

Medical Fitness to Drive - The Impact of Benzodiazepines

Anne Fitzpatrick, a 55 year old lady was driving home from shopping when her car collided with oncoming traffic. She didn't understand how this could have happened as she considered herself an experienced driver and had never had an accident before. On admission to hospital, when asked about medication, Anne informed the doctor that she had started taking Xanax, a benzodiazepine, five days previously. She was surprised to hear that her new prescription could have seriously affected her driving. Her GP had mentioned some side effects of the drug but driving had not been discussed.

Driving a vehicle requires skill, concentration, coordination, spatial awareness and rapid decision making. Any substance which affects these skills has the potential to impair driving and in turn increases the risk of road collisions and fatalities. Benzodiazepines are drugs which have been proven to impair driving, and road users impaired by benzodiazepines pose a threat to road safety. Benzodiazepines are a class of psychoactive drug which act as central nervous system depressants. In order to protect the safety of drivers who take benzodiazepines as well as the safety of all other road users, doctors and health care professionals must be cognisant of the risks associated with driving while taking benzodiazepines and should appropriately advise patients when prescribing these drugs.

Benzodiazepines are used as hypnotics, anxiolytics, sedatives, anti-convulsants and muscle relaxants and their effects can be either long acting or short acting¹. The properties of benzodiazepines were first discovered by chance by L. Sternbach in Roche's laboratories, in the 1950s and benzodiazepines have since become one of the most used prescription drugs worldwide^{2,3}. Examples of benzodiazepines include diazepam, alprazolam and chlordiazepoxide. Benzodiazepines act at the gamma-aminobutyric acid-A (GABA-A) receptor in the central nervous system. Binding of the compound to the GABA-A receptor potentiates the inhibitory effects of GABA at the receptor and increases the neuron's resistance to excitation. As a result, benzodiazepines have a depressant effect on the central nervous system.

While the anxiolytic and hypnotic properties of benzodiazepines are beneficial, the adverse effects of the drug include psychomotor impairment, drowsiness, memory impairment and decreased concentration. As a result, benzodiazepines can compromise driving skills and represent a major traffic safety problem⁴. Through a systematic review of epidemiological studies, benzodiazepine users have been consistently demonstrated to increase the risk of road traffic collisions when compared to nonusers. This risk has been highlighted across all age groups, in both elderly and younger drivers⁴.

Drug use studies indicate that benzodiazepine use is prevalent in Ireland. According to the *National Advisory Committee on Drugs and Public Health Information and Research Branch, Drug use in Ireland and Northern Ireland: 2006/2007 drug prevalence survey*, almost 11% of those surveyed reported having used sedatives and tranquilisers (which include benzodiazepines) at some point in their lives⁵. A study in the west of Ireland showed that the number of prescriptions for benzodiazepines increased annually between 2000 and 2007 from slightly less than 25,000 in 2000 to a little over 33,000 in 2007⁶.

Benzodiazepines are most prevalent among female drivers aged 50 and above and are most commonly detected during daytime hours on weekdays⁷. They are least prevalent in young drivers aged 18-24 years⁷. Amongst benzodiazepine users those at highest risk are new users, female users, young and middle-aged users and intermediate and long half-life benzodiazepine users⁷. Interestingly, while benzodiazepines are most prevalent among female drivers, when examining the gender distribution of seriously injured drivers testing positive for benzodiazepines, the drivers are mostly male⁷. Furthermore, the highest crash risk is seen in benzodiazepine users ≤ 40 years of age⁸.

Current research including the Medical Bureau of Road Safety's *Report on Roadside Drug Testing and Equipment and Related Matters*⁹ explores the numerous effects which benzodiazepines can have on driving. Single doses of benzodiazepines can increase lateral deviation of lane control^{10,11}, reduce reaction times, reduce ability to perform multiple tasks, decrease attention⁹, decrease visual capacity¹², adversely affect memory and cognition and increase the effects of fatigue⁹. The impairing effects of diazepam on driving performance may persist for at least the first three weeks of daily administration¹³.

The European Integrated Project DRUID (Driving under the Influence of Drugs, Alcohol and Medicines) has brought together the most experienced organisations and researchers throughout Europe with an aim of filling the knowledge gap and providing a solid base for EU-wide regulation on driving under the influence of alcohol, drugs and medicine⁷. DRUID states that among drivers killed on European roads, benzodiazepines are the second most frequent toxicological finding after alcohol. The presence of benzodiazepines in killed drivers ranges from 1.8-13.3% across European countries. With regard to seriously injured drivers, benzodiazepines were present in up to 10.2% of drivers, and were the third most prevalent substance found on analysis, after alcohol and THC (cannabis). Benzodiazepine use is more common in Northern European countries, and in Finland the prevalence of benzodiazepines in seriously injured drivers is highest, reaching the upper limit of 10%. The prevalence of benzodiazepines in killed drivers in Finland is 5%. Interestingly in the Netherlands there was no presence of benzodiazepines in seriously injured drivers⁷. The North Report 2010 '*Review of Evidence Related to Drug Driving in the UK*' cites regional variations in benzodiazepine use in the UK¹⁴. In Scotland, benzodiazepines are the most prevalent drug group among drivers, with over 80% of drivers surveyed with suspected impairment testing positive for a benzodiazepine¹⁴. The significance of benzodiazepine use while driving is most clearly demonstrated by examination of the statistical relative risk. As calculated by analysis of European statistics, it is estimated that for those under the influence of benzodiazepines, the relative risk of serious injury is 1.99 and the relative risk of fatality is 5.40⁷. These estimates were adjusted by age and gender.

While the American Psychiatric Association (APA) Task Force on Benzodiazepines concluded that benzodiazepines are not drugs of abuse, misuse of therapeutic drugs or "medicines" can impair driving as previously discussed. Benzodiazepine abuse is common among people who are actively abusing alcohol, opiates, cocaine, or sedative hypnotics¹⁵. Significant driving impairment is exacerbated when alcohol use is combined with benzodiazepines⁹. Of note, a study carried out by the Medical Bureau of Road Safety in 2000 and 2001 found that the majority of drivers who tested positive for benzodiazepines are not concomitantly positive for alcohol. However, drivers taking benzodiazepines without alcohol are more likely to be taking more than one type of drug in combination¹⁶.

A number of changes have recently been implemented in Irish driving law under The Road Traffic Bill 2016¹⁷. These changes will help to improve safety on our roads and address in particular the issue of driving under the influence of drugs. Under 2010 legislation, it is an offence to drive under the influence of an intoxicant, meaning that both drug presence and impairment have to be proven¹⁸. The Road Traffic Bill 2016 has introduced a new offence whereby under section 4 of the bill the presence of specified drugs, cannabis, cocaine and heroin, at or above specified levels, while driving or in charge of a mechanically propelled vehicle, will be an offence analogous to that for presence of alcohol¹⁷. While these *per se* levels do not relate to benzodiazepines, nonetheless this offence supports the concept that driving under the influence of drugs is a criminal offence.

Section 7 of the Road Traffic Bill 2016 discusses the introduction of Mandatory Intoxicant Testing (MIT) checkpoints^{17,19}. This expands the powers of the Gardaí so that preliminary roadside oral fluid testing can be undertaken. Gardaí will use the Dräger Drug Test 5000 Analyser which is a portable device which can be used from the boot of a car. For sampling, the driver will be instructed to use the swab

of the test cassette to obtain an oral fluid sample. An indicator turns blue when sufficient oral fluid has been collected⁹. The Dräger Drug Test 5000 Analyser is capable of indicating the presence of cannabis, cocaine, opiates and benzodiazepines in oral fluid at the roadside. This may result in the arrest of the driver and confirmation of a positive sample by blood analysis. As a result, drivers abusing benzodiazepines may face a period of disqualification for a minimum of one year for a first offence, and two years for a second or subsequent offence under section 4 or 5 of the 2010 Act¹⁷.

The introduction of roadside testing for benzodiazepines may be concerning for people taking benzodiazepines as legally prescribed. Drivers can however be reassured that when taking benzodiazepines in accordance with prescription and when also ensuring that their driving is not impaired, they will not be prosecuted²⁰. It is interesting that the APA Task Force on benzodiazepines states that driving skills are rarely impaired if benzodiazepines are taken at regular therapeutic dose¹⁵. Nonetheless, benzodiazepines can cause driving impairment and as a result prescribing doctors should take due care to follow prescribing guidelines and should regularly warn their patients of the risks of driving while taking benzodiazepines¹⁵.

When reviewing current recommendations for doctors prescribing benzodiazepines and for patients taking benzodiazepines, the risks of driving under the influence of benzodiazepines are evident. According to the College of Psychiatry of Ireland, physicians who prescribe benzodiazepines should warn patients of the risks of the possible adverse effects on driving or operating machinery and of the risk of combining benzodiazepines with other sedative drugs or alcohol²¹. *The Irish Benzodiazepines: Good Practice Guidelines for Clinicians* advises practitioners to caution patients not to drive or operate machinery if they experience drowsiness or are taking opioid compounds²². *Actavis UK Diazepam tablets Patient Information Leaflet* also provides useful information for benzodiazepine users, stating that diazepam can make patients sleepy, forgetful, dizzy and have poor co-ordination. It also advises against driving until it is known how the drugs will affect the patient²³.

It is thought that the period of commencing benzodiazepines is a time of increased risk and therefore it is advisable to exercise particular caution during this stage. This viewpoint is supported by Neutel in the *Annals of Epidemiology* who when identifying the timing of exposure, states that the highest crash risk is seen during the first week of the index prescription⁸. This initial increase in risk may be explained by the fact that as tolerance develops to the sedative effects of long acting benzodiazepines, their adverse impact on driving skills reduces²⁰. The APA Task Force on benzodiazepines also highlights this risk, stating that driving may be substantially compromised when benzodiazepines are taken by benzodiazepine naïve individuals¹⁵. Long acting benzodiazepines in particular are associated with increased risk of collision and the *Road Safety Authority. Sláinte agus Tiomáint Medical Fitness to Drive Guidelines* recommend that if a hypnotic is needed, it is preferable to prescribe a shorter-acting medicine²⁰.

The medical expert panel for Federal Motor Carrier Safety Administration outlines a number of stricter recommendations for commercial vehicle drivers who are taking benzodiazepines²⁴. It states that all individuals currently taking benzodiazepines should be immediately prohibited from driving a commercial motor vehicle and that they should not be allowed to resume driving until the drug has been cleared from their system²⁴. It advises that chronic users of benzodiazepines should wait an additional week after the drug has been eliminated from the body.

All of these guidelines have a similar message, that benzodiazepines can impair driving and that patients should be aware of this and take precautions to ensure that they are safe road users. To date, unfortunately this important message has not been effectively communicated to members of the public and many are unaware of the driving hazards of benzodiazepines. The Road Safety Authority's former Chief Executive, Noel Brett has stated that drug-drivers typically think that they are more

competent drivers while they are under the influence²⁵. Furthermore, the reading of online forums reveals a similar misperception surrounding drug driving. It is unsettling to read about those taking benzodiazepines prior to a driving test: "I have to take a Xanax before I do my road test. I've never taken Xanax before"²⁶, while others fail to recognise the reality that benzodiazepines impair driving: "I've taken it and driven, it doesn't bother me"²⁷. It is clear that certain members of the public do not appreciate the dangers of taking benzodiazepines while driving and this is a concern of great priority.

Undoubtedly, there is a need for education and awareness in relation to the risks of driving under the influence of drugs. According to *Driving under the influence of drugs in Ireland: Results of a nationwide survey 2000-2001*, current anti-drug campaigns and legislation has focused on illegal drugs and little attention has been given to prescribed drugs¹⁶. Specific educational programmes should be set up for the different target groups and a general media campaign should be initiated as soon as possible¹⁶. With regard to developing an awareness of the risks of drug driving, medical students should receive teaching and guidance on the relevance of this important topic to their future roles as clinicians. Clear and easy to use guidelines should be provided for prescribing physicians, students, pharmacists and patients alike. It is wise to recommend that when driving, people taking benzodiazepines abstain from alcohol, and it is the role of the clinician to impart this information. When considering benzodiazepine naïve individuals such as Anne Fitzpatrick, it may be prudent to introduce a short initial limitation to driving. This will help prevent accidents and facilitate patients' adjustment to the medication while allowing them to effectively assess whether it is appropriate and safe to drive.

In conclusion, benzodiazepines pose a significant threat to driving safety and their use should be monitored closely to allay this risk. It is important that drivers taking benzodiazepines are actively assessed for impairment and that roadside benzodiazepine testing becomes routine. As stated by William Osler, "One of the first duties of the physician is to educate..." and this is true with regard to informing patients of the complexities of benzodiazepine use while driving. With benzodiazepine use becoming more prevalent in Ireland it is time to confront this challenge²⁸. The amendment to driving legislation is certainly a positive step and reflects the pro-active approach which we should all adopt in tackling the risks of benzodiazepine use while driving.

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