Injury prevention programs against distracted driving: Are they effective?

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ABSTRACT

Introduction: Distracted driving (talking and/or texting) is a growing public safety problem, with increasing incidence among adult drivers. The aim of this study was to identify the incidence of distracted driving (DD) among health care providers and to create awareness against DD. We hypothesized that distracted driving is prevalent among health care providers and a preventive campaign against distracted driving would effectively decrease distracted driving among health care providers.

Methods: We performed a 4-phase prospective interventional study of all health care providers at our level I trauma center. Phase 1: one week of pre-intervention observation; phase 2: one week of intervention; phase 3: one week of postintervention observation; and phase 4: one week of 6 months of postintervention observation. Observations were performed outside employee parking garage at the following time intervals: 6:30–8:30 a.m., 4:40–5:30 p.m., and 6:30–7:30 p.m. Intervention included an e-mail survey, pamphlets and banners in the hospital cafeteria, and a postintervention survey. Hospital employees were identified with badges and scrubs, employees exiting through employee gate, and parking pass on the car. Outcome measure was incidence of DD pre, post, and 6 months postintervention.

Results: A total of 15,416 observations (pre: 6,639, post: 4,220, 6 months post: 4,557) and 520 survey responses were collected. The incident of DD was 11.8% among health care providers. There was a significant reduction in DD in each time interval of observation between pre- and postintervention. On subanalysis, there was a significant decrease in talking ($P = .0001$) and texting ($P = .01$) while driving postintervention compared to pre-intervention. In the survey, 35.5% of respondents admitted to DD and 4.5% respondents were involved in an accident due to DD. We found that 77% respondents felt more informed after the survey and 91% respondents supported a state legislation against DD. The reduction in the incidence of DD postintervention was sustained even at 6-month follow-up.

Conclusion: There was a 32% reduction in the incidence of distracted driving postintervention, which remained low even at 6-month follow-up. Implementation of an effective injury prevention campaign could reduce the incidence of distracted driving nationally.

Introduction

Motor vehicle crashes remain a leading cause of trauma mortality and morbidity in the United States and distracted driving continues to rise as the major contributor. From 2005 to 2012 despite considerable decline in overall mortality related to motor vehicle crashes, there was a surge in mortality related to distracted driving (NHTSA 2014a, 2014b; Wilson and Stimpson 2010). Distracted driving has been described as “diversion of attention from activities critical for safe driving towards a competing activity” (Redelmeier and Tibshirani). Though many other competing tasks such as eating, talking to passengers, and following navigational systems while driving may be considered manual, cognitive, and visual distractions, respectively, texting or talking while driving involves all 3 types of distraction. As a result, talking and texting greatly increases drivers’ risk of a crash (Sherin et al. 2014).

The American College of Preventive Medicine promotes studies to address cellphone use, especially texting and driving, to assess the effectiveness of educational and awareness campaign (Sherin et al. 2014). Recently there have been some efforts to encourage drivers to refrain from cell phone use while driving, in the form of educational campaigns, especially in adolescent populations (Hafetz et al. 2010; Manno et al. 2012; Murphy et al. 2013). Though the data are mixed regarding the efficacy of prevention and educational campaigns on behavioral change, previous community efforts have shown a positive impact on drinking and driving, smoking and substance abuse, and immunization (Goslar et al. 2009; Houston et al. 2010; Philbrook and Franke-Wilson 2009).

The American College of Surgeons Committee on Trauma (2014) advocates education in order to increase injury prevention and control. Health care providers in trauma centers are among the first responders to accident victims, and their educational role is very important during the immediate aftermath of the accident and early rehabilitation (American College of Surgeons Committee on Trauma 2003). However, health care providers are among the most active professionals in today's
society, with a lifestyle adaptation that makes them very likely to text and talk while driving (Mathew et al. 2014). Lack of proper knowledge can also contribute to this unhealthy behavior. Moreover, the effectiveness of related campaigns in prevention of texting and talking or distracted driving is not well understood.

The aim of this study was to identify the incidence of distracted driving among health care providers and to create awareness against distracted driving. We hypothesized that distracted driving is prevalent among health care providers and a preventive campaign against distracted driving would effectively decrease distracted driving among health care providers.

**Methods**

We performed a 4-phase prospective interventional study of all health care providers at our level 1 trauma center from August 2013 to January 2014. This study was exempt from consent by the Institutional Review Board at the University of Arizona because it was a survey questionnaire that involved self-participation and reporting and did not involve collection of any personal information but involved only observation of behavior. Participants of this study were health care providers at the University of Arizona Medical Centre.

**Phase 1: Pre-intervention observation**

In this phase, investigators observed the incidence of distracted driving among health care providers for 1 week. Talking using a hands-free device was not included in the observation. We selected a spot near the entrance of the hospital staff parking lot, which could not be easily noticed. The observation duration was 4 h a day, in the morning from 6:30 to 8:30 a.m. and in the evening from 4:30 to 5:30 p.m. and 6:30 to 7:30 p.m. We selected these hours because these were the hours for shift changes and we could obtain a maximum number of observations. The participants were unaware of the study purpose. We defined distracted driving as texting or talking on a cell phone while driving. Hospital staff were identified and counted if they had badges and scrubs, entered and exited through the employee gate, and/or possessed an employee parking pass hanging from the rear mirror.

**Phase 2: Educational campaign (Intervention)**

In this phase we started an educational campaign against distracted driving among the health care providers. The specific aim of this phase was to document the awareness among nursing staff about the dangers of distracted driving and assess the impact of the educational outreach program. This phase consisted of a survey and Intervention (educational campaign).

1. **Survey:** The survey consisted of 11 questions asking about the demographics and baseline information on the health care providers, which was sent through e-mail. Health care providers’ official hospital e-mail addresses were used to identify hospital staff. Participants were questioned about the risk of texting and driving, their knowledge about the legality of texting and driving in the state of Arizona, and their habits while driving (see Appendix 1, online supplement). Participants were informed about the risks of texting and driving using quick interventional points (see Appendix 2, online supplement). After the intervention was conducted, the hospital staff was asked about the potential changes in their habits regarding cell phone use while driving. The postintervention survey included 5 questions. Participants’ knowledge and attitudes toward texting and driving were measured based on a 1–5 scale in postintervention surveys (see Appendix 3, online supplement).

2. **Intervention (educational campaign):** Investigators initiated an educational campaign in the cafeteria of the hospital for 1 week targeting health care providers. An educational movie was played during this week on the 5 monitors installed in the cafeteria and investigators provided pamphlets and informative brochures on the cafeteria tables. This task was carried out daily (from 11:30 a.m. to 1:30 p.m.) during the lunch break. Investigators attached “don’t text and drive” signs to the stop signs near the hospital parking entrance and exit.

**Phase 3: Postintervention observation**

In this phase, investigators observed the incidence of distracted driving among health care providers postintervention for the duration of 1 week. The observers, observation spot, hours, duration of the observation, inclusion criteria, and definitions were similar to those in phase 1. The participants were not informed of the study purpose. To maintain reliability, the same observer performed the observation postintervention. To insure internal consistency, we also calculated Cronbach’s alpha for texting and driving during the 3 phases of the study. Values of Cronbach’s alpha for both texting and driving exceeded .700.

**Phase 4: 6 months postintervention observation**

In this phase, investigators observed the incidence of distracted driving among health care providers 6 months postintervention for 1 week. The observers, observation spot, hours, duration of the observation, inclusion criteria, and definitions were similar to phases 1 and 3. The participants were not informed of the study purpose. To maintain reliability, the same observer performed the observation 6 months postintervention.

**Outcomes, data presentation, and data analysis**

Primary outcome measures in this study were the incidence of distracted driving in pre-intervention, postintervention, and 6 months postintervention. Our secondary outcome measures were subjectively reported change in knowledge and attitude toward distracted driving among the hospital staff compared to the pre-intervention phase.

The results of the observational phases of the study were assessed initially for the incidence of distracted driving. The comparison was based on the percentage of staff members driving while distracted and compared pre-intervention, postintervention, and 6 months postintervention. In a subanalysis we separated the observations into 2 groups of distracted driving: texting and talking on a cell phone while driving. The comparison was based on the percentage of staff members doing
either of these tasks and compared pre-intervention, postintervention, and 6 months postintervention. We also compared the rates of distracted driving during different hours of the day. Data were presented as percentages for the nominal variables.

Results

Figure 1 outlines the study phases, observations, participants, and the intervention protocol.

**Observation analysis results: Pre-intervention (Phase 1), postintervention (Phase 3), and 6 months postintervention (Phase 4)**

A total of 15,316 observations (pre-intervention: 6,639; post-intervention: 4,220; 6 months postintervention: 4,557) were collected during the 6-month study period. Overall distracted driving among the health care providers was 11.8% during the study period. Drivers were more likely to talk (overall 8.6%) rather than text (overall 3.1%) while driving ($P = .0001$). There was a 24% reduction (from 13.7% pre-intervention to 10.4% postintervention, $P = .0001$) in the distracted driving rate during the postintervention phase, which increased to 32% at 6 months postintervention (from 13.7% pre-intervention to 9.3% 6 months postintervention, $P = .0001$).

The highest incidence of distracted driving was observed between 6:30 and 7:30 in all 3 observational phases of the study, with an average rate of 25.3% distracted driving. There was a significant reduction in distracted driving in each time interval of observation between the pre-intervention, postintervention, and 6 months postintervention phases (Figure 2). On subanalysis, there was a significant decrease in both talking and texting while driving postintervention (talking $P = .0001$, texting $P = .01$) and 6 months postintervention (talking $P = .0001$, texting $P = .003$) compared to pre-intervention (Figure 3).

**Survey results: Intervention (Phase 2)**

A total of 520 survey (both surveys) responses were obtained during this phase of the study. The mean age of the respondents was $41.4 \pm 27.5$ years and 88.7% were female. The survey had a response rate of 97.4%. We found that 35.5% of respondents admitted to distracted driving and 4.5% of respondents were involved in an accident due to distracted driving. The rate of respondents who felt more informed after the survey was 77%, and 91% of them supported state legislation against distracted driving. Table 1 shows the results of the pre-intervention survey questions.

In the pre-intervention survey, 99% of the participants responded that they understood that texting and driving was unsafe. This percentage of respondents was contradicted by only 37% of respondents being fully informed on the risks of distracted driving. In assessment of their knowledge, 46% of employees believed that drinking and driving was worse than
texting and driving. In addition, 61% of hospital staff were incorrectly informed regarding the average amount of time that texting takes the driver’s eyes off the road. We noted that 70% of respondents believed that texting while driving was illegal in the State of Arizona. In fact, Arizona is one of the few states that have no legislative against any form of distracted driving. In addition, 64.5% of respondents admitted to texting while driving regularly and 35.5% denied using their cell phone while operating a vehicle.

In the postintervention survey, 59% of participants stated that their cell phone use would stop completely and 49% stated that their habits would at least change following the intervention. In addition, 76.6% of participants agreed that they felt more informed after the intervention had taken place and 90.9% of participants agreed that statewide legislation in Arizona should be proposed. Table 2 shows the results of the postintervention survey questions.

### Discussion

Distracted driving is a growing area of concern. Results of our study indicate that a multifaceted educational campaign against texting and driving in a targeted population of health care providers has potential effectiveness and the effects were sustained. Our study provided both subjective and objective evidence indicating the success of our educational campaign.

In our study, we selected health care providers because they are considered to be more aware of health risk factors including distracted driving. Additionally, they form a highly educated cohort of the population that is thought to be more aware and informed of the danger of distracted driving compared to the general population because they are on the front line for victims of this behavior. In addition, they are more receptive to information provided and active in participation and health care providers are more sensitive to public health considerations.

Furthermore, it was feasible to perform this study among health care providers because it was easy to observe the behavior, conduct the intervention in a controlled environment, perform the survey, and follow them for the long term because the population remained consistent.

Results of our study indicate a significant reduction in the rate of distracted driving despite the fact that health care providers were kept blind from the observation. Our results are consistent with other studies promoting educational campaigns (Bauman and Ennett 1996; Goslar et al. 2009). In our study, we found that the incidence of distracted driving was higher during the evening. Although we did not investigate the exact causes, it is plausible that staff members check-in with families and friends more often after work compared to in the morning. Most interesting, the results of our study were sustained after 6 months. However, there have been controversial results after educational campaigns as well (Hallfors et al. 2002; Merzel and D’Afflitti 2003). Studies have shown that a multipronged approach directed toward a target society in educational campaigns usually produces more desirable results (Juarez et al. 2006; Senserrick et al. 2009; Unni et al. 2013; Wandersman and Florin 2003). Our intervention had 2 distinct phases. In phase 1, we sent e-mails to health care providers, approaching them individually to inform them of the study while assessing their knowledge base related to the issue of distracted driving. A general and comprehensive educational campaign in the workplace, cafeteria, and outside the hospital parking was performed to increase the general awareness. We think that this comprehensive approach was one of the influential factors in successfully inducing a behavioral change and achieving the desired results. The success of our educational campaign among health care providers also hinges on their enthusiastic approach and participation. The participation was voluntary but we received a very high response rate. We think that this high response rate might have had a role in making distracted driving a popular conversation subject in the working environment and provoking a synergistic effect on the health care workers.

An alarming result of our study is that nearly half of the health care providers were unaware of dangers of distracted driving and one third of them admitted to sending texts while driving. This rate was significantly higher than the self-reported rate of 9–12% in the literature (Horrey et al. 2008; Wilson and Simpson 2010). A recent study by Mathew et al. (2014) showed that almost 64% of health care providers admit to texting and driving regularly. We noticed that 68% of them acknowledged that they did not change their behavior after the state legislation passed (Mathew et al. 2014). In our study, 70% of the participants were incorrectly informed about the texting and driving law in the state of Arizona. Though 91% said they would support legislation to ban texting and driving, half of our participant said they would not change their behavior. Previous observational studies examining the influence of legislative bans on cell phone use have reported either no significant long-term effects or limited benefits (McCarrt et al. 2010). The subjective data are engrossing, because health care providers who text and drive will be less likely to effectively counsel their patients against distracted driving. However, our objective observation shows promising results. Efforts should be made to increase community awareness with targeted campaigns against distracted driving.

### Table 1. Pre-intervention survey results.

| Questions                                                                 | Percentage |
|---------------------------------------------------------------------------|------------|
| Texts while driving                                                       | 35.5       |
| Had an accident due to texting and driving                                 | 4.5        |
| Understood that texting and driving is unsafe                             | 99         |
| Incorrectly informed that texting while driving is illegal in the State of Arizona | 70         |
| Incorrectly informed on the risk of texting while driving                  | 37         |
| Believes that drinking and driving is worse than texting while driving     | 46         |
| Incorrectly informed about the average time texting takes your eyes off the road | 61         |

### Table 2. Postintervention survey results.

| Questions                                                                 | Percentage |
|---------------------------------------------------------------------------|------------|
| Will stop using cell phones in their vehicles after the intervention      | 59         |
| Changed their habits following the intervention                           | 49         |
| Do not feel safe about their driving after knowing the risks of texting and driving | 51         |
| Feel more informed about dangers of texting and driving after this survey  | 76.7       |
| Will support state and national legislation against texting and driving   | 90.9       |
Investments should be guided toward educational programs, commercials, roadside signs, and driver’s education classes.

Our study had limitations. Because we sought to assess texting and driving among health care providers, the generalizability of our results might be limited to this particular population. Our questions examined texting and talking while driving and we did not assess the full spectrum of activities that would qualify as cell phone–related distracted driving such as checking social media websites, using a Global Positioning System on the phone, or watching clips. In our objective assessment, our identification of distracted driving was based on visibility of the cell phone. Observers might have missed hands-free talking and/or using a cell phone for texting under the plane of the car window. However, it is unlikely that the rate for these particular behaviors might change during the study period. Some participants could have noticed the researcher observing them and might have modified their behavior accordingly. Finally, we could not assess the objective behavioral change in health care providers who might have been using public transportation. Despite these limitations, we performed a successful educational campaign with encouraging results.

Distracted driving continues to be a safety issue and a tangible threat. The incidence of distracted driving among health care providers is unexpectedly high. As a result of a multipronged campaign against distracted driving, there was a 32% reduction in the incidence of distracted driving postintervention, which remained low even at 6-month follow-up. Implementation of an effective injury prevention campaign could reduce the incidence of distracted driving nationally.

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