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Cross-sectional Study Investigating Texting and Driving in Grenada, West Indies

James A Ducey[1]
Ryan Malave[1]
Iman Zahedi[1]
Emmanual Keku[1]
Satesh Bidaisee[1*]

[1]*Saint George's University, West Indies, Grenada*

Abstract

Objective: Conduct a cross-sectional study to gather data regarding texting while driving behaviors, identify vulnerable populations, as well as assess public opinions about receptiveness to interventions in Grenada, West Indies. This will inform efforts to curb motor vehicle accidents (MVAs) locally.

Design and Methods: An anonymous 16-item questionnaire assessing cell phone usage while driving was answered by Grenadian drivers recruited from across Grenada. The survey assessed incidence and prevalence of texting while driving, frequency of MVAs involving texting, participant risk perception, demographic data, as well as which interventions are perceived to be effective in reducing texting while driving. Drivers were approached in public car parks and roadsides by the study researchers to obtain their participation.

Results: From 191 survey responses, mean age was 37.05 ± 10.038 years. 50.3% admitted to texting while driving. Statistically significant between group differences were documented with variables of gender (females comprise 59% of never texted group vs. comprising only 40% of texting while driving group, p= 0.009), mean age (Never texted group39.3 years ± 11 vs. Texted while driving group 34.9 years ± 8, 0.003), and knowing anyone involved in a MVA due to texting while driving (texted while driving group 26% vs never texted group 5%, p ≤ 0.001).

Conclusions: Younger age, male gender, and knowing other drivers who had MVA's involving texting while driving were associated with increased incidence of persons texting while driving. Interventions targeting the socially reinforcing effects to these groups, safer technologies, as well as legislation may mitigate texting while driving's consequence in Grenada.

Keywords: Texting, Driving, Road distraction, Mobile device, Motor vehicle.

Introduction

Distracted driving (DD) is devoting a significant amount of time or effort towards a secondary task such that they cannot maintain driving performance at an acceptable level [1]. Distractions can be categorized as visual, auditory, physical, or cognitive, all which impact driver performance. Distractions can also be categorized as internal or external. While non-technological distractions exist, newer technological distractions are more cognitively demanding and time consuming [2]. Individuals using mobile phones are reported to have delayed reaction times to braking, traffic signals, impairing lane positioning, and maintaining safe vehicular distance [1]. The World

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***Corresponding author:** Dr. Satesh Bidaisee, Professor of Public Health and Preventive Medicine, Saint George's University, West Indies, Grenada. Tel: (473) 439-2000, Email: satesh.bidaisee(at)gmail.com; sbidaisee(at)sgu.edu

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Health Organization (WHO) suggests that even hands-free devices do not completely alleviate the problem, and texting dramatically increases the risk of MVA [1,3]. Texting while driving is hazardous in that it requires active cognition to form a message as the driver also physically manipulates the phone. One explanation proposes attention span is limited, and complex secondary tasks force the driver to divide their attention which impedes concentration on driving; while another propones some driving, conditions place higher demands on the driver, so they cannot cope with both tasks [4]. A meta-analysis of 28 studies revealed that texting while driving decreased performance relating to: eye movement, stimulus detection, reaction time, maintaining speed, lane positioning, and vehicular control, compromising the safety of everyone on the roadway [5].

Cell phone use while driving is an established major risk factor for MVAs [6]. Drivers using cell phones are four times more likely to be involved in an MVA [1,7,8]. Even more striking, deficits from cell phone use are comparable to driving under the influence of alcohol. Strayer et al. found that while drinkers tended to be more aggressive on the road, cell phone users had greater delays in reaction time [2]. Other studies demonstrate cell phone use interferes with visual and steering capabilities, suggesting a compounding effect of cognitive, visual and physical demands [9].

Who has been impacted?

The WHO estimates that 1.3 million deaths result from MVAs worldwide annually [1,10]. According to data from the Fatality Analysis Reporting System collected between 1999-2008, the number of fatalities due to DD decreased between 1999-2005 [6]. However, the number of DD related fatalities grew rapidly by 28% thereafter, which was attributed to increased texting post 2005. Researchers used multivariate analysis to show approximately 16,000 additional fatalities can be attributed to increases in text messaging while driving from 2001 to 2007 [6]. US Department of Transportation National Highway Traffic Safety Administration reported that DD was associated with approximately 421,000 injuries in motor vehicle collisions in 2012, with evidence that smartphone use is increasingly contributing to these incidents [11]. Coinciding with this increase in MVAs due to DD is an increased prevalence of habitual engagement in DD. Participants in surveys who drove experimental routes indicated strong willingness to engage in activities which impaired attentiveness to the task of driving, particularly cell phone use [12]. In 2013, the Center of Disease Control (CDC) compiled data from the 2011 EuroPNStyles and Health Styles surveys to compare estimates of cell phone use among drivers in the US and European nations [13]. Among drivers aged 18-64, self-reported cell phone use for making calls while driving in the past 30 days was variable, ranging from 21% in the UK to 69% in the US [13]. Additionally, drivers who admitted to reading or sending text messages while driving at least once in the past 30 days was also variable, ranging from 15% in Spain to 31% in the US [13]. This suggests that among these different countries, willingness to engage in cell phone use is variable, and likely dependent on multiple factors.

Who texts and drives and why?

Many explanations for the motivations behind texting while driving have been developed. Researchers speculate the motivations vary from perceived urgency of the message to the consideration of current risks by the driver [4]. Research by Lerner et al. suggests driver decisions about cell phone use are strongly correlated with the consideration of task motivations [14]. DD is weakly related to driving considerations such as current or predicted road conditions [14]. However, Lerner et al. demonstrated a strong positive correlation between age of the driver, behaviors the driver determined risky, and when they chose to engage in such behaviors, texting being a prime example of risky behavior [14]. Additionally, teen drivers (aged 15-19) were more likely to engage in cell phone use than any other age group [14]. Cell phone use showed a strong linear relationship with the perceived risk of the task [14]. Although there was a weak relationship between willingness and road type, there was a stronger influence of driving task (merging, exits, lane change) [14]. Taken together this evidence suggests a correlation with driver's willingness to text when the risk is perceived as minimal and their age, coupled with consideration for the driving maneuver difficulty plays an important predictive role.

Cross-sectional and observational studies demonstrate impairment due to cell phone use is particularly prevalent in younger and inexperienced drivers [15-17]. Recent work reports 71.5% of drivers surveyed ages 18 to 24 reporting reading text messages in the last 30 days [18]. This is due to multiple factors such as perceived risk and familiarity with technology. Independent of reason, multiple studies demonstrate younger drivers are more likely text and drive, therefore interventions should be targeted at this demographic.

What has been done about it?

Certain nations such as the UK have curbed texting and driving by banning cell phone use while operating a vehicle [19]. The UK government demands hands-free devices only while the vehicle is in motion and even while it stopped in traffic or at a red light. Additionally, penalties include monetary and incurrence of penalty points [19]. The consequence is more severe with the threat of loss of license if the driver obtained their license two years prior to the incident [19]. In the US, texting is prohibited in 46 states, DC. Puerto Rico, Guam, and the US Virgin Islands for all drivers [8]. However, no state prohibits an "all cell phone" use [8]. It is important to note that the ability to enforce these regulations have proven to be problematic due to the difficulty of apprehending someone texting while driving as compared to other risky behaviors such as speeding and driving while intoxicated [20].

What about low and middle-income countries?

Investigations in the risks and prevalence of texting while driving has been increasing in recent years. However, relatively little research has focused on the incidence of texting while driving in low and middle-income countries [10]. This is especially surprising considering that the WHO

estimates that 90% of road traffic related deaths occur in low and middle-income countries [10]. There are indications that texting while driving poses a significant risk amongst non-Western drivers presented by reports from South Africa and Kuwait [21,22].

Grenada has sparse research into the growing incidence of MVAs as it relates to DD. However, from September to December 1980, data regarding causes of death was collected from the English-speaking Caribbean, which showed MVAs as the fourth leading cause of death [23]. The study revealed MVAs were more likely to involve young males, and associated risk factors were inexperienced drivers and alcohol intoxication [23]. Today concern grows texting while driving represents a novel, growing risk factor for Caribbean MVAs.

The need for data to understand motivations behind DD is necessary to implement effective prevention campaigns and strategies. Recent research from 2015 suggests that there has been an increase in the number of non-fatal crashes in Grenada [7]. However, there has also been an increase from 4.1 to 11.9 per 100,000, in the proportion of fatalities in MVAs in Grenada from 2000-2009 [7]. Researchers speculate that a possible explanation for the increase could be DD, specifically texting while driving.

To address this growing problem in Grenada, we have begun collecting data on traffic accidents and cell phone use. Obtaining this information may be useful in understanding the current social influences on driving behavior to effectively reach and deter the public from DD [2]. This data will assist the national government by informing legislation of opportunities to deter drivers from texting. It will also aid to regional police, healthcare workers, and educators with developing awareness to this public health crisis [2].

METHODS

Study Design, Oversight, Participants, and Data Management

Researchers obtained ethical and research clearance from the Institutional review board at St. George's University in Grenada, while noting a minimal risk of discomfort associated with recollection of MVAs. Additionally, participants gained exposure to risks of texting while driving and insight regarding the risks of engaging in such behavior. No compensation was provided for participants, but it was communicated the information gathered will be provided to RGPF and to potentially inform policy, regulations and legislation.

The survey was a 16 question, anonymous, self-reporting paper questionnaire assessing cell phone usage while driving taking no more than 7 minutes to complete. The survey assesses the frequency of texting while driving and the reported frequency of MVA involving texting, as well as demographic data. The survey also assesses how informed participants are to the risks of texting while driving, current legislation, as well as which interventions they believe will reduce DD behavior. **T**here were 191 motor vehicle drivers from all parishes across Grenada from April 1 through June 30, 2017. Drivers were approached in public car parks as well as roadsides by the study researchers to obtain informed consent for their participation in a survey. The informed consent was verbally obtained from drivers and upon receipt, drivers were presented with the survey to assess their texting and driving behavior.

Survey data was compiled to MS Excel dataset which was stored on a secured computer along with MVA data extracted from RGPF records into a separate MS Excel dataset by the principal investigators to be retained indefinitely. No personal identifiers were included in either dataset to ensure participant anonymity and confidentiality. Original paper surveys are retained in a secure location for five years, after which they will be destroyed.

Results

Table 1 displays the compiled survey data regarding texting while regarding frequency, prevalence, circumstance, as well as receptiveness to interventions or discouraging factors.

Demographic Data and Overall Characteristics

Sample size was n=191 participants. For the variable of age, 180 valid responses recorded age, ranging from 18 to 64 years of age (mean= 37.05 years, std. deviation= 10.038 years). Grouping the sample by gender revealed 190 valid responses with men comprising a majority (men= 97, 51.1%, women= 93, 48.9%). Of 191 responses, 96 (50.3%) answered "yes" to the question "Have you ever texted while driving", with 95 (49.7%) responding "No". From 180 valid responses to the question "Have any of the following occurred to someone you know because of texting", 32 (17.8%) responded that a MVA had almost occurred, 28 (15.6%) responded that a motor vehicle accident had occurred, and 2 (1.1%) had been ticketed. When asked "Are you aware of any local laws pertaining to texting while driving, 75 (41.1%) of the 181 usable responses replied "Yes" while 106 (58.6) replied "No".

Differences between Groups

Stratifying the sample by texting behavior (Never texted while driving Vs. Ever) revealed statistically significant between group differences in variables: sex, age, and having known anyone in an MVA due to texting. Females were less likely to text while driving (females comprise 59% of never texted group vs. comprising only 40% of texting while driving group, p= 0.009.) Mean age of participants who reported never texting while driving was older than those who responded texting while driving behavior (39.3 years ± 11 vs. 34.9 years ± 8, p= 0.003. Having known anyone in a MVA due to texting was more strongly associated with the ever texted while driving group. 26% of people who admitted to texting while driving knew someone in texting related accident vs. 5% who never texted while driving knew someone in texting related accident (p =< 0.001). No significant intergroup differences were found based on the variable of awareness of current local laws pertaining to texting while driving (43% who never texted were aware of laws vs. 40% who ever texted were aware of laws, p= 0.735.)

Table 1: Survey Data n= 191 (Questions 4 through 12 only pertain to those who answered yes to question 1).

1	Ever texted while driving?				Yes	No	No Response
					96 (50.3%)	95 (49.7%)	0
2	Are you aware of any local laws pertaining to texting and driving?				**Yes**	**No**	**No Response**
					75 (41.4%)	106 (58.6%)	10
3	Any of the following occur to someone You know because of texting?		**None**	**Ticket**	**Almost Accident**	**Accident**	**No Response**
			118 (61.8%)	2 (1.0%)	32 (16.8%)	28 (14.7%)	11
4	How often do you text while driving?			**Rarely**	**Sometimes**	**Most of the Time**	**No Response**
				57 (59.4%)	27 (28.10%)	12 (12.50%)	0
5	Do you text while the vehicle is in Motion?			**Standing Still**	**In Motion**	**Both**	**No Response**
				28 (29.2%)	16 (16.7%)	52 (54.2%)	0
6	How do you text?			**Read Only**	**Write Only**	**Both**	**No Response**
				21 (22.1%)	3 (3.2%)	71 (74.7%)	0
7	Circumstances you text?	Emergency	**Directions**	**Can't Wait**	**Boredom**	**All the Above**	**No Response**
		44 (47.3)	7 (7.5%)	27 (29.0%)	2 (2.2%)	13 (14.0%)	3
8	Do you text when with others or alone?			**Alone**	**With Others**	**Both**	**No Response**
				57 (60.6%)	2 (2.1%)	35 (37.2%)	2
9	Impact on driving ability while texting?			**Negative**	**Not Affected**	**Positive**	**No Response**
				64 (68.1%)	29 (30.9%)	1 (1.1%)	2
10	Emotions about texting while driving?		**Guilty**	**Worried**	**Neutral**	**Invincible**	**No Response**
			24 (25.3%)	35 (36.8%)	34 (35.8%)	2 (2.1%)	1
11	Is it dangerous to text and drive?				**Yes**	**No**	**No Response**
					91 (95.8%)	4 (4.2%)	1
12	Have you ever had any of the following while texting?		**None**	**Ticket**	**Near Accident**	**Accident**	**No Response**
			67 (72.8%)	1 (1.1%)	23 (25.0%)	1 (1.1%)	4
13	Would any of the following deter you from texting while driving?				**Yes**	**No**	**No Response**
	Make it illegal to text and drive				43 (39.1%)	67 (60.9%)	81
	Different Technology				65 (59.1%)	45 (40.9%)	81
	Ticketing				23 (20.9%)	87 (79.1%)	81
	Getting in an accident				32 (29.1%)	78 (70.9%)	81
	Nothing				6 (5.5%)	104 (94.5%)	81

Discussion

This study examined texting as a risk factor for MVA's, frequency of negative outcomes from texting while driving, and knowledge and perception of these risks in the location of Grenada, West Indies. Utilizing survey responses to drive descriptive data gathering allowed for examination of risk-taking behavior, as well as provided an opportunity for further investigation of possible public health interventions targeted to reduce harm caused by texting and driving.

Compared to females, male drivers were more likely to respond that they did engage in texting while driving (p= 0.009), a difference reflected in prior studies examining distracted driving stratified by sex [15,16,10,24,25,3]. Comparison of the mean ages between those who had never texted while driving versus those who did text while driving revealed that those who never texted while driving was on average 4.6 years older (39.3 ± 11 years, 34.9 ± 8, p=0.003). This is also supported by previous research that suggests that younger drivers are disproportionately affected by DD [15,17,18]. Additionally, there is a statistically significant relationship ($p < 0.001$) between those admitting to texting and driving and knowing someone who was involved in a MVA due to texting. This provides evidence that the knowledge of MVAs involving DD, is not a strong deterrent of such behavior. In future studies, investigating the type or extent of the relationship between the texter and the victim of a MVA involving texting may be useful.

Awareness of the illegality and consequences for texting while driving was similar among those who did text and those who did not text while driving (p= 0.735). This speaks to larger concerns about whether legislation alone is sufficient to deter DD since such laws cannot be regularly or strictly enforced. However, social influences seem to be

connected to DD, as knowing someone who was involved in a MVA due to texting correlated with texting while driving. This may be explained by perceptions of risk while DD is in part reinforced through socialization, thus perpetuating the habit [25,26]. Since young adults are among the highest risk for DD, it is plausible to target primary driver education as a forum to teach how to drive distraction free despite social bias.

Most participants who responded "yes" to have you ever texted while driving admitted they believed it is dangerous (n= 91, 95.8%), and their driving ability is negatively affected (n= 64, 68.1%). One explanation of this contradictory behavior is the texters believe the frequency of texting while driving correlates with risk level and having a relatively low texting rate reduces risk of MVA. Also, the majority of 'texters' tend to be alone in their vehicle (n= 57, 60.6%), and have never personally encountered any negative consequences such as getting into an accident (n= 1, 1.1%) or being ticketed for texting while driving (n= 1, 1.1%). This suggests the perceived risk to oneself and not being responsible for other passengers may play a role in motivating texting behavior.

The subjects were asked about possible interventions to curb texting while driving to reveal what measures are perceived as effective by the population in deterring this behavior. The interventions perceived most effective were "implementation of different technology" to make texting safer (n= 65, 59.1%), and "make it illegal to text and drive" (n= 43, 39.1%). This suggests drivers want to continue to text and drive, and but would like to do so safely if possible. However, research suggests hands-free equipment such as headsets and vocally based texting technology still impairs a driving ability [20]. Additionally, about 40% of drivers reported making it illegal to text and drive would be a good deterrent. However as previous mentioned, 'texters' and 'non-texters' were equally aware of the legal regulations regarding texting and driving and it was determined to have no significant deterrent effects. Additionally, difficulty enforcing may compromise the efficacy of such a strategy as an independent and sole solution.

Conclusion

This study profiled DD from texting in Grenada. Survey data demonstrates the behavior is disproportionately prevalent among younger age groups and males, revealing vulnerable populations. Responses suggest interventions targeting socially reinforcing effects, safer technologies, as well as legislation may mitigate texting while driving's consequence in Grenada, West Indies. The findings and conclusions of this study will be made available to the Royal Grenadian Police Force to inform public educational initiatives regarding attitudes surrounding DD, campaigns to reduce the behavior, and law enforcement policy to curb texting while driving.

Conflicts of Interest

There is no conflict of interest on the part of any members of this research team.

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