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Strapped for life or trapped: survey of drivers' knowledge levels and attitudes towards seatbelts and seatbelt law in Zimbabwe

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Abstract

The study sought to assess drivers' level of knowledge of seatbelts, seatbelt law and attitudes to the seatbelt law using a descriptive survey design. Data were collected from a convenient sample of 180 drivers using a structured interview schedule. The research findings revealed 53.30% correct responses on seatbelt knowledge, 36.94% on seatbelt law and that 47.96% of drivers had negative attitudes towards the law on seatbelts. The findings indicated that there existed some knowledge gaps and that almost 50% of the drivers harboured negative attitudes. The research recommends that the government, using the Traffic Safety Council of Zimbabwe, should increase driver education programmes on seatbelts and seatbelt law following a review of the Defensive Driving Course curriculum. In doing so, this may assist to develop a culture of being 'strapped for life' instead of being 'trapped to death' by ignorance.

Keywords

Attitudes, Defensive driving course, Knowledge level, Seatbelt

Background

Road accidents are a major cause of death and injury around the world [1]. In Zimbabwe, close to 2000 deaths and 15,300 injuries result from road accidents annually. Of these deaths, about 1000 are drivers and passengers while pedestrians and cyclists account for the other 1000 fatalities [2].

In order to curb this carnage on the roads, Zimbabwe launched the Decade of Action for Road Safety Campaign on improving road safety in May 2011. This road safety campaign is a clear indication that the government is committed to 'applying brakes' to the careless loss of valuable life, limb and property due to unsafe motoring habits such as the failure to be 'strapped'. It is recorded that seatbelts reduce the risk of death for a front seat car occupant by approximately fifty-percent [3]. Statistics in favour of seatbelts indicate that in America, over 135,000 lives were saved by seat belt use between 1975 and 2 000 [4]. By contrast, Zimbabwe is not in the habit of capturing such seatbelt use statistics either due to technological ineptitude or a lack of political will. Positively however,

the country enacted a seatbelt law in 1987 that made it mandatory for all drivers and front seat passengers in Zimbabwe to wear seatbelts while motoring on any road in a light motor-vehicle fitted with seatbelts [5]. This current law recommends the lap and diagonal belt and likewise the law is clear on motorists who are exempted from wearing seatbelts. The seatbelt law also spells out the procedures for seeking exemptions where necessary. Failure to get Ministerial exemption could lead to a fine of twenty dollars for breaching the seatbelt law. The current seatbelt law has now been in force for almost three decades.

This study sought to assess the drivers' level of knowledge of seatbelts and the law; and attitudes towards seatbelt law bearing in mind that the government of Zimbabwe, through the Traffic Safety Council of Zimbabwe (TSCZ), conducts driver improvement training courses called Defensive Driving Courses (DDC), in order to promote road safety. Weekly, an average of 500 drivers attend these courses which are post-licence driving courses aimed at the development and improvement of the drivers' cognitive ability to read and interpret correctly accident causing situations and behaviour [6]. An analysis of the curriculum in [7], shows that it contains the following content areas arranged in Sessions 1 to 8: Preventable or not; How to avoid a collision with the vehicle ahead; How to avoid a collision with the vehicle behind; How to avoid a collision with an oncoming vehicle; How to avoid an intersection collision; Art of passing and being passed; The mystery crash; How to avoid other common types of accidents. Glaringly missing is a session on seatbelts and the law although the goal of the defensive driving course is to bring about a lasting, constructive change in the perceptions and driving conduct of the driver [6].

The Zimbabwe Central Vehicle Registry estimated that in 2012 the vehicle population was 1.3 million compared to 23,256 drivers that had attended defensive driving courses since the country attained independence in 1980. It is apparent that many more drivers are still to attend the country's defensive driving programme. This situation places the TSCZ in a strategic position to play a pivotal role in disseminating seatbelt information to accelerate the 'strapped for life' campaign alluded to in the Decade of Action for Road Safety programme.

Objectives of the study

The research process was guided by the following objectives:

- to find out how much drivers know about the use of seatbelts ;
- to assess the knowledge of drivers about the seatbelt law; and
- to find out the attitudes of drivers towards the seat belt law.

Conceptual framework

It is important to situate research in literature so as to clarify key issues of the research and to provide new insights [8]. Similarly, this research focused on analysing seatbelt types and their uses.

Definition of seatbelts

A seatbelt, which is also called a safety belt, is a safety strap or harness designed to hold a person securely in a seat, as in a motor vehicle or aircraft [9]. The government of Zimbabwe defines a seatbelt as a harness or safety belt assembly that includes both a lap and diagonal strap [5]. In this research, a seatbelt is referred to as a device that can be used to strap oneself in a motor vehicle based on the notion that it is better to be 'strapped for life' than to be 'trapped' to death by ignorance of the value of seatbelts as per the analogy 'strapped' or 'trapped'.

Types of Seatbelts

There are four basic versions of seatbelts, namely Lap belt; Diagonal belt; Lap and Diagonal belt and the Full Harness [10]. Each of these types has its own strengths and weaknesses. The Lap belt is the simplest type, passing over the lap onto the floor. The wearer is restrained over the pelvis during an impact but the belt does not prevent the upper trunk from moving. The Diagonal belt is a belt that passes in front of the chest from the car roof or side pillar down to the floor. Ideally, this distributes the load over the chest during impact. In practice, the centre of gravity of the body is usually below the line of the belt and in a forward impact; there would be a tendency for the wearer to slide out from under the belt. In overturning accidents, this type of belt would provide little restraint and the head would strike the roof. Then there is the Lap and Diagonal belt that provides restraint in several directions. One of its advantages is that the danger of slipping out under the belt is eliminated [10]. This belt is sometimes referred to as the modern 'inertia reel' type combination. Last but not least, is the Full Harness that consists basically of two belts over the chest and shoulders and one belt over the lap. However, general limitations of this belt are that even in normal use, the 'take-up' buckle used for adjusting the slack can work itself loose and that the buckle can fly open when bumped against in an accident.

In Zimbabwe, vehicles should be fitted with safety belts of the lap and diagonal belt type [5].

Uses of seatbelts

In general, all the four types of seatbelts are known to prevent death and injury. However, the lap and diagonal type is considered to be the most basic but most effective type of seatbelt that can be used to get motorists 'strapped'

for life. The basis of the argument is that when used properly, research has shown that lap and diagonal belts reduce the risk of fatal injury to front-seat passenger car occupants by 45% and the risk of moderate-to-severe injury by 50% [3]. In general, injuries sustained when one is not wearing a seatbelt can be up to five times greater. This can be explained as follows: firstly when a car's sudden stop or turn is caused by a collision with an external object such as another car, this produces what is called the 'first collision'. Inertia then causes the driver's body to continue the car's motion until this body collides with objects inside the car such as the steering wheel, the dashboard or windscreen. It is this sudden and violent motion of the body that results in the 'second collision'. Then a 'third collision' occurs when the internal organs of the crash victim's body hit against the chest wall or skeletal structure [1]. The purpose of the seatbelt becomes that of minimising the effects of the 'second collision' which subsequently leads to the avoidance of the 'third collision' by providing something for the body to hit, which in this case is the seatbelt .The seatbelt then absorbs the shock of sudden deceleration and spreads the force of collision over the body parts that can easily take it. The collision that, ironically, is with the seatbelt, allows the occupant to ride down the accident so that the driver and vehicle obtain zero velocity at the same time. Admittedly, this can only happen to one who is 'strapped' to the car seat!

The proper use of seatbelts also ensures greater control of one's vehicle at sudden stops; control on quick turns; control under unexpected hazards and can act as a reminder to the driver that accidents can happen even to the most careful driver at the lowest of speeds. Also, therefore, there is need to minimise economic losses due to road accidents. These economic costs include wage losses, medical expenses, administration costs, property damage and employer costs; not forgetting the decline in quality of life to accident victims and their families [11].

As such, driver education on the benefits of being 'strapped' informs motorists of the consequences of their actions in the pre-crash phase.

Methodology

This study used a descriptive survey approach on the advice of [12] and [13], that the approach is suitable for investigating phenomenon such as knowledge levels and attitudes. The afore-mentioned authors argue that a well-planned and conducted survey enables a researcher to collect accurate information on what the situation is at the time of the research. A survey looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees [14]. Information for use in establishing the drivers' level of knowledge and attitudes was collected using a short structured interview schedule. The interviews were conducted at four large shopping locations in Harare, namely: Hatfield, Machipisa, Sam Levy and Marimba. The locations were conveniently chosen to be representative of Harare residents as per the four cardinal points of the compass, namely; Eastlea in the east, Hatfield in the south, Machipisa in the west and Sam Levy in the north. The survey candidates were selected conveniently as the researcher went from one available driver to the next over a period of four weeks. Each driver responded to a short structured interview schedule that lasted approximately six minutes. A total of forty-five (45) drivers were interviewed at each of these four shopping centres. The data that were collected were quantified and presented using tables that depicted the number of responses and percentages. Data pertaining to each research objective were treated separately in order to clearly show the extent of fulfilment of each of the research objectives.

Presentation of data and discussion

Objective one: to find out how much drivers know about the use of seatbelts

The responses to the level of knowledge on seatbelts were first tabled in a cluster to show the general level of knowledge of the respondents. The responses to each statement were then discussed separately.

Table 1: Level of seatbelt knowledge N=180

Statement	Frequency and percentage of correct responses	Frequency and percentage incorrect responses	Totals
Main function of seatbelts	109 (60.55%)	71 (39.45%)	180 (100%)
It is safer to be ejected in a car crash	82 (45.56%)	98 (54.44%)	180 (100%)
It is safer to be belted up even when the car catches fire	83 (46.11%)	97 (53.89%)	180 (100%)
Seatbelts should be worn all the time	108 (60.00%)	72 (40.00%)	180 (100%)

On the question of the main function of seatbelts: the majority of respondents knew the main function of seat belts since 109 (60.55%) drivers stated correctly that the main function of seat belts was to prevent the 'second' collision which is the major cause of injury and death when the body collides with objects in the vehicle such as the steering column. By contrast, 71 (39.45%) drivers were ignorant on the issue.

On the question of whether or not it is safer to be ejected when a crash occurs: A total of 82 (45.56%) drivers knew about the benefits of 'being strapped' in the car. By contrast, 98 (54.44%) drivers perceived that they would be 'trapped' and as such they would rather be thrown out of a crash vehicle. In most cases, wearing a seat belt prevents ejection from the vehicle [4]. As justification, [4] draws attention to the National Highway Traffic Safety Administration (NHTSA) statistics of 2006 which showed that 75 percent of drivers ejected during car accidents were killed in America. Regrettably, this type of data for Zimbabwe was not available to this study.

It was important to check the consistency and reliability of responses by asking the respondents to indicate their degree of knowledge regarding the need to wear seatbelts in specific cases of exteremely bad car crashes.

On the question of whether or not it was safer to have been belted up than not, even in a car accident that would result in a car catching fire or being submerged in water: The responses revealed that 83 drivers (46.11%) remained firm on being 'strapped' although earlier on, 109 drivers (60.55%) had indicated that they knew the main use of seatbelts. This apparent objection can be attributed to myths about seatbelts. Myths or misgivings arise from a lack of concrete and convincing information on an issue or facts [15], such as on the benefits of seatbelts. Some drivers felt that they would be 'trapped' in the car thereby effectively minimising any chances of escaping, whereas research shows that a driver who is wearing a seatbelt has a better chance of escaping death than a driver who is not 'strapped' even in a fire or water incident. When an accident is so bad that a vehicle catches fire, an unbelted driver is likely to be killed instantly whereas the one who is 'strapped' might be rescued, injured but still alive [16]. A total of 97 or 53.9% of survey candidates thought it was dangerous to use a seatbelt in those circumstances.

On the question of whether or not to wear seatbelts every time: As many as 108 drivers (60%) were inclined to wear seatbelts often. The other 72 drivers (40%) gave reasons such as: 'seatbelts are not necessary for low speeds; seatbelts are not for slow rural speeds; pregnant women need not be compelled to wear seatbelts; reversing should be exempted'.

The overall picture shown in Table 1 is that the average of the correct responses was 53.30% and this means that there is a seatbelt knowledge gap on the part of nearly half of drivers in Zimbabwe.

Objective 2: to assess the knowledge of drivers about seat belt law

Table 2: Level of knowledge on seatbelt law N=180

Statement	Frequency and percentage of correct responses	Frequency and percentage of incorrect responses	Totals
The legal seatbelt type for light motor vehicles	75 (41.67%)	105 (58.33%)	180 (100%)
Persons who are required to wear seatbelts by law	88 (48.89)	92 (51.11%)	180 (100%)
Persons and situations legally exempted from wearing seatbelts	49 (27.22%)	131 (72.78%)	180 (100%)
Maximum fine for not wearing a seatbelt	54 (30.00%)	126 (70.00%)	180 (100%)

On the question of the legal type of seatbelts for light motor vehicles: Only 75 drivers (46.67%) correctly identified the lap and diagonal type as opposed to 105 drivers (58.33%) who answered incorrectly. The implications are that drivers could install the 'wrong' type of seatbelts that is not mandated when replacing worn seatbelts. The lap and diagonal type has been found to reduce the risk of fatal injury to front seat motorists and is deemed to be the safest and most commonly used in cars, vans, minibuses, trucks and the driver's seat of buses and coaches [1].

On the question of persons who are required to wear seatbelts by the law: Eighty-eight (88) drivers, who represent 48.89% of the sample, responded correctly that it is mandatory in Zimbabwe for drivers and front seat passengers to be 'strapped'. Ninety-two drivers (51.11%) answered incorrectly displaying ignorance of this aspect of the road safety law.

On the question of legal exemptions: There were 49 drivers (27.22%) who correctly identified reversing situations and pregnant women as examples of situations and persons that were exempted by the seatbelt law. As many as 131 drivers (72.78%) gave incorrect responses, which is evidence of a low level of knowledge among most drivers. This implies that some drivers had to suffer the discomfort of seatbelts in ignorance such as when one is pregnant. However, it is important to note that modern

retractable lap/sash belts are not uncomfortable and the woman and baby are much safer if she wears a belt.

On the question of the legal maximum fine for not wearing seatbelts: As many as 126 drivers (70%) of the respondents answered incorrectly as compared to 54 drivers (30% of the respondents) who stated correctly that the maximum fine is twenty United States Dollars ($20). Ignorance of such law could render motorists vulnerable to corrupt elements among law enforcement agents who could extort more amounts of money than is stipulated. The irony of it is that whereas the penalty for a heinous offence such as rape is publicly known to be a minimum of eight years behind bars in a maximum security prison, the schedule of fines for the breach of traffic fines appears to be difficult to obtain. The researcher failed in his attempts to get the relevant document from the authorities and copies were unavailable for sale. The overall picture shown in Table 2 is that, on average the correct responses amounted to 36.94% indicating that there is a vast need for seatbelt knowledge among the respondents.

Objective 3: To find out the attitudes of drivers towards seatbelt law

On the question of attitudes towards the mandatory wearing of seatbelts: A total of 123 drivers (68.34%) stated that they were in favour of the seat belt law while 48 drivers (26.66%) were not. Those in favour of the law supported their position with reasons such as that seatbelts were useful in saving lives, with some drivers even testifying that they had survived road crashes because they heeded the seatbelt law and were 'strapped'.

Some of the drivers who expressed negative attitudes towards the seatbelt law cited the discomfort of seatbelts to pregnant women, thereby again exposing their ignorance about seatbelt wearing exemptions, as was shown earlier in Table 2. There were other respondents who perceived that seatbelts can be a hazard and that they would rather be thrown out of crash vehicles. These responses further served to reinforce the correlation between low levels of knowledge and subsequent negative attitudes indicative of feeling trapped in the analogy 'strapped' or 'trapped'.

Attitude to paying a fine for not wearing a seatbelt: Positive attitudes were recorded from 97 drivers (53.89%) while 71 drivers (39.44%) expressed negative attitudes about paying a fine for not wearing a seatbelt. The positive attitudes were supported with reasons such as: 'seatbelts save lives; a fine is a reminder and a lesson not to do it again; if you break the law you pay.' Negative attitudes were supported by reasons such as: 'seatbelts are a risk to drivers if a vehicle catches fire or falls into a dam; there is no need to be fined when you are reversing; police should just caution the driver; after all seatbelts are unnecessary; the fines vary so we do not know the correct amount to pay'.

The findings showed the existence of knowledge gaps among some drivers that underscores the need for adult education to engage drivers in a process to change and promote a culture of being 'strapped'. It is encouraging to learn that in America seat belt use is on the rise due to laws, education and technology. There has been an increase in seat belt use from 11% in 1981 to nearly 85% in 2010, saving hundreds of thousands of lives [17].

Attitude towards applying to the Minister of Transport for exemption from wearing a seatbelt: One hundred and one drivers (61.67%) disagreed with this section of the seatbelt law while 61 drivers (33.89%) agreed with the procedure; with eight drivers (4.44%) taking a neutral stand. The majority of the respondents cited the bureaucratic nature of the process that rendered it long and ineffective, especially in cases of emergency such as one involving the ferrying of a pregnant woman in a pickup truck. There were also those who stated that it was unnecessary for the Minister to be directly involved in matters of operations which the traffic police could directly and effectively handle at road blocks by conducting on-the spot visual assessments and interviews. Those in favour of this procedure were of the attitude that they trusted the law-makers who had made the law in the first place.

Table 3: Attitude to seatbelt law N=180

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Attitude to making the wearing of seat belts mandatory	104 (57.78%)	19 (10.56%)	9 (5.00%)	38 (21.11%)	10 (5.55%)	180 (100%)
Attitude to having to pay a fine for not wearing a seat belt	38 (21.11%)	59 (32.78%)	12 (6.67%)	36 (20.00%)	35 (19.44%)	180 (100%)
Attitude towards applying to Minister of Transport for exemption from wearing a seat belt	44 (24.44%)	17 (9.45%)	8 (4.44%)	23 (12.78%)	88 (48.89%)	180 (100%)

Indications were that either there were insufficient consultations with all the stakeholders before the enactment of this law or that the dissemination of the information was flawed, thereby creating this need for driver education.

Summary

Using a survey method and a short structured interview schedule that was administered on a convenient sample of 180 drivers in Harare, the study discovered that on average the Zimbabwean drivers possessed less knowledge on seatbelts (53.30%) than is available in books, journals and on the internet. When asked about information pertaining to seatbelt law that is contained in S.I. 247 of 1987 of the Road Traffic (Safety belt) Regulations, their general level of knowledge on the seatbelt law amounted to 36.94%. The study further established that almost half of the drivers had negative attitudes towards the seatbelt law. The DDC Instructors Guide that was last revised in 1979 has a narrow coverage of seatbelt content and is totally deficient of seatbelt law information.

Recommendations

The study recommends that the Zimbabwe government, through the Traffic Safety Council, should rewrite its DDC curriculum in order to improve the nature and form of seatbelt and seatbelt law information to increase drivers' knowledge and promote attitude change. Since a curriculum is not static, [18] argue that it must encapsulate the dynamic needs of individuals and those of the society, such as the learning and safety needs of Zimbabwe's drivers. Accordingly, the research recommends the inclusion of a session on seatbelts with the following sub-topics: History of Seatbelts; Seatbelt Use and Benefit; Seatbelt Facts versus Myths; The Road Traffic Safety Belt Regulations; and Community Mobilisation for 'Strapped for Life' Campaigns. The research also recommends that law-makers, road safety experts and adult educators should engage drivers in a consultative process since adults, by nature, need to participate in matters that affect them [19]. The researcher also recommends research in other related road safety education areas such as the legalisation and promotion of child restraints; and improved seatbelt law enforcement.

Conclusion

Based on these findings, the study concludes that some knowledge gaps exist with drivers regarding information on seatbelts and seatbelt law. In addition, many drivers hold negative attitudes towards the seatbelt law. The driver improvement programme's curriculum needs to improve in both content and scope. The Traffic Safety Council of Zimbabwe should champion initiatives to educate drivers and inform motorists on seatbelt and seatbelt law thereby promoting a culture of being 'strapped' for life.

The research also underscores the incompatibility of education initiatives and effective law enforcement for improved seatbelt usage. There is sufficient evidence to show that laws, education and technology have led to incredibly high user rates - 85 to 95% in some countries - thereby saving hundreds of thousands of lives [20]. Zimbabwe as a country and the Southern Africa Development Community (SADC) as a region can best learn from these success stories.

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Contributed articles

Reducing Rear-end Crashes with Cooperative Systems

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Abstract

This paper presents an evaluation of the effectiveness of a cooperative Intelligent Transport System (C-ITS) to reduce rear-end crashes. Two complementary simulation techniques are used to demonstrate the benefits of the C-ITS. Traffic (VEINS) and sensor (SiVIC) simulations use realistic data related to traffic and roads in Brisbane's Pacific Motorway; driver's reaction time; and injury severity to evaluate benefits. The results of our simulations show that C-ITS could reduce rear-end crash risk by providing several seconds of additional warning to drivers.

Keywords

Rear-end crashes, Cooperative ITS, Traffic simulation.

Introduction

Rear-end collisions represent approximately one-third of all reported crashes in Queensland and often result in injuries which have long-standing consequences [1]. These crashes constitute the third most common type recorded by police. Between 2000 and 2009, rear-end crashes cost the Queensland community $1.7 billion. Rear-end crashes often arise from a complex set of interacting factors including the roadway, environment (such as poor weather conditions), vehicle capability and road user factors [2].

Rear-end crashes are over-represented on roads with higher speed limits (70-90 km/h) [3]. Signalised intersections are also rear-end crash-prone areas due to the variability in drivers' braking behaviours during the signal change. Post-crash analyses have shown that inattention and distraction, from in-car and external sources, and a deterioration of driver alertness are associated with an increased risk of involvement in rear-end collisions [1, 4, 5]. Unsafe following distances have been identified as a contributing factor in between 10% and 66% [2] of rear-end crashes.

Several engineering, education and enforcement approaches have been used to curb rear-end related crashes. There are a plethora of ITS in-vehicle technologies such as Forward Collision Warning (FCW), which provide warning to the driver and performs emergency braking on behalf of the driver when a crash is imminent [1]. However the use of Cooperative-ITS (C-ITS) to prevent rear-end crashes have not been comprehensively evaluated. Most of the studies do not take into account human factors issues (e.g. reaction time) and limitation of wireless network reliability. Furthermore there is a lack of naturalistic on-road benefit assessment mainly due to limited market penetration of such devices. In this paper, we use relevant variables such as real traffic network (Brisbane Highway), real traffic data and driver's reaction time, in a traffic simulator (VEINS), to assess the benefits of cooperative systems.

C-ITS intervention assessment: general methodology

We use simulation to evaluate the safety benefits of C-ITS. Simulation is chosen over on-road experimentations