

# Wernicke-Korsakoff Syndrome

## Introduction

The reason I chose the topic of Wernicke-Korsakoff Syndrome is because I had never heard about it before and I wanted to learn something new. After learning that it is a neurological disorder I became even more interested because I have recently done a research paper on a neurological disorder known as Bovine Spongiform Encephalopathy (BSE). Though the two disorders are very different, neuropathology is an area of great interest to me and I hope to learn more in this area with this research.

## Section 1: Background and Problem Statement

Wernicke-Korsakoff Syndrome (WKS) is a neurological disorder caused by a deficiency in thiamine, which is Vitamin B1. It causes ataxia, vision impairment, and loss of memory. It may be caused by alcohol abuse, deficiencies in diet, and eating disorders. The effects of chemotherapy can also cause it.

- **Web site #1 Name: National Institute of Neurological Disorders and Stroke**
- **Web address: <http://www.ninds.nih.gov>**
- **Summary of the information:**

HealthyPeople2010 does not address Wernicke-Korsakoff Syndrome because it is an environmental and social disorder. There are other organizations that are concerned with the disorder and research this neurological condition. The National Institute of Neurological Disorders and Stroke (NINDS) is a Web site that focuses entirely on neurological conditions that affect human health. Anyone can have access to the information available through this site, and have access to recent research and news concerning all neurological disorders, including WKS. NINDS defines Wernicke's

encephalopathy as a degenerative brain disorder that is caused by deficiency of thiamine with symptoms of coma, hypothermia, ataxia, and mental confusion. The site defines Vitamin B1 deficiency as the major cause of Korsakoff's amnesic syndrome. Korsakoff's syndrome causes amnesia, attention deficit, and vision impairment. Both syndromes are different stages of the same disorder. Treatment of WKS involves thiamine replacement and appropriate nutritional consumption. Drugs may also be used as therapy. WKS is a reversible syndrome if the symptoms are caught very early on in their development. In most of the cases, however, memory loss becomes disabling (NINDS par 1-5).

- **Web site #2 Name: Alzheimer's Association**
- **Web address: <http://www.alz.org>**
- **Summary of the information:**

The Alzheimer's Association is one of the leading voluntary health organizations fighting to educate and provide help to millions of people and families afflicted with Alzheimer's disease, and other neurological disorders. The organization's mission is to eliminate Alzheimer's disease through the advancement of research. They have a 24/7 help-line that provides information and support in multiple languages. The site defines Wernicke-Korsakoff Syndrome as a two-stage neurodegenerative disease caused by lack of Vitamin B1. Since thiamine helps brain cells convert sugar to energy, lack of the vitamin can cause significant damage to the brain's normal functioning. The most common cause is alcoholism, and the syndrome is also related to AIDS, cancer, and high levels of thyroid hormone. The site claims that recent research has found that a genetic variation may even be associated with the risk of developing WKS. This comes

as no surprise, as heredity plays a role in the risk of many other diseases. If the syndrome is caught early on it can be reversed with thiamine supplementation (Alzheimer's Association par 1).

- **Web site #3 Name: University of Maryland Medical Center**
- **Web address: <http://www.umm.edu/>**
- **Summary of the research:**

The University of Maryland is one of the leading educational institutions of neurology in the United States. It defines WKS as a brain disorder caused by thiamine deficiency. The most common cause of this condition is alcoholism, though it isn't the only one. Having too much alcohol in the body leads to the breakdown of thiamine. After Wernicke's symptoms begin to dissipate, Korsakoff's symptoms take precedence over the brain and damage to the memory areas of the brain become irreversible, even with thiamine treatment (par 1-5).

## Section 2: Research

- **Web site #1 Name: Pub Med**
- **Web address:**  
**[http://www.ncbi.nlm.nih.gov/pubmed/19590929?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed\\_ResultsPanel.Pubmed\\_DefaultReportPanel.Pubmed\\_RVDocSum](http://www.ncbi.nlm.nih.gov/pubmed/19590929?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum)**
- **Summary of the research:**

The Pub Med Web site contains many studies done on Wernicke-Korsakoff Syndrome and other neurological disorders like it. The Department of Internal Medicine at the University of Kentucky College of Medicine has implemented an approach to treating neurodegeneration with the use of antioxidants. Researchers wanted to find a way to help decrease neurotoxicity from ethanol. The researchers are conducting studies on anthocyanins. These are a subgroup of flavanoids found naturally in many

fruits and vegetables. These antioxidants already have beneficial effects on the cardiovascular system. They exhibit anti-atherosclerotic activity (opening of blocked arteries), anti-diabetic, anti-cancer, and anti-inflammatory properties. Researchers have found that anthocyanins have the ability to cross the blood-brain barrier in order to get to the central nervous system. These findings give hope to the future in treating patients with neurotoxicity from ethanol (Chen et al.).

- **Web site #2 Name: Pub Med**
- **Web address: <http://www.ncbi.nlm.nih.gov/pubmed/18706897>**
- **Summary of the research:**

Researchers at the Department of Psychology at Binghamton University in New York conducted a study on Pyriethamine-induced thiamine deficiency (PTD), an animal version of Wernicke-Korsakoff Syndrome that causes cholinergic (acetylcholine) abnormalities including spatial memory loss. Using intraseptal bicuculline, a GABAA (ligand-gated ion channel on cell membrane) augmenter, they were able to increase the acetylcholine levels in the hippocampus of the brain. Scientists found that it increased the animals' performance related to memory. Using specific doses had varying effects on the recovery of the PTD animals to normal functioning (Roland et al.).

- **Web site #3 Name: Scirus Search Engine**
- **Web address: <http://www.ncbi.nlm.nih.gov/pubmed/19147797?dopt=Abstract>**
- **Summary of the research:**

Researchers at the Department of Environment and Primary Prevention, Istituto Superiore di Sanità in Rome, Italy conducted a series of studies to identify biomarkers (pre-diagnostic signs) of alcohol consumption. The premise for identifying biomarkers from alcohol is so that health problems such as thiamine deficiency (TD) can be treated well before serious complications arise within the body. One such biomarker they found

is Ethyl glucuronide (EtG). It forms in the liver after alcohol reacts with glucuronic acid, and is a direct metabolite of alcohol. Presence of EtG should be higher than normal in people who binge drink or consume heavy levels of alcohol. This indicates a high probability of thiamine deficiency in the future for such persons (Mancinelli et al.).

### Section 3: Statistics

- **Web site #1 Name: Pub Med**
- **Web address: <http://www.ncbi.nlm.nih.gov/pubmed/>**
- **Summary of the statistics:**

The National Center for Health Statistics provides data on most national health issues and all data are open to the public. It provides data stating that more than half of the adult U.S. population drank alcohol in the past 30 days. About 5% drink heavily and about 15% engaging in binge drinking. Binge drinking is having 5 or more drinks during a single occasion for men or 4 or more drinks during a single occasion for women. Heavy drinking is having more than two drinks per day on average for men or more than one drink per day on average for women. From 2001 through 2005, the average death rate per year attributed to alcohol as a lifestyle factor was 79,000 deaths. NCHS states that excessive alcohol use is the third-leading lifestyle factor related to deaths for people in the United States (par 1). As previously demonstrated, such excessive alcohol use and alcoholism is a major risk factor for developing WKS.

- **Web site #2 Name: National Institute of Health**
- **Web address: <http://www.nih.gov/>**
- **Summary of the statistics:**

The National Institute of Health lists Wernicke-Korsakoff Syndrome as a rare disease. This means that less than 200,000 people are afflicted with it on an annual basis. The site says that up to 80% of alcoholics have a deficiency in thiamine, and that

some of these people will likely go on to develop serious neurological disorders, such as WKS and Alzheimer's. About 25% of WKS patients have permanent, irreversible brain damage.

- **Web site #3 Name: National Institute on Alcohol Abuse and Alcoholism**
- **Web address: <http://www.niaaa.nih.gov/>**
- **Summary of the statistics:**

The National Institute on Alcohol Abuse and Alcoholism reports that approximately 80 to 90% of alcoholics that develop Wernicke's encephalopathy will also develop Korsakoff's syndrome, the chronic stage of the two stage neurodegenerative disorder.

#### Section 4: Consumer Information

- **Web site #1 Name: National Institute on Alcohol Abuse and Alcoholism**
- **Web address: <http://www.niaaa.nih.gov/>**
- **Summary of the information:**

Patients with Wernicke's encephalopathy are too confused and often cannot find their way out of a room. Some may not even be able to walk. Patients with Korsakoff's psychosis are quickly frustrated and very forgetful. They have difficulty with walking and coordination. These patients have problems not only in remembering old information, but also in learning new information as well. An example of this is how WKS patients might tell you about a significant event in their lives but then forget that they even told you about it.

- **Web site #2 Name: Medline Plus**
- **Web address: <http://www.nlm.nih.gov/medlineplus/>**
- **Summary of the information:**

The main symptoms of WKS are the inability to process new information, loss of memory, loss of muscle movement and coordination, confabulation, hallucinations, and

vision changes. When patients make up stories that never happened (confabulation), they are not necessarily lying. They may actually believe their explanation. They may also be trying to cover up their inability to remember things.

- **Web site #3 Name: University of Maryland Medical Center**
- **Web address: <http://www.umm.edu>**
- **Summary of the information:**

Patients with Wernicke-Korsakoff Syndrome may have damage to many of their nerve systems. Patients show decreased or abnormal reflexes and the inability to adopt proper gait (walk upright). Muscle weakness and atrophy lead patients to rely on others for assistance. Along with decreased muscular stability comes irregular eye movement. Patients often seem like they are looking elsewhere or not paying attention. WKS patients are often mistaken as drunk. Most patients do not exhibit slurred speech.

### **Section 5: Solutions to the Problem (or Issue)**

- **Web site #1 Name: University of Maryland Medical Center**
- **Web address: <http://www.umm.edu>**
- **Summary of the information:**

For most neurological disorders, prevention is key. This is because once nerves become damaged, namely the brain, it is nearly impossible to regain one's ability to learn and continue living normally. With the treatment that is available now, the goals are to control symptoms and reduce the risk of the disorder worsening in condition. Patients therefore may need to stay in hospitals for treatment. Since the disorder is caused by lack of Vitamin B1, the vitamin is given to the patients through injection, intravenously, or orally. Thiamine does not usually help with the loss of memory, but may help with symptoms of confusion and muscle impairment.

- **Web site #2 Name: University of Maryland Medical Center**
- **Web address: <http://www.umm.edu>**
- **Summary of the information:**

The best way to avoid WKS is through prevention. Abstaining from alcohol or drinking in moderation is the best way to prevent the thiamine-depleting effects within one's body. Though not all cases are presented in alcoholics, the majority of them are. With alcohol, thiamine supplements are recommended, as well as good nutrition with plenty of B vitamins.

- **Web site #3 Name: Imperial College London**
- **Web address: <http://wwwfom.sk.med.ic.ac.uk/medicine/research>**
- **Summary of the information:**

A good solution to the treatment of WKS is to treat more people for the disorder. Any patient that is a chronic alcohol abuser should be treated and checked for the signs and symptoms of WKS. If the patient already shows a symptom of WKS they should begin checkup for the disorder right away. The key to diagnosing WKS is to recognize it first. Patients with delirium tremens should be treated for WKS because they usually have it. Alcoholics should be given access to support groups and programs that will help them get rid of their alcohol dependency. Before treatment comes identification of the disorder, and since signs of WKS seem like drunkenness, doctors and nurses should assess alcoholic individuals with this in mind.

## Two-minute Twitter Brief

The fact that I chose to share with the class in my Twitter brief is the definition of Wernicke-Korsakoff Syndrome. After naming the symptoms and relating thiamine deficiency with alcohol consumption, I hope my classmates will understand the long term affects of alcohol in one's body.

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