

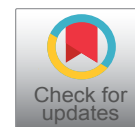


ORIGINAL RESEARCH

Distracted Driving Prevention Requires More than Just Legislation: Preliminary Results of a Cross-Sectional Survey

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Background

Distracted driving is a dangerous epidemic that has gained increasing amounts of attention over the past decade. The United States (US) Government has launched numerous campaigns and efforts to combat the issue yet the number of people killed in distraction-related accidents remains high at 3,328 in 2012 according to the National Highway Traffic Safety Association [1]. Currently, 44 states, the District of Columbia, Guam, and the US Virgin Islands ban text messaging for all drivers [2]. Additionally, 14 states, the District of Columbia, Guam, and the US Virgin Islands prohibit all drivers from using handheld cell phones while driving [2]. Though these laws exist, we have not seen a significant decrease in distraction-related deaths or crashes. Distracted driving is a growing public safety concern worldwide and handheld cell phone use is just one facet of distraction. Distracted driving can be visual, manual, auditory, or cognitive and is defined by the US Government as any event that takes your eyes off the road, your hands off the wheel, or your mind off the primary task of driving [1].

Studies have shown that cell phone use within 10 minutes before a crash led to a fourfold increase in the likelihood of a crash. When researchers reduced the interval time to 5 minutes before the crash, similar results were seen. Of importance is the fact that the researchers did not see a statistical difference between handheld and hands free cell phone use [3,4].

In 2013, we reported in a large autopsy series that

45% of the drivers in Kern County who were involved in central nervous system related pre-hospital deaths had texted within five minutes of collision and death. The majority of subjects in this study were young drivers between 18-45 years of age. At the time of the data collection, California had a law prohibiting the use of texting while driving as well as handheld mobile phone use while driving [5].

This work, along with the vast amount of attention surrounding distracted driving led our research team to explore the behavioral and psychological characteristics of people that predispose them to risky behaviors and driving with distractions such as texting or mobile phone use. Our primary objective in this preliminary work is to characterize patterns of distracted behavior among adult drivers and to potentially identify high-risk subsets of our population to target prevention efforts. Based on our previous autopsy data, we developed the study hypothesis that the highly prevalent distracted driving in Kern County is more common in young adults drivers and in drivers requiring admission to our trauma center.

Methods

An IRB approved risk stratification tool in the form of a detailed cross-sectional survey of drivers in Kern County was used. The study subjects comprised admitted trauma patients as well as non-trauma patients, family members, visitors, and employees of Kern Medical Center. The non-trauma patients include general surgery, emergency, oncology, orthopedics, and patients



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having diagnostic tests. As the sole trauma center and a public safety net hospital for Kern County, the subjects surveyed represent a reflective subset of drivers in our region. Exclusion criteria were limited to patients that were admitted to the trauma service with a mechanism of injury that resulted in a death, as to not trigger negative reactions in the acute stress period. All surveys were administered a trauma research nurse and subjects were approached in a variety of settings within the hospital. Subjects were provided an information sheet and verbal consent was obtained.

Demographic data was collected in the survey including, age, gender, as well as socioeconomic data. The survey also included questions from a validated tool on a four-factor model of impulsivity (sensation seeking, lack of pre-meditation, lack of perseverance and urgency) [6].

These were used in the assessment of high-risk personality behaviors. Distracted behaviors in the survey were based on texting and driving, non-texting mobile phone use while driving, and other distracted activities such as personal grooming and eating. Additionally, the survey included items regarding subjects' perceptions of safety issues as well as laws and regulations. The prevalence of high-risk behaviors will be reported. Subset analysis will include comparisons of survey results based on age, and trauma versus non-trauma study subjects. Fischer's exact test was performed for categorical data and a P value of < 0.5 was considered significant.

Results

Demographics

There were n = 130 subjects that were recruited to complete the survey. Males were predominant at n = 77. The age groups for comparison were divided accordingly: [18-45 (n = 81), 46-74 (n = 49)]. Trauma patients and non-trauma subjects had a similar distribution respectively, n = 64 vs. n = 66.

Trauma patient characteristics and outcomes

There were n = 25 trauma patients who granted our research team access to their medical records. The mean Injury Severity Score (ISS) was 13 + 6.29. The length of stay was 10 + 30 days. The majority of trauma patients were discharged home, n = 21; n = 3 were transferred to a rehabilitation facility and n = 1 was discharged to jail. There were no deaths.

Impulsive behaviors

Overall 56% of subjects (n = 73) exhibited at least one form of high-risk impulsive behavior and 12% (n = 16) reported greater than 6 impulsive behaviors. Impulsive behavior was prevalent across all age groups and was similar between trauma and non-trauma subjects respectively, 53% vs. 59%. Of the patients without any

impulsive traits, (n = 36) there was less texting and driving when compared to patients that exhibited at least one form of impulsive behavior respectively; (36% vs. 58%, P = 0.02).

Texting

Texting while driving was reported in 40% of the entire patient cohort, n = 61. When comparing ages 18-45 vs. 46-75, there was a significant difference in texting respectively: (48% vs. 24%, P = 0.04). The lowest incidence was 16% in the elderly group ages 61-75. Trauma patients overall reported a lower incidence of texting and driving, when compared to non-trauma subjects: (Trauma 30% vs. 51%, P = 0.03).

Mobile phone use while driving

The overall use of mobile phones while driving was highly prevalent at 67%. Similarly, all age groups reported cell phone use in high numbers with the exception of the elderly: [18-30 (66%), 31-45 (78%), 46-60 (64%) and 61-75 (24%)]. Trauma and non-trauma subjects reported similar mobile phone use as well; (trauma 64% vs. 72%).

Eating or grooming and navigation system use while driving

Non-cell phone distractions based on eating and grooming versus navigation system use were similar in all age groups at 75% and 50%, respectively. Eating or grooming showed similar distribution between trauma and non-trauma subjects respectively; 76% vs. 72%. Navigation use while driving was reported as higher in the non-trauma subjects at 60% versus 40% in the trauma subjects, P = 0.03.

Perceptions of safety and texting while driving laws

The majority of study participants (72%) reported knowledge of California state laws banning cell texting while operating a motor vehicle. Similarly, 70% of participants reported knowledge of laws restricting mobile phone use to hands free versus handheld use. Only 36% of study subjects reported that their perception of texting or handheld cell phone use resulted in distracted driving.

Discussion

These preliminary data demonstrate a predominance of risky driving practices in the form of distracted driving among adult drivers of all ages in Kern County. Overall, 40% of subjects report either reading or sending a text while driving which is significantly greater than the 10% and 6%, respectively, seen in a national phone survey conducted by the U.S. Department of Transportation [7]. Additionally, over half of the subjects, 67%, reported mobile phone use while

driving. Despite a relatively low incidence of texting in the elderly, other forms of distraction were highly prevalent. We did not validate our study hypothesis that trauma patients would have a higher incidence of distracted driving. Trauma patients overall reported lower rates of all forms of distractions while driving compared to the non-trauma population; this could possibly be explained by the an inherent bias based on their admission circumstances and fear that their responses would somehow result in legal action, despite the informed consent for the survey.

The high prevalence of texting and mobile phone use demonstrated this survey is daunting and is in line with our coroner study that showed a similar incidence of texting prior to collision and death [5]. Patients younger than 45 reported a higher incidence of texting, whereas mobile phone use was similarly distributed across age groups. This finding may reflect generational differences and norms in regards to communication and technology. There have been data to document a higher incidence of texting in the younger population, and even data to suggest that these behaviors are reflective of altered perceptions in youth regarding laws related to texting as not being as punishable as laws related to drinking and driving [8]. Alternatively, there are psychological data suggesting that there is a form of possession attachment that may contribute to the social norms of and perceptions of cell phone use while driving [9,10].

The impulsivity data was based on a validated tool for establishing impulsive behavior in patients with personality disorders and other forms of addictive behavior. We choose to use this tool because it has been well standardized in psychology literature and there seems to be some correlation of cell phone use and preoccupation with technology that may appears to be related to personality traits of object possession and sensation seeking behavior that may be similar to impulsiveness [6,9-11]. Our data revealed some impulsive behavior in the majority of our subjects and those without any impulsive behavior overall had a lower incidence of texting and driving. This finding is interesting and gives some validation to impulsiveness being linked to texting, however we will need a larger patient sample to full validate these findings.

Other information gathered in our survey is the perceptions regarding safety considerations when driving and laws regarding cell phone use. Although the majority of our patients acknowledged the existing state laws banning texting while driving and handheld mobile phone use, only about one third of patients reported that they felt texting or handheld cell phone use resulted in distracted driving. This observation may be a strong contributor to such high illegal cell phone use in our general population despite the laws against phone

use. Thus, the existing campaigns may have limited effectiveness without knowledge of the extensive psychological effects of cellular phone use and other technologies that impact all aspect of daily activities including driving.

Conclusions

We recognize the limitations of this preliminary survey data based on the relative small sample size, and some inherent biases that may exist in our trauma population sample. Despite these limitations, this data is compelling in that the high incidence of distracted driving is prevalent across a broad population sample. Factors related to age, seem to impact texting versus other forms of mobile phone use. Impulsive behavior traits also correlate with texting while driving. Despite broad general knowledge of laws regarding driving safety and cell phone use, the perceptions on illegal cell phone use and distractions are lacking. Thus prevention campaigns against distracted driving require a complex multidisciplinary approach to achieve effective outcomes in the future.

Author Contributions

Santa Ponce RN: Study design, data collection, data analysis, manuscript writing and critical revisions; Will Pho, MD: Data collection, data analysis, data collection manuscript writing and critical revisions; Cathy Farr, RN: Study design, data analysis, manuscript writing and critical revisions; Ruby Skinner, MD: Study design, data collection, data analysis, manuscript writing and critical revisions.

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