

Review on Drowsy Driving: Becoming Dangerous Problem

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Abstract: Every year, traffic accidents due to human errors cause increasing amounts of deaths and injuries globally. Driver drowsiness is recognized as an important factor in the vehicle accidents. It was demonstrated that driving performance deteriorates with increased drowsiness with resulting crashes constituting more than 20% of all vehicle accidents. But the life lost once cannot be rewinded. In this paper, I discuss basic introduction about drowsy driving. It starts with definition of drowsy driving, its problems, and effects of lack of sufficient sleep, which is at risk of drowsy driving and how to prevent drowsy driving.

Keywords: drowsy driving, characteristics, problem of drowsy driving, risk of drowsiness, prevention of drowsy driving.

1. Introduction

Drowsy driving is an important, but often unrecognized, traffic safety problem. NHTSA estimates that drowsiness contributes to more than 100,000 collisions each year, resulting in over 1,500 deaths and 40,000 injuries. Drowsiness increases the impairment caused by alcohol. Teenagers, professional drivers (including truck drivers), military personnel on leave, and shift workers are at particular risk.

Drowsiness appears in situations of stress and fatigue in an unexpected and inopportune way and may be produced by sleep disorders, certain types of medications, and even, boredom, for example, driving for long periods of time. The sleeping sensation reduces the level of vigilance producing danger situations and increases the probability of an accident occurring.

It has been estimated that drowsiness causes between 10% and 20% of traffic accidents, causing both fatalities dead [2] and injuries [3], whereas within the trucking industry 57% of fatal truck accidents are caused by this problem [4],[5]. Fletcher et al. in [6] have stated that 30% of all traffic accidents have been caused by drowsiness, and Brandt et al. [1] have presented statistics showing that 20% of all accidents are caused by fatigue and lack of attention. In the USA, drowsiness is responsible for 100000 traffic accidents yearly producing costs of close to 12.000 million dollars [7]. In Germany, one out of four traffic accidents originate from drowsiness, while in England 20% of all traffic accidents are produced by drowsiness [8], and in Australia 1500 million dollars has been spent on fatalities resulting from this problem [9].

2. Drowsy Driving

Drowsy driving, the dangerous combination of sleepiness and driving or driving while fatigued, and can result from many underlying causes, including excessive sleepiness, sleep deprivation, changes in circadian rhythm due to shift work, fatigue, medications with sedatives and consuming alcohol when tired. The cumulative effects of these factors

have severe effects on performance, alertness, memory, concentration and reaction times.



Driving while drowsy is a problem almost all driver's have experienced. It is a very insidious problem in that it can affect every driver, and it sneaks up on you. You will see some statistics below about how many people have been killed or injured in collisions related to drowsy, sleepy or fatigued drivers. These numbers are much lower than the actual amount because officials do not always know when a driver has fallen asleep. Often the driver will not admit to having fallen asleep, as that would place them at fault and make them liable. Also, if the driver dies before they can give a statement, we will never know that they fell asleep before they crashed. According to a 1998 survey, 23% of adults have fallen asleep while driving [10]. According to the United States Department of Transportation, male drivers admit to have fallen asleep while driving twice as much as female drivers [11].

2.1 Drowsy Driving is characterized by the following

- Driving with less than 6-7 hrs of sleep.
- Driving if you have been awake for more than 12 hours.
- Yawning frequently.
- Trouble keeping your head up.
- Difficulty focusing, frequent blinking and heavy eyelids.
- Unable to remember the last few miles you've driven.
- Missing exits or traffic signs.
- Drifting from your lane, swerving or tailgating.

3. Drowsy Driving Problem

Drowsy drivers may cause nearly a third of all deadly car crashes according to federal statistics and a study at the University of Pennsylvania Health System proves the danger. According to Dr. Michael Grandner "A lot of people don't realize that more serious crashes are caused by falling asleep at the wheel than alcohol". "Though we've all heard of drunk driving, we haven't heard much about drowsy driving, but it's a major health problem and safety problem [12]." Dr. Grandner, a member of the Center for Sleep and Circadian Neurobiology, says a survey of more than 17,000 people showed that most people need at least seven hours of sleep each night:

While distracted driving has been getting a lot of attention lately, drowsy driving remains a major risk for motor vehicle crashes.

- Two out of every five drivers (41%) admit to having fallen asleep at the wheel at some point. One in ten said they have done so in the past year according to a new AAA Foundation for Traffic Safety Study.
- One in six (16.5%) of deadly crashes, one in eight of crashes resulting in a hospitalization, and one in eight out of fourteen crashes in which a vehicle had to be towed involved a drowsy driver.
- The National Highway Safety Administration estimates that drowsy driving results in 1,550 deaths, 71,000 injuries and more than 100,000 accidents per year.
- More than half (55%) of drivers who reported falling asleep while driving in the past year said they had been driving for less than one hour before falling asleep.
- Many traffic researchers believe drowsy driving has been under-reported and underestimated.

4. Risk of Drowsy Driving

There are many underlying causes of sleepiness, drowsiness, fatigue and drowsy driving. They include sleep loss from restriction, interruption or fragmentation; chronic sleep debt; circadian factors associated with driving patterns or work schedules; time on task; the use of sedating medications; and the consumption of alcohol when already tired. These factors have cumulative effects and a combination of any of these increases crash risk greatly.

The risk of having a crash due to drowsy driving is not uniformly distributed across the population. This is due to two factors. First, crashes tend to occur at times in keeping with one's circadian rhythms when sleepiness is most pronounced, for example, during the night and in the mid-afternoon [13]. Thus individuals who drive at night are much more likely to have fall-asleep crashes. Second, people who are excessively sleepy either because of lifestyle factors or because of an untreated sleep disorder are more likely to have crashes related to excessive daytime sleepiness. Research has identified young males, shift workers, commercial drivers and people with untreated sleep disorders or with short-term or chronic sleep deprivation as being at increased risk for having a fall-asleep crash. Individuals at an increased risk of drowsy driving include those who...

- Have had less than 7 to 8 hours of sleep.
- Drive after being awake for more than 12 hours.
- Take medication that causes drowsiness.
- Drive at night or the early afternoon.
- Consistently have difficulty getting to sleep or staying asleep at night.
- Have untreated organic sleep disorders such as sleep apnea, narcolepsy or periodic limb movement disorder.
- Drive frequently for long periods on monotonous highways or rural roads.
- Work the night shift, especially when driving home after the shift.
- Driving alone

In addition, younger drivers age 16-24 are nearly twice as likely to be involved in a drowsy driving crash as drivers age 40-59. Men (52%) are also more likely than women (30%) to report having ever fallen asleep while driving.

5. Prevent Drowsy Driving

Drowsiness causes: slow reaction times, impaired judgment and vision, decline in attention, decreased alertness, increased moodiness and aggressive behaviour, problems with processing information and short term memory. According to the National Sleep Foundation, signs of drowsiness while driving may include:

- Turning up the radio or rolling down the window
- Impaired reaction time and judgment
- Decreased performance, vigilance and motivation
- Trouble focusing, keeping your eyes open or your head up
- Daydreaming and wandering thoughts
- Yawning or rubbing your eyes repeatedly
- Drifting from your lane, tailgating and missing signs or exits
- Feeling restless, irritable or aggressive

The best remedy for avoiding drowsy driving is getting enough sleep, which means 7-9 hours of good quality sleep for most adults; however, most people do not get enough sleep. According to the 2002 Sleep in America poll conducted by the National Sleep Foundation, nearly 40% of adults sleep less than 7 hours a night.

The three best ways to prevent drowsy driving involve behaviour choices. First, make sure you get a good night's sleep before driving. Sadly, most people don't think about the effects of failing to get enough sleep until it is too late. Getting up extra early in the morning to start a long driving trip is not a good strategy. Neither is driving overnight when your body would usually be sleeping. Prevention is the best way to avoid drowsy driving. For that, there is no substitute for sleep. Making it a habit to get a good night's sleep is the best protection against drowsy driving.

The second way to prevent drowsy driving is to pull off the road and get some sleep when you are feeling tired. You should do this even if you think your driving ability is not being affected. Many people think they can overcome being drowsy as they are driving. They don't always realize how much less alert they are. They can have no idea how close

they really are to causing a crash. Even if you are only starting to feel sleepy while driving, be safe and pull over. At the very least, take a short nap to rest your eyes. This will go a long way toward keeping you safe.

Third, it is also wise for drivers to avoid alcohol and medications that can make them tired. Be very careful. Never get behind the wheel of a car after you have had any alcohol to drink. Also be aware that a medicine can still affect you even hours after you have taken it. Talk to your doctor about any medications you take. Make sure that you know for certain if they can hurt your ability to drive. To prevent drowsy driving, individuals should...

- Get plenty of sleep (at least 7 hours) the night before a long drive.
- Schedule a break every two hours or every 100 miles. During the break, lay your head back and snooze for 10-15 minutes. A brief nap is often refreshing.
- Travel at times when you are normally awake, and consider staying overnight rather than driving straight through.
- Drink a caffeinated beverage, but because it takes approximately 30 minutes for caffeine to enter the bloodstream, find a safe place to take a 30-minute nap while waiting for the caffeine to take effect. Remember, caffeine cannot substitute for sleep.
- Stop driving if you become sleepy. Opening the windows, turning off the heat, playing the radio, singing or calling a friend to keep you awake do not work and may be risking your safety and the safety of others. If you need sleep, pull over and take a short nap as indicated above. If you notice you have consistent problems getting to sleep or staying asleep, seek consultation at a Sleep Center.

6. Future Enhancement

Some companies are working on a system that recognizes tiredness-related changes in personal driving style and warns the driver that it's time to take a break when these changes are detected. The system records the angle of the steering wheel, speed, acceleration, the use of indicators and pedals, as well as external factors such as a side wind or an uneven road surface. If changes occur within the established parameters of the individual's driving behavior (with steering behavior having proved a particularly telling indicator) a warning sounds and an alert symbol appears in the instrument cluster so the driver knows it's time for a break. Some assistance systems are developing to controlling accident due to drowsiness. Here one eye blink sensor is fixed in vehicle where if driver loses consciousness, then it alerts the driver through buzzer to prevent vehicle from accident.

7. Conclusion

All drivers should learn more about drowsy driving. In fact, it can be just as dangerous as drunk driving. The results in terms of damage, injury, and death can be just as permanent. The risk is obvious when someone falls asleep at the wheel. But the danger begins long before that. Drivers who are tired and sleepy have delayed reactions and make bad decisions.

Not only are they putting themselves in danger, but they are a risk to everyone else on the road. In this paper, I discussed drowsy driving, its problems, and effects of lack of sufficient sleep, which is at risk of drowsy driving and how to prevent drowsy driving.

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