

Research Report Summary



Gary R. Gaffney, MD; Gary Milavetz, PharmD; Timothy L Brown, Ph.D.; Andrew Spurgin, PharmD; 5/31/2017

Evaluating Drugged Driving

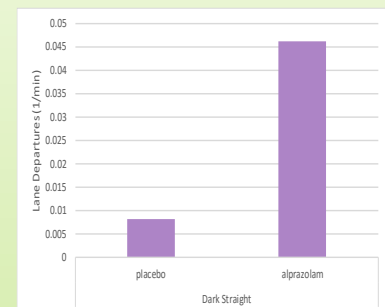
Effects of Pain and Anxiety Medications

To extend the National Advanced Driving Simulator's research program into distracted and drug-influenced driving, our group studied the effects of a frequently prescribed combination of sedating drugs: hydrocodone/acetaminophen (an opioid pain-relieving medication) and alprazolam (a benzodiazepine useful for muscle relaxation and sedation).

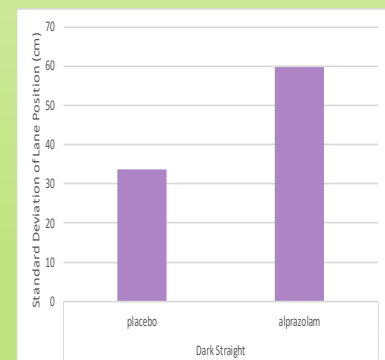
This study is important because the use and abuse of prescription drugs in the United States continues to be an important issue for the public and policy makers (Maurer, 2016). According to the National Center for Health Statistics (2016), over 48% of Americans had used at least one prescription drug in the past 30 days, while over 21%



Representative Lane-Keeping Results



Increase in lane departures on dark rural straight road



Increase in variability in lane keeping on dark rural straight road

had used two and over 10% had used five.

Utilizing a within-subjects design, we recruited 8 healthy, experienced drivers without major physical and psychological histories. In a double-blind, placebo-controlled, crossover design, we administered placebo, alprazolam alone, hydrocodone/acetaminophen alone, and a combination of the two drugs in a standardized simulated driving protocol. Measures of lateral and longitudinal control were collected, and the data were reduced and then statistically analyzed.

Alprazolam produced robust negative effects on longitudinal control and lateral control measures during a period when subjects noted sedation. However, hydrocodone/acetaminophen did not induce nearly the amount of adverse driving effects as alprazolam did, nor was it perceived by subjects to be as sedating. The frequently prescribed drug alprazolam appears to adversely affect driving measures of motor vehicle control. Professionals prescribing or dispensing this short-acting, powerful benzodiazepine must be aware

of potential potent adverse effects on driving that may result in significant driving impairment. Physiological mechanisms of such impairments remain

According to Dr. Gaffney, "... the benzodiazepine accounted for the overwhelming proportion of impairing drug effects."

speculative. Distracted and drug-influenced driving presents a major risk for traffic safety morbidity and mortality.

The study observed significant detrimental effects of alprazolam on measures of lateral control and longitudinal control. Driving appeared to more aberrant with higher speeds and in rural scenarios. There were no significant differences between hydrocodone and placebo. We noted no interactive effects between drugs. A measure of sedation showed that subjects rated alprazolam as significantly more sedating than both hydrocodone and placebo.

The findings suggest that a frequently prescribed combination of psychoactive drugs for pain control resulted in significant deleterious pharmacological effects in driving simulation. Deleterious changes in driving performance included measures of lateral and

longitudinal control, although the deleterious effects on lateral control measures such as standard deviation of lane position were more robust.

Although the number of subjects was small, thus making it more difficult to draw conclusions on the opioid effects,

these preliminary results suggest that in this combination of drugs the benzodiazepine accounted for the overwhelming majority of impairing drug effects. These results have clear implications for prescribing physicians and dispensing pharmacists, traffic safety experts, law enforcement officers, and patients themselves.

References

Maurer, D. C. (2016). *Office of National Drug Control Policy: Progress toward Some National Drug Control Strategy Goals, but None Have Been Fully Achieved.* (GAO-16-660T). Washington, DC.

National Center for Health Statistics. (2016). *Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities.* Hyattsville, MD.