



# Wernicke-Korsakoff Syndrome (WKS): A Review for Criminal Justice, Forensic, Legal, and Mental Health Professionals

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## Introduction

Wernicke-Korsakoff syndrome (WKS) is a multifaceted syndrome composed of Wernicke's encephalopathy (WE) and Korsakoff syndrome (KS) (Nikolakaros, Ilonen, Kurki, Paju, Papageorgiou, & Vataja, 2016; Sukop et al., 2016; Sullivan & Fama, 2012; Wijnia et al., 2016). Precipitated by low levels of thiamine (vitamin B1), these disorders are typically driven by chronic alcohol use and/or malnutrition (McCormick, Buchanan, Onwuameze, Pierson, & Paradiso, 2011; Nardone et al., 2010). The classical triumvirate of three impairments associated with WE includes abnormal eye movements, poor physical coordination, and mental confusion (e.g., executive control, memory deficits, and confabulation). However, the majority of WE cases do not present with all symptoms associated with this classical group simultaneously (Bonucchi, Hassan, Policeni, & Kaboli, 2008; Tanasescu, 2009). As such, this can create barriers and challenges associated with proper identification and subsequent treatment. Despite the fact that damage from WE can be managed and perhaps delayed if it is detected early, many cases go unrecognized and undiagnosed. As a result, this can lead to a host of deficits and long-term consequences for the impacted individual. Consequently, it is likely that some of these individuals will become involved in the criminal justice system as either witnesses, victims, or defendants as a result of the symptoms and complications associated with latent WKS. This is problematic because these deficits likely undermine the capacity to function (e.g., capacity to waive *Miranda* rights and competency to stand

trial) in criminal justice and legal settings. This article provides an overview of WKS to broaden awareness among professionals who work within various criminal justice, forensic mental health, and legal settings. It also serves to encourage additional advanced awareness, training, and research on the topic.

## What Is Wernicke-Korsakoff Syndrome?

Wernicke-Korsakoff syndrome (WKS) is a complex and under-recognized condition composed of two closely associated neuropsychiatric disorders—Wernicke’s encephalopathy (WE) and Korsakoff syndrome (KS) (Nikolakaros et al., 2016; Sukop et al., 2016; Wijnia et al., 2016). These disorders are caused by a deficiency, excessive loss, or lack of absorption of the nutrient thiamine (vitamin B1), which is often, but not exclusively, associated with chronic alcohol use. WKS is characterized by memory deficits including anterograde amnesia, retrograde amnesia, and increased susceptibility to confabulation (the unconscious production of distorted or fabricated memories). The combination of WKS symptoms and chronic alcohol use may increase the likelihood of involvement in the criminal justice system as a suspect, defendant, offender, victim, or witness. However, research has yet to examine the prevalence of individuals with WKS who become involved in the criminal justice system.

## Wernicke’s Encephalopathy (WE)

Wernicke’s encephalopathy (WE) is characterized by an acute onset of three classic peripheral neurological symptoms: abnormal eye movements (e.g., ophthalmoplegia), lack of coordination (ataxia), and mental confusion (Hata et al., 2014; Thomson, Guerrini, & Marshall, 2009; Osiezagha et al., 2013; Wijnia et al., 2016). However, the presence of this constellation of symptoms is not required, as only 8% to 30% of WE patients will display the full spectrum (Galvin et al., 2010; Harper, Giles, & Finlay-Jones, 1986; Isenberg-Grzeda et al., 2012; McCormick et al., 2011; Thomson et al., 2009). The absence of this symptom collection may be particularly true in non-alcoholic cases, where their effects are significantly less likely to present (Galvin et al., 2010).

## Korsakoff Syndrome (KS)

If left untreated, WE may progress into Korsakoff syndrome (KS) (Harper, 2006; Kopelman, Thomson, Guerrini, & Marshall, 2009). The primary symptom of KS is anterograde amnesia, or the inability to form and consolidate new memories, which can occur even in the presence of normal intellectual functioning. Other common symptoms include retrograde amnesia, frontal lobe dysfunction, disorientation, apathy, confabulation, and disturbances in mental processing (Dayal et al., 2015; McCormick et al., 2011; Thomson et al., 2009). For example, affected individuals may repeatedly ask the same question or not recognize people who they have recently met. In some cases, long-term memory impairments can even be observed in memories dating back as long as 30 years before the onset of the syndrome. As a result, individuals with KS may be vulnerable to not only jumbled memories but also a heightened risk of confabulating false memories that they believe to be real (Kopelman et al., 2009;

Thomson et al., 2009). These memory issues can have devastating consequences in criminal justice, forensic, and legal settings.

While all alcoholics with Wernicke's encephalopathy have characteristic lesions to the diencephalon in the brain (Victor et al., 1989), only some have Korsakoff psychosis. Harding and colleagues (2000) provided the first demonstration of a differentiating lesion in Korsakoff syndrome as neuronal loss in the anterior thalamic nuclei consistently correlated with Korsakoff's amnesia specifically.

## Risk Factors for Developing WKS

Wernicke-Korsakoff syndrome is significantly more likely to occur with the chronic and long-term sustained use of alcohol. Estimates show that as many as 90% of WE cases have a long history of alcohol consumption (Thomson, 2000). Furthermore, thiamine deficiency is estimated to be present in 20% to 80% of severe alcoholics (Isenberg-Grzeda et al., 2016). This disorder is not limited to only long-term alcoholics. Due to the lack of knowledge regarding other circumstances that can cause WKS, it commonly goes undiagnosed in the absence of a prolonged history of alcohol use (Tanasescu, 2009).

Other populations that may be at risk for WKS include those with the following conditions (Bonucchi et al., 2008; Isenberg-Grzeda et al., 2016; Thomson et al., 2009):

- Acute pancreatitis
- AIDS
- Cancer
- Chronic homelessness
- Crohn's disease
- Eating disorders (e.g., anorexia nervosa and bulimia)
- Gastric bypass surgery
- Hyperthyroidism
- Malnourishment
- Recurrent dialysis
- Severe morning sickness during pregnancy
- Starvation

To our knowledge, there has been no systematic research on the similarities between risk factors for WKS and the prevalence of these same factors in criminal justice settings. However, case studies, media accounts, and interviews with various professionals familiar with this topic suggest that WKS may be over-represented in detoxification facilities and homeless drop-in centers. As such, criminal justice professionals may encounter individuals with WKS and should be prepared to deal with their neurocognitive sequela.

## Lack of Recognition and Diagnosis

Wernicke-Korsakoff syndrome is under-recognized and under-diagnosed (Isenberg-Grzeda et al., 2016; Kuo, Debnam, Fuller, & de Groot, 2008; Thomson et al., 2009). In fact, a recent meta-analysis found that only 33% of alcoholics and 6% of non-alcoholics with post-mortem confirmation of WKS diagnoses had been accurately diagnosed during their lifetimes (Galvin et al., 2010; Isenberg-Grzeda et al., 2016). There may be several reasons for this lack of diagnostic recognition.

First, accurate diagnosis of WKS may be limited by the similarities between WKS and a host of other conditions, including (Isenberg-Grzeda et al., 2012):

- Alcohol withdrawal
- Alzheimer's disease
- Delirium
- Delusional disorders
- Dementia
- Infection
- Intoxication
- Post-concussive syndrome

Second, individuals with both WKS and issues associated with alcohol misuse may escape detection simply because of the treatment-avoidant behavior that is common among this population. According to information gathered from the National Survey on Drug Use and Health (2009), more than 92% of Americans who meet the criteria for alcohol use disorder do not see the need for treatment of the disorder (National Council on Alcoholism and Drug Dependence, 2014). Third, the inconsistent presence of the core symptoms, particularly in individuals without a history of alcohol use issues, increases the difficulty of identification. The resulting under-diagnosis and under-recognition of WKS can delay or prevent treatment entirely, which has serious long-term consequences such as the irreversible deterioration of mental faculties (Isenberg-Grzeda et al., 2012).

## First Responder Considerations

Although first responders often come into contact with individuals presenting symptoms of WKS, the exact number of cases is unknown. This section is supported by interviews gathered from various helping professionals familiar with the topic of WKS.

First responders (e.g., law enforcement officers, emergency medical technicians, paramedics, and firefighters) are likely to interact with individuals presenting inhibited cognitive and physical symptoms that are often overlooked or incorrectly attributed during a response call. Although these symptoms are not formally diagnosed as WKS, they may appear to mimic the other medical or mental health conditions previously listed. The nature of the response call may be medical (physical and psychological), personal welfare and safety checks, alcohol-related offenses and misconduct, trespassing and wandering, and a variety of other community or social-related disturbances. Altered states of consciousness can potentially lead to coma, apathy, disorientation, hallucinations, behavioral disturbances, and cardiac issues (Lana-Peixoto et al., 1992; Thomson et al., 2008). Once diagnosed, many of these alcohol-related mental status changes are only partially remediable (Tanasescu et al., 2012).

The initial perceptions of first responders are only cursory and superficial. Therefore, enhanced on-scene observations are crucial and time sensitive to the proper handling of each individual's situation. It is vital to observe individuals and their surroundings, alcohol use, food storage, living conditions, personal hygiene, cognitive alertness, and behavioral responses. Classically, WKS may present with cognitive impairments such as confusion, diminished judgment, weakened bodily function, ataxia, and nystagmus. It is not uncommon to observe an unintelligible mixture of random words/phrases (word salad). Additional physical behaviors that may be observed are often consistent with alcohol intoxication, including poor mobility, eyelid drooping, and non-compliance that often leads to combative behavior. These behaviors could also be perceived as a diabetic reaction (hypoglycemic or diabetic shock). Generally, alcohol-induced WKS afflicts individuals who are malnourished and underweight. These

people may also have issues with vomiting and urinary or fecal incontinence (McCormick et al., 2011). It is noteworthy that research indicates that heavy beer drinkers in particular may appear overweight or obese due to their poor absorption of vitamin B1 (thiamine), the distinguishing characteristic of WKS when it is deficient (Harper et al., 1986; Harper, 2006).

First responders may initially perceive an individual with WKS as just a case of severe substance abuse. Severe substance abuse has similar hallmarks to WKS, including alcoholic disorientation, confusion, and incoherency potentially leading to a coma. If not treated as the immediate medical emergency that it is, WKS may result in coma or death (Cook, 2000; Donnino et al., 2007; Kopelman et al., 2009; Thomson et al., 2002; Thorarinsson et al., 2011).

## Criminal Justice Considerations

When individuals with WKS become involved in the criminal justice system, they may face many obstacles, barriers, and challenges. This is particularly true when individuals with this condition are not accurately diagnosed and are therefore left untreated. The presence of confusion, amnesia, and a propensity for confabulation undermines the legitimacy of any self-reported information. Unfortunately for the individual, self-reported information, regardless of its veracity, is integral during investigations and carries tremendous weight when presented at trial. Similarly, the deficits of WKS may threaten individuals' ability to make informed and sound legal decisions, such as waiving their right to remain silent or have an attorney present during questioning. Additionally, the symptoms of WKS may make an otherwise competent defendant unfit to stand trial or greatly reduce the accuracy of an eyewitness testifying. As a result of these deficits, the likelihood of false confessions may also increase dramatically the longer an interrogation goes on.

## Treatment

Due to the permanency of the damage inflicted by WKS, early treatment is imperative. It has the potential to significantly reduce memory loss and associated symptoms that would typically result in irreversible brain damage and other debilitating long-term effects (Dayal et al., 2015; McCormick et al., 2011; Thomson et al., 2009). Treatment usually consists of thiamine that is properly administered by a qualified medical health professional (McCormick et al., 2011). If untreated, WKS may become a chronic condition with increasingly irreversible brain damage and increased risk of death (Cook, 2000; Donnino et al., 2007; Kopelman et al., 2009; Thomson et al., 2002; Thorarinsson et al., 2011).

## Conclusion

When it is known to be present, WKS is treatable in its early stages. Unfortunately, when WKS goes unrecognized and under-reported, it can result in a host of adverse consequences, including death in some cases (Kuo, Debnam, Fuller, & de Groot, 2008; Thomson et al., 2009). WKS can become a chronic condition with elevated risks of death for those afflicted if it is not identified and treated in its early stages (Donnino et al., 2007; Kopelman et al., 2009; Thomson et al., 2002; Thomson, Guerrini, & Marshall, 2012; Thorarinsson et al., 2011). The need for increased awareness, improved screening,

enhanced assessment protocols, better instruments, and clear treatment recommendations could not be greater. These recommendations are particularly salient for first responders, intervention personnel, and members of the criminal justice and mental health systems.

## Biographies

**Jerrod Brown, M.A., M.S., M.S., M.S.**, is the treatment director for Pathways Counseling Center, Inc. Pathways provides programs and services benefiting individuals impacted by mental illness and addictions. Jerrod is also the founder and CEO of the American Institute for the Advancement of Forensic Studies (AIAFS), and the Editor-in-Chief of Forensic Scholars Today (FST) and the Journal of Special Populations (JSP). Jerrod holds graduate certificates in Autism Spectrum Disorder (ASD), Other Health Disabilities (OHD), and Traumatic-Brain Injuries (TBI). Jerrod is certified as a Youth Firesetter Prevention/Intervention Specialist, Thinking for a Change (T4C) Facilitator, Fetal Alcohol Spectrum Disorders (FASD) Trainer, and a Problem Gambling Treatment Provider. Jerrod is currently in the dissertation phase of his doctorate degree program in psychology.

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