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Distracted driving: prevalence, problems, and prevention

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While the number of motor vehicle crashes has declined over the years, crashes resulting from distracted driving are increasing in the United States resulting in significant morbidity and mortality. The national public seems to be aware of the dangers associated with using technology while driving, but continues to engage in this dangerous behaviour, and may be unaware of or underestimate the impact of cell phone use on their own driving performance. Problems associated with distracted driving are not limited to novice or teenage drivers; multifaceted universal prevention efforts aimed at impacting large segments of the population may have the greatest impact. Legislation limiting drivers’ cell phone use has had little impact, possibly due to low regulation and enforcement. Behaviour change programmes, improved vehicle safety, and public awareness campaigns have been developed as potential preventive efforts to reduce accidents caused by distracted drivers.

Keywords: distracted driving; cell phone use; injury prevention; motor vehicle collisions; trauma

1. Introduction

Improvements in motor vehicle safety are a major public health concern, particularly in terms of changes in injury risk with the development of new technologies (Garner, Fine, Franklin, Sattin, & Stavrinos, 2011). Inattention occurring when drivers focus on an activity other than driving is known as distracted driving (National Highway Traffic Safety Administration, 2012b). The term ‘distracted driving’ encompasses a variety of activities including eating, applying make-up, reading, smoking, and talking, but the most prominent activity fuelling research is the use of cellular phones and portable electronic devices (National Highway Traffic Safety Administration, 2006). These distractions can be visual (e.g. taking your eyes off the road), manual (e.g. taking your hands off the wheel), or cognitive (e.g. taking your mind off driving) (National Highway Traffic Safety Administration, 2012b). Due to the hazards associated with distracted driving, the American College of Emergency Physicians supports the use of legal sanctions for distracted driving convictions (American College of Emergency Physicians, 2012). Here, we review the prevalence of distracted driving behaviours and their impact, how distractions impair driving ability, and prevention initiatives aimed at reducing distracted driving.

2. Prevalence

Each year more than 100,000 crashes resulting in injury and death involve texting drivers (National Safety Council, 2013). The National Highway Traffic Safety Administration estimates that in 2009, motor vehicle crashes (MVC) killed 5474 (16%) people and injured 448,000 (20%) as a result of distracted driving. While the number of MVCs and associated fatalities have declined over the years, distracted driving injuries and fatalities have increased since 2005, with driver distraction reported in 10% of fatalities and 16% of injuries (National Highway Traffic Safety Administration, 2011a). However, these data may be skewed, as the collection and reporting of this information have only begun in the past decade, and the quality of the data is generally poor and inconsistent across jurisdictions (Vermette, 2010).

Texting drivers are 23 times more likely to be in an accident (National Highway Traffic Safety Administration, 2006). In the United States, 69% of drivers between 18 and 64 years of age reported talking on a cell phone at least once in the last 30 days, and 31% reported reading or sending a text or email while driving (American College of Emergency Physicians, 2012). Ninety-seven per cent of teenagers reported knowing the dangers of texting and driving, but 43% reported engaging in the behaviour anyway. Additionally, 77% of teenagers have seen their parents text and drive, and 75% say it is common among their friends (AT&T, 2013).

Data obtained from police accident reports (PAR) estimate cell phone distractions resulted in 18% of fatal crashes and 5% of injury crashes. Additionally, distractions caused by cell phones were attributed to causing fatal crashes in 24% of drivers between 30 and 39 years of age and 22% of drivers under the age of 20. Due to

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differences in PAR specificity (distraction is not a consistent reporting variable across all jurisdictions) and under-reporting of distractions due to negative implications, these data are conservative estimates, but still provide a compelling argument against cell phone use while driving (National Highway Traffic Safety Administration, 2010).

3. Distractions and driving ability

Drivers can be distracted by using a cellular phone not only because of manual manipulation, but also because of cognitive distractions (Brookhuis, DeVries, & DeWaal, 1991; Wikman, Nieminen, & Summala, 1998). Research surrounding the effective distractions of physical manipulation of cell phones (i.e. texting) is widely documented.

Drivers tend to be unaware of or underestimate the effective distractions of simply conversing on the cell phone without physical manipulation (Horrey, Lesch, & Garabet, 2008; Strayer & Drews, 2007). Engaging in conversation with a passenger or on a cell phone has been shown to disrupt driver performance, but to different degrees. Conversing with a passenger has less of a negative impact on driving performance, and a plausible explanation for this could be that the passengers shared responsibility for monitoring the driving environment. Conversations with passengers may be modulated based on changes in driving conditions, while a conversation over the cell phone is void of contextual cues, and the social demand to continue a conversation in difficult driving conditions is higher (Bavelas, Coates, & Johnson, 2000; Gugerty, Rakauskas, & Brooks, 2004; Richardson, Dale, & Kirkham, 2007; Strayer & Johnston, 2001; Vollrath, Meilinger, & Kruger, 2002).

Contrary to what most Americans believe, the harmful effects of using a cell phone on driving performance does not differ between hands-free or hand-held use (Drews, Pasupathi, & Strayer, 2008; Horrey & Wickens, 2006; McCarley et al., 2004; McEvoy et al., 2005; Strayer & Drews, 2007). The act of having both hands on the wheel and looking forward does not guarantee the ability to react and adjust appropriately to changing conditions or unexpected events. In order to operate a motor vehicle through a continually changing roadway, the driver must perceive and interpret important information. Conversing and driving each require varying levels of an individual’s attention, and as the number of tasks demanding attention increases, performance on each individual task decreases (Salmon et al., 2011).

In a 2001 Boston Globe article, Ellen Goodman stated, ‘The very same people who use cell phones … are convinced that they should be taken out of the hands of (other) idiots who use them’ (Goodman, 2001). This statement illustrates the fact that most people are aware of the distracting effects of cell phones for other drivers but overestimate their own driving performance and ability to multitask (Horrey et al., 2008; Strayer, Drews, & Johnston, 2003; Watson & Strayer, 2010; Wogalter & Mayhorn, 2005). Drivers may be overconfident in their ability to engage in a conversation while driving because of experience or levels of practice. Research has shown the negative outcomes related to cell phone use while driving are worse for older drivers (Reed & Green, 1999; Violanti, 1998), but age has little impact on driving performance while using a cell phone (Horberry, Anderson, Regan, Triggs, & Brown, 2006; McEvoy et al., 2005; Shinar, Tractinsky, & Compton, 2005; Strayer & Drews, 2004).

Driving distractions do not always result in accidents; people engage in distracting behaviours without having an accident every day. Impairments become dangerous when something unexpected happens and a distracted driver is slower to react, or may not notice the event at all. Though there is not an absolute correlation with distracting driving and motor vehicle accidents, driving patterns displayed by distracted drivers increase the likelihood that an accident will occur. On average, drivers distracted by cell phones tend to drive more slowly (Strayer & Drews, 2004), increase following distance (Cooper & Strayer, 2008; Shinar et al., 2005), and change lanes less frequently (Beede & Kass, 2006; Cooper, Vladisavljevic, Medeiros-Ward, Martin, & Strayer, 2009), all of which can lead to disruptions in traffic flow and increased congestion. However, these impairments can be partially attributed to attention diversion, and is quickly reversible when drivers return their attention to driving (Strayer, Drews, & Crouch, 2006).

4. Prevention

Injury prevention and control programmes have been effective in reducing morbidity and mortality, and the American College of Surgeons Committee on Trauma requires all Level I and II trauma centres to participate in injury prevention. Prevention activities focus on four aspects of intervention: education, enactment, enforcement, and environmental modification (Committee on Trauma, American College of Surgeons, 2006).

4.1. Education

While the data are mixed on the efficacy of prevention programmes on behaviour change (Hallfors, Cho, Livert, & Kadushin, 2002; Merzel & D’Afflitti, 2003), multifaceted community-level prevention efforts have had an impact on drinking and driving, increased immunisation rates, and reduced tobacco and substance abuse (Wandersman & Florin, 2003). Harm reduction strategies involving cognitive-behavioural skills training, education, and personalised implementation and feedback have been shown to reduce alcohol use, excessive consumption, and...
associated negative consequences (Murphy et al., 2004; Neighbors, Larimer, & Lewis, 2004; Neighbors, Larimer, Lostutter, & Woods, 2006).

Research on adolescent drivers’ perceptions on cell phone use while driving provides useful information for intervention programme development. Strong beliefs about the advantages of abstaining from cell phone use while driving (as opposed to disadvantage beliefs) are associated with lower rates of associated risky behaviours. Prevention programmes designed to reinforce the benefits of abstaining from cell phone use while driving, rather than reinforcing the dangers, may be more effective. Weak advantage beliefs combined with strong disadvantage beliefs were associated with the highest rate of cell phone use while driving. Targeting the largest and the most at-risk group of adolescents may have the largest impact on distracted driving behaviours (Hafetz, Jacobsohn, Garcia-Espana, Curry, & Winston, 2010). Additionally, social norms among peer groups are particularly important among younger drivers. Research has shown that young drivers will continue to engage in these potentially hazardous behaviours when they believe that the behaviours are accepted among relevant others and when consequences (e.g. weak law enforcement) are absent (Riquelme, Al-Sammak, & Rios, 2010).

Collaborations between hospitals and schools addressing teen driving safety show promise in changing distracted driving perceptions and reducing texting and driving. An educational initiative aimed at addressing this issue consisted of two phases. In Phase I, student leaders participated in a combination of lectures, discussions, and simulations to increase awareness of risky driving behaviours and promote safe driving. Students reported a significant decline in texting and driving 3 months after the intervention. During Phase II, students conducted peer-to-peer interventions in their schools and unannounced observations of drivers were conducted pre- and post-intervention. The number of texting drivers declined significantly after intervention. However, the long-term effects of this programme are unknown, and implementation placed great demand on hospital and school staff resources (Unni, Morrow, Shultz, & Tian, 2013). Multi-pronged prevention programmes with support from the community, teachers, and hospital staff have been more effective than targeted driver-centred initiatives (Juarez, Schlundt, Goldzweig, & Stinson, 2006; Senserrick et al., 2009).

Advice and information received from a trusted authority in the context of a personal relationship combined with reinforcement through community norms have a lasting effect on an individual’s knowledge regarding injury prevention. This knowledge can be reinforced by public service professionals, organisations, or community agencies (Cohen & Swift, 1999). Active education and awareness programmes are being developed across the United States, but morbidity and mortality associated with distracted driving continue to rise. In 2009, the Department of Transportation launched Distraction.gov, a federal website aimed at raising awareness and advocating for safe driving (National Highway Traffic Safety Administration, 2012a). Adult education is a key element in injury prevention and outreach (Hoff et al., 2013), but education alone has had little impact on behaviour change.

Community education approaches have the ability to reach a large population and have been shown to increase awareness and change attitudes (Cohen & Swift, 1999). Moral outrage appeals have the ability to bring the hazards of distracted driving to the public’s attention, and have been effective in other public health campaigns. However, moral activism campaigns do not appeal to everyone, may experience backlash, and may not be appropriate in all settings (Lerner, 2011).

4.2. Engineering/environment

Technological solutions to cell phone use while driving have been proposed as potential solutions to technological driving distractions. Rendering cell phones inoperable while a vehicle is in use may reduce these distractions, but opponents argue against these measures due to a loss of freedom and inconvenience (Cohen & Zhu, 2013). The National Highway Traffic Safety Administration proposed Phase I Distraction Guidelines for vehicle manufacturers in 2012. Phase I includes voluntary guidelines aimed to discourage integrating distracting devices into vehicles. Phase II guidelines address portable devices not built into vehicles, while Phase III addresses voice-activated controls aimed to minimise distraction in both in-vehicle and portable devices (National Highway Traffic Safety Administration, 2012a).

Additionally, vehicle safety improvements such as sensors and monitoring equipment may reduce the number of accidents caused by distracted driving without targeting specific driver behaviour. Drivers with warning systems for rear-end collisions have been shown to have significantly shorter reaction times than drivers without advanced warning. Additionally, tactile warnings are associated with shorter reaction times than visual or auditory warnings (Scott & Gray, 2008). Although this research specifically addresses rear-end collisions, it is estimated that 60% are caused by driver inattention (Knipling et al., 1993). Advanced crash warning systems and driver monitoring technology may help avoid crashes, but manufacturers have been slow to adopt these changes (Jacobson & Gostin, 2010). However, the impact of vehicle safety systems and monitoring equipment on reducing crashes should not be overstated. Studies conducted by the Traffic Injury Research Foundation found that some drivers are more willing to drive distracted, impaired, or fatigued if they had safety features on their vehicle.
(Robertson, Vanlaar, Marcoux, & McAteer, 2012). At the best, engineering may offer a partial solution, and only if delivered with considerable educational efforts.

4.3. Enactment/enforcement

Comparisons have been made between the detrimental effects of distracted and intoxicated driving. Cell phone use or a blood alcohol level at the legal limit while driving increases the risk of a motor vehicle collision by fourfold (Redelmeier & Tibshirani, 1997). Driver impairment associated with cell phone use can be as profound as impairments associated with intoxication (Strayer et al., 2006). Logically, an activity with public safety risks comparable to those of driving while intoxicated should shape public policy. In some states, laws prohibit driving with a blood alcohol level equal to or greater than 0.08%, yet no uniform legislation regarding distracted driving has been enacted. However, distracted driving legislation is left to states and localities, and laws vary considerably. Combined with the challenges associated with measuring distraction and quantifying associated risks, enforcing uniform distracted driving laws is not feasible. As of February 2013, laws restricting the use of cell phones among teenagers and novice drivers exist in 33 states. These laws have not yet been shown to be effective, potentially due to enforcement (Goodwin, O’Brien, & Foss, 2012; National Highway Traffic Safety Administration, 2011b). The ability to operate a vehicle or react appropriately to changing conditions usually improves with experience and practice among drivers, but driving while distracted is not a ‘skill’ that can be developed. Practice and real-world driving experience do not diminish the harmful effects of using a cell phone while driving (Shinar et al., 2005).

Nearly all European countries (26 out of 27) have specific legislation regarding drivers’ mobile phone use, some specifically banning the use of hand-held devices (Janitzek, Brench, Jamson, Carsten, & Eksler, 2010). Drivers in those countries consistently reported lower rates of talking on a cell phone and sending or reading texts and emails while driving (American College of Emergency Physicians, 2012). These laws, while well-intentioned, only address a small aspect of cell phone distraction (Jacobson & Gostin, 2010).

5. Conclusion

A multifaceted approach combating various causes of motor vehicle collisions has been proposed as a comprehensive prevention campaign. Combining the development of safer roads, improved vehicle safety, better regulation of driver behaviour, and increased political support and publicity efforts may lead to the development of more effective prevention programmes (Lerner, 2011).

References


