.

A literature review exposed that very often individuals, especially elderly and poor people, do not read labels and make their food purchases based upon cost which often results in mass consumption of foods that are high in refined carbohydrates and sugar while lacking in complex carbohydrates, proteins, minerals, and vitamins (Burton & Andrews, 1996; Akande, Van Wyk, & Osagie, 2000). Further, literature that exists suggests sugar and refined carbohydrates should be avoided by those who suffer from anxiety, suffer from food sensitivities associated with autism, or those who have eating disorders and those who suffer from depression (Akande, Van Wyk, & Osagie, 2000; Kemp, Burton, Creyer, & Suter, 2007).

General Concerns with Refined Carbohydrates

Refined carbohydrates can be defined as foods that are not a protein, an animal product, or a legume, and they have undergone a man-made process that removes the important high complex carbohydrates from the natural food source which results in products such as white bread, flour, or white rice. The difference between refined carbohydrates and unrefined carbohydrates is that the same products that have not been refined can be consumed products such as whole grain bread, vegetable based pasta, or brown rice.

Most consumers may be surprised with how often they consume refined carbohydrates when they have so many options. For example, the British Dietetic Association (2005) notes that many people start off their day, and continue it, with products such as frosted flakes, white toast, cereal bars, and breadsticks, pasta, or French bread sandwiches. These products have been stripped of their natural nutritional benefits such as the bran, germ, and the whole grain that burns long term to keep blood sugar levels consistent.

The human body uses complex mechanisms such as inflammation to heal infections but this process can be complicated if there is an excessive consumption of refined carbohydrates incorporated into the nutritional composition of a person during the healing process (Harvard Heart, 2007). A better alternative to consuming refined carbohydrates would be to consume anti-inflammatory oils such as omega-3 fats and olive oil, walnuts, and almonds. Eating non-refined carbohydrates can decrease symptoms associated with a variety of biomedical disorders (Harvard Heart, 2007).

However, current research suggests that Americans are doing exactly the opposite. The United States Department of Agriculture has a department entitled the Economic Research Service and the information presented in their 2000 study is alarming. An average of 200 pounds of refined grain was consumed each year by Americans versus 135 pounds of consumption in the 1970s (Putnam, Allshouse, & Kantor, 2002). Specifically, there was a 48% increase in the consumption of flours, rice, and corn products such as corn flour and starch. The study also found that there was a 9% reduction in the consumption of oat products and a 22% reduction in the consumption of barley products which are complex carbohydrates that take longer to digest and therefore trigger less release of insulin into the blood stream (Putnam, Allshouse, & Kantor, 2002). These high fiber grains also have vitamins and minerals that are stripped from refined carbohydrates.

Depression

There have been many biomedical physicians who have suggested that a proper diet and exercise program could increase physical and mental health; however many psychotherapists and medical practitioners, when presented with a patient having symptoms of depression, often refer to pharmacological tactics to reduce symptomology because their professional training has focused on biochemical or cognitive behavioral problems and they may not have embraced the biopsychosocial model of treatment (Beardsley, 2000). Patients suffering from depression are often careless with their nutritional intake, they may miss meals because of mood swings, or they may have diets that are high in refined carbohydrates which results in a lack of consumption of necessary vitamins and minerals.

Sugar, or glucose, has been associated with having a sudden release and a surge of serotonin which increases the happiness centers of the brain resulting in a brief period of euphoria. However, that mood swing is short lived and it may result in a period of tiredness and an irritable or saddened mood. Refined carbohydrates are quick to break down into glucose and overload the blood stream with insulin and the neurological response of releasing serotonin. The consumption of foods that are high in refined carbohydrates such as nachos, noodles, soda, donuts, or commercial cereals contribute to the cycle of depression as they enhance a person's mood swings (Putnam, Allshouse, & Kantor, 2002).

Anxiety and Panic Disorders

Anxiety and panic disorders often stem from depressive disorders and although there is a broad spectrum of symptoms, many patients self-report or are diagnosed as suffering with irritability, excessive worrying, avoidance behaviors, and a disproportionate view in which they assess stressors as threats (McLoone, Hudson, & Rapee, 2006). For those who suffer from anxiety or panic disorders many individuals who try natural methods to relieve their symptoms often eliminate coffee, alcohol, tobacco, and excessive sugar from their diets. They may not be aware of the impact that consuming refined carbohydrates has on their symptoms. For example, in a study conducted by Grachev and Apkarian (2000), there was a relationship between anxiety and the increased activity of the orbital frontal cortices for patients when they were exposed to a variety of concentrations including glucose, lactate, and their derivatives. Glucose is a monosaccharide sugar and lactate is a derivative of lactic acid which is produced by muscles when they contract while processing glucose. These concentrations

are prevalent in refined carbohydrates and this is further evidence that those who have anxiety or panic attacks should avoid products that contain these substances. When suffering from this psychopathology it is best to keep blood sugar levels even and focus on eating slow releasing complex carbohydrates or proteins that do not contain glucose (McLoone, Hudson, & Rapee, 2006).

Eating Disorders

Eating disorders are often associated with depression and anxiety and eating disorders may range from anorexia nervosa, bulimia nervosa, or obesity; however the spectrums for these disorders are vast and hard to completely represent from a behavioral nutritional perspective. Individuals who suffer from these disorders, especially obesity, and also consume high carbohydrate filled foods, such as refined flour based products or tortilla laden Mexican dishes, increase their risk of having a heart attack, getting diabetes, or developing cholesterol related illnesses (Putnam, Allshouse, & Kantor, 2002). There are further implications for those who suffer anorexia or bulimia.

Johnson, Jarrell, Chupurdia, and Williamson (1994) found that there was a relationship between the cyclical pattern of bingeing and purging with glucose levels. Glucose levels are stimulated and accelerated by the consumption of refined carbohydrates which usually substantiate a majority of the food consumed by those who suffer from bulimia nervosa. In their study Johnson, Jarrell, Chupurdia, and Williamson (1994) concluded that participants who had recently purged food (specifically vomiting cookies and milk high in refined carbohydrates) had statistically significant reductions in insulin and glucose levels versus participants that ingested the cookies and milk without purging them. A fast drop in insulin and glucose levels is attributed with a cyclical

binging and purging process (Delvenne, Goldman, Simon, De Maertalaer, & Lotstra, 1997).

The research for this paper did not reveal a relationship between consumption of refined carbohydrates and the psychopathology of anorexia nervosa. Rather, the literature review displayed that a decrease in any and all carbohydrates was prevalent among all those who suffer with the disorder and that deficiencies in certain minerals, such as calcium, iron, magnesium, selenium, and zinc, was more likely a factor in the mental processes that encourage the disorder (Griner, Strickland, & Boatwright, 1993; Romeo, 1994; & Romeo, 1996).

Autism

Autism is a very different psychopathology in comparison with the previously discussed topics of depression, anxiety and panic attacks, and eating disorders. However, a lot of attention has been brought to the media regarding behavioral and cognitive disabilities and other psychoneurological disorders and the interaction with nutrition. Refined carbohydrates have been linked to documented literature starting as early as 1977 (Fishbein & Meduski, 1987). It was suggested, with controversy, that there might be an association with the aggravated behavior of those who suffer from disorders such as autism and nutrition. Many parents are now aware that there are possible interactions with gluten and their autistic children so they avoid refined carbohydrate products such as cookies, white bread, pasta, pretzels or cakes. There also is a level of acceptance in the scientific community that the intake of refined carbohydrates, especially those containing gluten, can increase the negative behavioral patterns of a child who is on the autism spectrum (Stahmer & Ingersoll, 2004). Additionally early biomedical and nutritional

intervention with children who are suspect of autism or have been diagnosed with the disorder has shown to benefit their behavior, concentration, and frequency of language usage (Hume, Bellini, & Pratt, 2005). The nutritional interventions can consist of removing gluten, which is a nitrogenous substance that results from washing the flour from wheat to remove starch (a refining process) from the diet.

Discussion

Research in behavioral nutrition is a fairly new science and there is limited research available, possibly because social scientists and medical professional have not recognized the relationship between nutrition and psychopathological disorders (Fishbein & Meduski, 1987). Therefore there are gaps in the available literature regarding the relationship between psychopathology, refined carbohydrates, and nutrition in general.

For example, there are a variety of informative books that are available on the market including *Optimum Nutrition for the Mind* and *The New Optimum Nutrition Bible* by Patrick Holford, *The Encyclopedia of Natural Medicine* by Michael Murray and Joseph Pizzorno, and *Atkins for Life* by Robert Atkins. These books present logical arguments about the need to minimize the consumption of refined carbohydrates; however, although they are based on sound nutritional information, they lack peer reviewed research experimentations or literature analyses. Further, a majority of the scientific, peer reviewed journal articles are dated in the 1980's and 1990's which may indicate a decline in interest in refined carbohydrates and psychopathology by the behavioral scientific community. An excellent way to reconcile the discrepancies in the available literature would be to perform a meta-analysis of the available research and

work with the authors discussed prior to compile a scientific compilation of behavioral nutritional data.

Conclusion

Based upon this review there are possible implications for future research such as further investigation regarding the behavioral nutritional aspects associated with anorexia nervosa or research into the biochemical interactions of carbohydrate deficiencies with neurological responses and addictive patterns.

A synthesis of research can conclude that there are implications between a person's diet and the affect it has upon an existing condition of the psychopathologies of depression, anxiety and panic disorders, eating disorders, and autism. The rapid release of glucose from refined carbohydrates, the reaction of insulin and serotonin levels, and the lack of vitamin and mineral content in these food products prove to be negative contributors to the symptomologies of these psychopathologies.

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Low-carbohydrate intakes result in a reduction of the circulating insulin level, which promotes high level of circulating fatty acids, used for oxidation and production of ketone bodies. It is assumed that when carbohydrate availability is reduced in short term to a significant amount, the body will be stimulated to maximize fat oxidation for energy needs. The currently available scientific literature shows that low-carbohydrate diets acutely induce a number of favourable effects, such as a rapid weight loss, decrease of fasting glucose and insulin levels, reduction of circulating triglyceride Behavioral models (a subset of animal models) are the main tool in contemporary experimental psychopathology, and much of our understanding on the psychological and biological mechanisms underlying mental disorders arises from studies using such tools. What, however, is a model in experimental psychopathology? In what sense does it represent a human disorder? What are animal models? How do we learn from models? In an attempt to answer these questions the present article summarizes current semantic and epistemological questions regarding behavioral models, and attempts to extend current theorie Running head: Interoception and psychopathology: A developmental perspective. Word count: 8451. Interoception and psychopathology: A developmental neuroscience. perspective. Jennifer Murphy^{1*} Rebecca Brewer^{1,2}, Caroline Catmur¹ & Geoffrey Bird^{1,3,4}. ¹MRC Social, Genetic and Developmental Psychiatry Centre, Institute of Psychiatry As reiterated in a recent review on interoception and psychopathology, interoceptive awareness plays a role in many higher-order abilities such as memory, learning, decisionmaking, and emotion processing [7]. A deficit in interoceptive awareness is associated with more difficulties in identifying emotions, which might increase the risk of emotion regulation difficulties [40].