

Knowledge, Attitude and Practice among Drivers in Trinidad, West Indies

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Abstract

Few studies have been conducted on the incidence and factors which contribute to road traffic collisions in Trinidad. In order to fill this gap in knowledge, we conducted knowledge, attitudes and practice (KAP) study among drivers to determine which factors contributed to these accidents. A questionnaire was developed and administered using a cross-sectional approach among 3000 persons living in 5 different areas of Trinidad. The collected data were analysed using SPSS version 22, t-test and multivariate analysis. Of the 2998 respondents, at least 572 (19.1%) had been involved in one or more road collisions. While only 46.7% of respondents always wore seat belts, approximately 93% believed strongly that their use was essential for safety—a 3-fold increase in that found in a previous study. The multiple regression analysis indicated that attitude and age were significantly associated with accidents and increased risk for accidents. The results showed that alcohol consumption, use of mobile phones while driving, speed, and age were significantly ($p > 0.001$) associated with accidents. In conclusion, most respondents were aware of traffic laws and regulations, but their knowledge and practice often diverged. However the improvement in attitude to seat-belt wearing suggests that a holistic driver education program may improve driver practice and adherence to the road traffic regulations in Trinidad.

Keywords

KAP, Trinidad, Road Collisions, Post Traumatic Stress

1. Introduction

Road traffic collisions (RTC) account for approximately 1.24 million deaths each year

or 3400 per day, with the majority of deaths reported from low-income countries [1] or in rural communities in high-income countries [2]. With respect to global morbidity, up to 50 million have suffered injuries by road traffic collisions [1]. Globally, it is estimated that approximately 41.2 million persons have experienced an adjustment in life expectancy and in the quality of their life caused by road-related injuries and this figure is expected to rise. That is, in 2004, road traffic collisions were considered the ninth world leading cause of morbidity (health care burden) and this is expected to move to third position by 2030 [1].

This increase in the number of RTC can be attributed to 1) no new effective policies implemented to reduce the incidence, 2) no effective policies to reduce the number of vehicles on the road and 3) non-adherence or disregard of the road safety regulations or highway-code by young inexperienced drivers [1]-[3]. Within the Caribbean region, few studies have been conducted on RTCs with the exception of work done by Barreto *et al.* [4], Holder [5], St Bernard and Mathews [6] and Ramroop *et al.* [7].

Studies conducted in Trinidad and Tobago were primarily concerned with the pattern of mobile and seat-belt use by drivers [8] [9], mortality of young male drivers [4] [5], trends in road crashes and their economic burden [4]-[7] and various road fatality models were developed [4] [5] but all authors lamented the fact that the data sets used were of poor quality [3]-[9]. It is therefore difficult to understand how models that are useful in informing policy can be developed without robust epidemiological data. These models, although limited in scope, form the basis for launching studies on road traffic collisions prevention by the World Bank and the World Health Organization [1]. It should be noted that WHO [1] reported that Trinidad and Tobago did not have an agency with responsibility for road safety and accident prevention. However, the responsibility for coordinating road safety, education and collision prevention is carried out by various non-governmental organization (NGOs) while the Ministry of Health conducts campaigns aimed at increasing the use of seat-belts and discouraging driving under the influence of alcohol [1] [7] [8].

The knowledge, attitude and practice (KAP) survey is a powerful tool that can be used to determine these criteria in groups or populations regarding a wide range of social issues [10]. Many of these surveys have been conducted in the Caribbean region ranging in topics from public health epidemiology such as studies on dengue and leptospirosis [11] [12] to environmental issues such as climate change and tsunami readiness [13] [14] but to date no studies have been conducted on road traffic collisions. Therefore, the use of KAP surveys has now become a standard tool to evaluate population awareness and to determine behaviour change [15].

This study was conducted to evaluate the efficacy of current Ministry of Health and NGO programs aimed at reducing the number of road traffic accidents and therefore to reduce the number of deaths among young drivers in Trinidad and Tobago. No previous studies on driver's knowledge, attitudes and practices have been conducted, so this study attempts to fill this major gap in our knowledge and lay the foundation for future intervention measures.

2. Methodology

The study was carried out between the months of May and December of 2012, in Trinidad and Tobago, a country with a population size of 1,324,699 (CSO [16]). The country is divided into 14 Regional Corporations and Tobago House of Assembly (see **Figure 1**). The regional corporations used for this study were located in Trinidad and were selected based on their high population densities, as well as to represent geographical spread within the island *i.e.* north, south, east and west (see **Table 1**). This approach ensured participants from different socio-economic strata, educational background, ethnicity and religious groups were represented. Six main locations were chosen including: Westmoorings (Diego Martin), Chaguanas (Chaguanas), Gasparillo (Couva-Tabiquite-Talparo), Trincity (Tunapuna-Piarco), Princes Town (Princes Town) and San Fernando (San Fernando) (see **Figure 1**).

The formula by Daniel was used to calculate the sample size of 3000 persons cited in Elliott & Armitage [17]. Variables were based on a confidence interval of 95%, $p = 0.5$, $X^2 = 0.05$, a prevalence rate of 8% (12) and a precision of 2%.

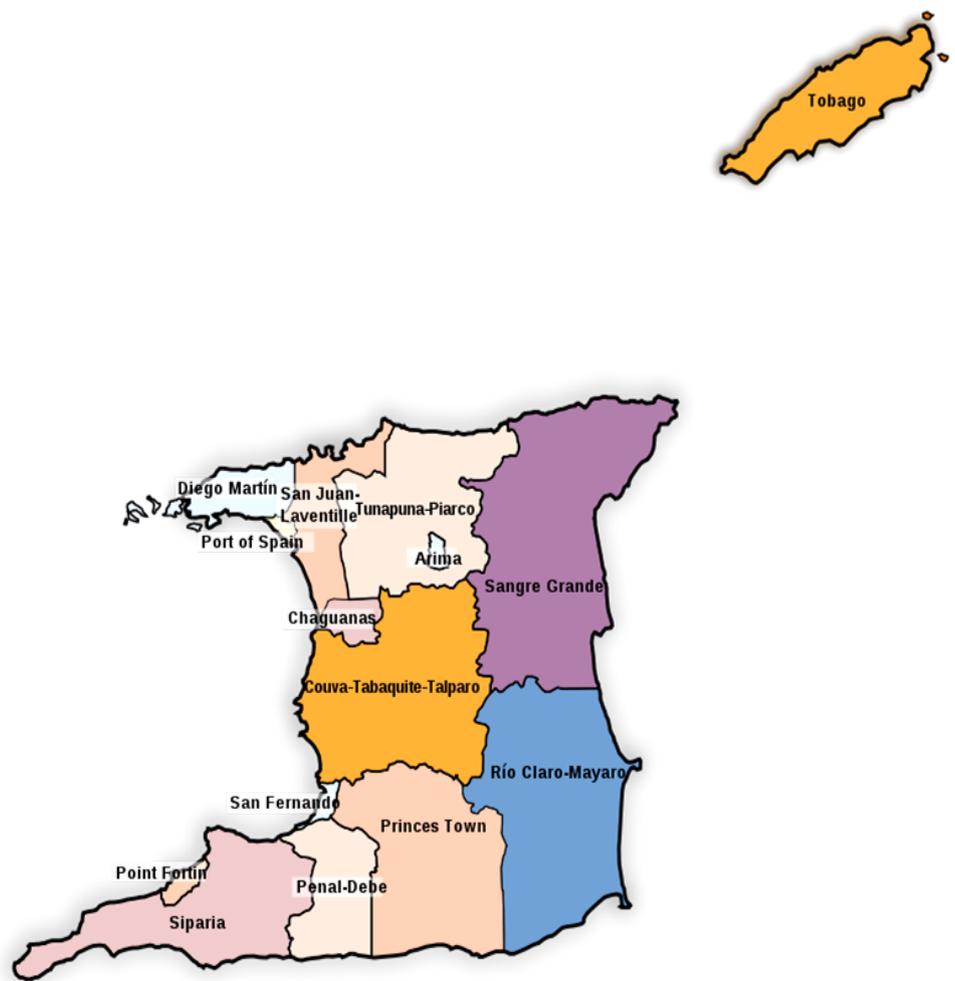


Figure 1. Regional corporations of Trinidad and Tobago.

Table 1. Population of regional corporations of Trinidad.

Corporation	Population
Port-of-Spain	36,963
San Fernando	50,208
Arima	33,807
Chaguanas	84,216
Point Fortin	20,331
Diego Martin	101,703
San Juan/Laventille	155,606
Tunapuna/Piarco	211,741
Sangre Grande	74,546
Couva/Tabaquite/Talparo	185,243
Princes Town	101,134
Mayaro/Rio Claro	34,846
Penal/Debe	91,294
Siparia	86,251
Total	1,267,889

The questionnaire was developed and validated among drivers from the other geographic areas (see **Figure 1**) with similar demographics to the chosen study sites. Validation of the questionnaire was conducted among 300 residents (10%) and based on feedback from the respondents minor changes were made to the questionnaire before they were administered. With a sample size of 3000 participants and six study sites selected, a total of 500 surveys were to be completed in each location. A cross-sectional study was conducted using a convenience sampling method which involved interviewing all residents who were home during the survey time, which was between the hours of 8 am to 4 pm. Only one member per household was interviewed after obtaining permission, but the selected person had to have a valid driver's license.

On completion of the study all questionnaires were collected and data encoded and organized into a database using SPSS [18] (Statistical Package for the Social Sciences) version 20. Chi-square tests were used to determine differences in age and gender G-test and T-tests were conducted to compare different factors, and univariate and multivariate analyses were used to determine other correlations with different study sites and ethnic variations or cross-cultural factors. All data was further analyzed to determine whether the selected variables were independent of each other and were significant at the 5% level. Results are presented in tables.

3. Results

A total 2998 residents of Trinidad and Tobago participated in this study which is equivalent to a compliance rate 99%, with only 2 persons refusing to participate. The

minimum age was 17 years and no maximum age limit was set. The majority of the participants from Westmoorings, Chaguanas, Gasparillo, Trincity, Princes Town, and San Fernando were educated (89.9%) and also employed (83.5%). Most participants had achieved at least secondary level schooling (54.7%), or tertiary education (35.2%), as reflected in a large number being employed (83.5%) in either public service (30.5%), self-employed (16.2%), or the private sector (36.8%), as shown in **Table 2**.

The largest group of persons participating in this survey belonged to the age group 30 - 39 years (30.1%) followed by 20 - 29 years (29.8%), 40 - 49 years (21.1%), above >50 years (13.3%), and 17 - 19 years (5.7%). The majority of the participants were either married (45.9%) or single (33.3%), with Christians (47.6%) and Hindus (37.0%) dominating the religious domain (see **Table 2**).

Most participants 2894 (96.5%) demonstrated either a moderate (79.0%) or a high (17.5%) level of knowledge of road traffic regulations (**Table 3**). A significant number of respondents (70.7%) correctly indicated the major contributory factors for road traffic collisions, which included driver's noncompliance, lack of awareness about traffic regulations and very high driving speeds (**Table 3**).

When participants were questioned about the use of seat belts (**Table 4**), 61.8% strongly agreed that they should be used. Though, when it came to judging their attitudes/motivations behind using them, 53% were in support of their use for passengers, while others thought that drivers should insist that passengers wear their seat belts while in their vehicles (31%).

When asked about the use of phones while driving, 0.6% suggested the practice was very safe, while 0.8 % felt that it was just safe, but the majority, 46.1% and 48.2% thought that use of mobile phones was unsafe and very unsafe, respectively (**Table 4**).

On drinking and driving a significant number ($p > 0.002$) of respondents were concerned (94.6%), however only 33.1% were always concerned while 61.5% were only sometimes concerned and 5.3% were not concerned at all about drinking and driving.

On speeding, only 35.9% were always concerned about speed regulations but the majority (57.7%) were only sometimes concerned and 6.4% never concerned. In line with the Trinidad Roads Act, the second schedule, the preferred and recommended speed in Trinidad roads is 80 km/H, except for buses, trucks, goods and vehicles (65 Km/H), and trailers and tractors which should be driven between 35 Km/H. Only 56.1% of the participants knew the correct speed limit. Other respondents suggested that the recommended speed was 60 km/H (12.9%), 70 km/H (21.3%) and 90 km/H (9.7%).

Each of the ten listed potential causes of accidents was identified by more than half of respondents.

Respondents practice (**Table 5**) regarding observing speed limits were slightly worse than their reported attitudes in that only 32.1% of participants reported always obeying speed limits while the remainder either sometimes or never obeyed them.

Fewer than half (46.7%) of respondents always wore seat belts though 61.8% reported very strong approval of them.

Table 2. Socio-demographics of the study participants (n = 2998).

		Frequency	Percent
Age	17 - 19	171	5.7
	20 - 29	894	29.8
	30 - 39	903	30.1
	40 - 49	633	21.1
	>50	398	13.3
Marital Status	Never Married	1000	33.3
	Married	1377	45.9
	Divorced	237	7.9
	Common-law relationship	384	12.8
Religion	Christian	1428	47.6
	Hindu	1111	37
	Muslim	373	12.4
	Other	86	2.9
Gender	Male	1917	63.9
	Female	1081	36.1
Ethnicity	Afro-Trinidadian	497	16.6
	Indo-Trinidadian	1803	60.1
	Mixed	654	21.8
	Other	44	1.5
Level of Education	Nursery/Kindergarten	8	0.3
	Primary	246	8.2
	Secondary	1641	54.7
	Tertiary	1056	35.2
	None	15	0.5
	Other	32	1.1

Table 3. Knowledge of the participants about road traffic regulations (n = 2998).

Variable	Number	Percentage %
Knowledge		
1) High	525	17.5
2) Moderate	2369	79.0
3) Low	104	3.5
Reasons for traffic road accidents		
1) Driving too fast	360	12.0
2) Lack of awareness about traffic laws	306	10.2
3) Non-compliance with the law	213	7.1
4) All the above	2119	70.7

Table 4. Participant attitude towards road traffic regulations and accidents (n = 2998).

Variable	Number	Percentage %
Convinced about use of seat belts		
1) Very strong	1852	61.8
2) Strong	930	31
3) Weak	216	7.2
Use of mobile phones while driving		
1) Very safe	16	0.6
2) Safe	25	0.8
3) Undecided	131	4.4
4) Unsafe	1381	46.1
5) Very unsafe	1445	48.2
Concerned about Driving while drunk		
1) Never	159	5.3
2) Sometimes	1846	61.5
3) Always	993	33.1
Concerned about High speeds		
1) Never	192	6.4
2) Sometimes	1730	57.7
3) Always	1076	35.9
The following factors always cause accidents:		
1) Driving when tired	2294	76.5
2) Drinking and driving	1846	61.5
3) Following a vehicle too closely	1995	66.5
4) Driving too fast	1730	57.7
5) Taking medication and driving	2009	67.0
6) Taking illegal drugs and driving	1910	63.7
7) Poorly maintained roads	2245	74.8
8) Traffic congestion	2212	73.7
9) Defective vehicle	2243	74.8
10) Texting while driving	1907	63.6

Table 5. Practice by participants towards road traffic regulations and injuries (n = 2998).

	Number	Percentage
Observe speed limit		
1) Sometime	1845	61.5
2) Always	962	32.1
3) Never	191	6.0
Comply with wearing seat-belt		
1) Always	1400	46.7
2) Sometimes	947	31.6
3) Usually	561	18.7
4) Never	90	3
Prior involvement in RTAs in last five years		
1) None	1090	36.4
2) One	385	12.8
3) Two	144	4.8
4) Three	32	1.1
5) More than Four	11	0.4
6) No response	1336	44.6
Environmental conditions during accident		
1) Poor weather	145	4.8
2) Poor visibility	140	4.7
3) Poor road surface conditions	174	5.8
4) Absence/malfunction of a traffic light	63	2.1
5) Good conditions	50	1.7
Risk behaviours for RTAs		
1) Intoxication	18	3.2
2) Multitasking	42	7.4
3) Disobedience of the driving regulations	30	5.3
4) Negligence of the other driver	217	38.0
5) Bad luck	255	44.5
6) Other	10	1.6

Only 36.4% of respondents had not been involved in an RTA in the previous 5 years, while 44.6% gave no response and 572 persons (19.1%) admitted to having been involved in at least one accident, and 11 persons to having had more than four. Of those who had been involved in accidents only 15.9% admitted to hazardous driving behavior (intoxication, multitasking, or disobedience of regulations) while 82.5% either blamed the other driver or “bad luck”.

The DSM-IV approach in diagnosing acute stress disorder elaborates on post-traumatic reactions that occur between 2 and 28 days after RTA and incorporates a number of symptoms including dissociation, hyper-arousal, avoidance, and intrusion. Using simple logistic regression, the four variables identified individual life behaviour after RTA and predicted if the encounter would change their normal activities. The simple logistic model used in this case is based on a linear relationship between the natural logarithm (ln) of the odds of an event and a numerical independent variable. The form of this relationship is as follows:

$$\text{Ln}\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

where

p is the proportion of successes,

L is the ln(odds of event),

X is the independent variable,

$\beta_0 + \beta_1$ are the Y -intercept and the slope, respectively.

Preliminary score of foreshortened and irritability future symptoms of Post-Traumatic Stress Disorder (PTSD), and early degree of vulnerability after involvement of RTAs were examined. Hyper-activity was indicated by questionnaire items, (difficulty paying attention to details, inability to sustain attention on tasks, difficulty in facing up to problems and frequent shifts from one uncompleted activity to another), combined to predict that 64% of individuals had recuperated from the accident, while 36% remained affected by the RTAs. Using multiple regression in predicting continuous variable totals, which is also a measure of PTSD, it was observed that 38.1% ($R = 0.618$) of the respondents were *distracted* or *dissociated* from their normal way of life (that is, they experienced depersonalisation and de realisation), while those who experienced *intrusion* were approximately 53.4% (constant reminder of the events, flashbacks, dissociative reaction and feeling distressed). Lastly, individuals who had been subjected to avoidance were 32.6% (individuals who were described as unable to overcome the events or external reminders of the events). Those that showed much more than usual behaviours to all the questionnaire items (acutely anxious) were 5.6%, those who behaved normally or showed no more than usual behaviour were 6.6%, while those who remain unaffected with PTSD were 6.2% and those whose lives were affected more than usual were 13.4%. As such, in evaluating the statistical correlation between PTSD and increased RTAs, the findings establish that both destruction and increased activity are linked to RTA ($p = 0.002, 0.028$ respectively), while intrusion and avoidance from

normal livelihood are non-significant ($p = 0.02$ and 0.0625 respectively) at 0.05 level as shown in **Table 6**.

The logistic model results predicted that over 80.9% of those involved in RTC were likely to experience the observed PTSD related factors. The observed groups and predicted probabilities are as shown below.

Years of research and evaluation have stipulated that traffic accidents and injuries cannot be stopped completely. However, the frequency of accidents and severity of injuries can be minimised and significantly eliminated by adhering to simple protective measures. This can include obeying traffic speed regulations and the use of seat belts. Findings from this study demonstrate that risk predisposing factors to road accidents include road conditions, driver's attitude to traffic regulations and car conditions. As such, the logistic regression model predicted that those who have a history of RTCs have a high probability of experiencing PTSD, as evidenced by psychological factors such as dissociation, intrusion, avoidance and hyperactivity, which can result in an increased risk of road accidents. In this case, dissociation is a psychological disorder where a person separates himself from the effects of his thoughts, memories, as well as

Table 6. Regression analysis.

Factor	%	<i>T</i>	<i>p = 95% CI</i>
Dissociation	38.1	2.83	0.002
<ul style="list-style-type: none"> • Depersonalisation • Derealisation 			
Hyperactivity	64.0	0.07	0.028
<ul style="list-style-type: none"> • Competence making decisions • Usefulness since RTA • Enjoying daily activities • Facing up problems • Feeling reasonably happy 			
Avoidance	32.6	0.25	0.0425
<ul style="list-style-type: none"> • Inability to overcome the events • External reminders of the events 			
Intrusion	53.8	1.64	0.02
<ul style="list-style-type: none"> • Constant reminder of the events • Flashbacks, dissociative reaction • Feeling distressed 			

the sense of self-identity. Hyperactivity, on the other hand, is a psychological disorder where the individual is anxious and has an abnormal form of enhanced physical energy which makes the person highly active, unable to relax and think straight. Research conducted by Anon (2012) shows that avoidance is a maladjustment coping mechanism that enables a person to avoid dealing with the reality if it entails highly traumatic experience. Additionally, intrusion entails a memory disorder that merges the past and the present in a manner that a person undergoes a repeated experience of the past traumatic event.

With respect to the traffic lights compliance, 15.6% admitted that upon seeing the red light they were more likely to defy it, while a large majority (84.6%) ($p > 0.002$) indicated that they would approach it slowly and stop. However, the results showed that most people who drove past the red light (16.6%) were either late (2.2%), wanted to save time (5.4%), frustrated about stopping again (5.6%), enjoyed the fun of beating the red light (1.8%) and other reasons (0.6%).

The results of the univariate analysis indicated that age was a significant factor when considering the occurrence of road collisions among the participants while car speed and place of residence were not significant factors contributing to road collisions (**Table 7**). However, the number of years of driving or experience was found significantly associated with exposure risk to traffic collisions.

When subjected to a multivariate analysis (using a multiple linear regression model), showed that alcohol consumption, use of mobile phones while driving, speed, and age were significantly ($p < 0.001$) associated with accidents. Whereas, when the reference group (>30 years of age) was compared with the younger age group, the younger age group was found at greater risk of accidents than persons over 30 years of age.

Table 7. Factors that influence exposure to traffic road accidents among respondents in Trinidad (n = 2998).

Variables	T	p-value
Age		
≤30	3.97	0.001
Place of residence		
City location	0.23	0.826
Rural location		
Having a driving license		
Yes	1.62	0.542
No		
Speed in the highway		
≤60	0.08	0.943
>90		

4. Discussion

Our KAP study has illustrated potentially rich information that can be obtained by using a large number of motor vehicle drivers to determine the major factors associated with road traffic collisions in Trinidad and Tobago. The fact that about 19% had been involved or experienced motor vehicle accidents suggests that a frequency distribution or probability distribution can be estimated, and the risks of an adverse impact can be calculated and used to make risk-based judgements. In addition, because of the high proportion of educated and legal aged drivers, these findings indicate that illiteracy and under age driving played no part in shaping the drivers' attitudes and practices towards road safety and traffic regulation. In fact their high education levels and knowledge of traffic regulations did not influence compliance with the regulations and drivers continued to flout these by driving while intoxicated, while using mobile phones and at high speeds, major factors which contribute to road traffic accidents in Trinidad. This finding is very similar to that found by Blincoe *et al.* [19] and Pierro *et al.* [20].

The present results clearly indicate that most drivers consider themselves knowledgeable about road traffic laws, however their knowledge was not always put into practice. Similarly, Nan [21], Anon [22], Waylen and McKenna [23], and Yilmaz and Eray [24], also found a divergence between knowledge of traffic laws and adherence in practice. For example, the present study showed that approximately 93% of drivers support the use of seat-belts while only 46.7% always wear them. However this is a 3-fold improvement in attitude to seat-belt wearing over that found in a previous study [25] which indicated that 31.6% considered seat-belts important to save lives and should be worn at all times. This seat belt requirement is outlined in article 43 (A) of the 1994 Trinidad and Tobago Motor Vehicles (Seat Belt Assemblies) Regulations, Subsection 9 (clauses 1 - 6) which spells out the passenger requirements and the fines for non-compliance.

The results of the univariate analysis showed that the duration or number of years of driving experience was significantly linked to the frequency of road traffic collisions (Table 7). That is the drivers with a limited number of years of driving experience had a greater tendency to become involved in collisions after an initial period with fewer collisions. Other studies have reported opposite findings with drivers who have less than "four years of driving experience" demonstrating a positive attitude and complying with road traffic rules, regulations and speed limits, while those with more years of experience were less likely to follow these regulations. That is novice drivers were more likely to adhere to traffic regulations because of the fear of accidents and limited driving experience. This observation is supported by the fact that the mean speed of novice participants fell between 60 km/H and 90 km/H on the highways. However, the results from Nakagawa *et al.* [26] and the present study indicate that less experienced drivers are more likely to drive at higher speeds and generally to disobey road traffic regulations, although persons above 50 years of age are less likely to break the law [19]-[24] [26].

Results from the multivariate analysis showed a significant association between age

and road traffic accidents in Trinidad. The older participants who were above 30 years of age were less likely to take risks that may lead to accidents when compared with young and/or new drivers who were 30 years of age or less.

The present results showed large numbers of young people used the roads, drove aggressively and with a higher tendency to drive dangerously. Similar results were reported by Nakagawa *et al.* [26] and Elliott and Armitage [17] who indicated that the demographic causing the most collisions belonged to the under 30 age category. This age group displayed attitudes which lead to excess alcohol use, non-compliance with seat belt regulations and high speed driving, which demonstrated a total disregard for traffic regulations and laws. In general the results found a significant relationship with age and the frequency of road traffic accidents in Trinidad.

These results show that there is a strong relationship between individual attitudes and road collisions. Some workers have shown that drivers' attitudes were the most important factor leading to the significant increase in the number of road traffic accidents [25] [27]-[29]. Similarly, during the present study, drivers' attitudes towards traffic laws were found to be the main cause of road collisions and contribute to 76% of all collisions in Trinidad. This is despite the drivers' awareness and knowledgeable about basic traffic laws and regulations many driver ignore some of the basic road and safety regulations. For example, the motor vehicles and road traffic (mobile devices) regulations of 2010, section 4 (1 - 2) prohibits drivers from using or holding a handheld telephone device but many still break this law although fines include \$10,000TT or 5 years' imprisonment or both. Heavy fines seem not to serve as a deterrent nor does education in a small number of individuals.

5. Conclusion

In this research, the KAP questionnaire was developed and tested among 3000 drivers from five locations in Trinidad, West Indies. The analyzed results indicated that 2998 drivers responded, of which circa 19% were actually involved in road traffic accidents. The results showed that alcohol consumption, use of mobile phones while driving, speed, and age were significantly associated with accidents. In addition, most participants had achieved at least secondary level schooling (54.7%), or tertiary education (35.2%), but these levels of education played no part in shaping the drivers' attitudes and practices or compliance with road safety and traffic regulations. The 3-fold improvement in attitude to seat-belt wearing over that found in a previous study gives hope that with appropriate public campaigns, this may be translated into improved compliance (in practice). It similarly suggests that with a more holistic driver education program, the large percentage of drivers who are only sometimes concerned about driving at high speed or while drunk can be persuaded to always be concerned and to obey the traffic laws and regulations of Trinidad and Tobago.

Authors' Statement

Ethical approval was obtained from the University of the West Indies (St. Augustine).

The authors have no conflicts of interest to declare.

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