

# Benzodiazepines — Effects on Human Performance and Behavior

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**REFERENCE:** Drummer OH: Benzodiazepines — Effects on human performance and behavior; *Forensic Sci Rev* 14:1–14; 2002.

**ABSTRACT:** There exist a large number of drugs belonging to the benzodiazepine family. These include the 1,4-benzodiazepines such as diazepam, temazepam and oxazepam, the often more potent diazolo- and triazolo-groups represented by alprazolam, midazolam, triazolam etc. These drugs represent a large range of potencies from sub-milligram doses to over 100 mg and a range of polarities. Consequently, blood or plasma concentrations associated with prescribed use range from sub-nanogram per mL to near-microgram per mL.

Their medical use varies, but they are predominantly used as hypnotics and sedatives. Some members are also used in the treatment of post-traumatic stress and obsessive-compulsive disorders, alcohol withdrawal, muscle spasm, and seizures. Recreationally, drug users favor these drugs to reduce the symptoms of withdrawal and unpleasant effects of heroin and cocaine. They are also commonly used as “date-rape” drugs to render a victim incapable of resisting an attack.

Benzodiazepines elicit a large number of physiological and psychological responses in humans that often can lead to significant behavioral changes and adverse effects on skills required for safe driving. These include reduced lane control, increased reaction times, reduced hand-eye coordination and cognitive impairment. Impairment can exceed that seen with 0.05 g% ethanol. In high doses benzodiazepines can cause persons to exhibit classical features of CNS-depressant drugs such as nystagmus, ataxia, slurred speech, and impaired divided attention skills.

As one would expect with hypnotics and sedatives, any sleep deprivation, or situations involving monotonous driving can lead to a reduced ability to concentrate and maintain vigilance. Adverse effects on REM and NREM sleep patterns will exacerbate fatigue-related components to driving. Persons with sleep abnormalities, e.g., sleep apnea, may be more likely to be affected by benzodiazepines than those with normal sleep patterns. Ethanol and narcotic analgesics also affect sleep patterns and may compound any CNS-depressant effects associated with the use of benzodiazepines.

**KEY WORDS:** Behavioral changes, benzodiazepines, cognitive skills, driving, impairment, performance, psychomotor skills, sleep.

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