Towards Reducing the Dangers Associated with Road Traffic Accidents: Seat Belt Use and Explanatory Factors in the Accra Metropolis of Ghana

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Abstract

The paper presents empirical results from a cross-sectional survey of car users in the Accra metropolis, regarding their seat belt usage. Primary data was generated through direct road side observations simultaneously with short self-reported attitudinal surveys. The use of seat belt was observed to be impressively higher among surveyed drivers. Seat belt usage is a function of gender, age and levels of education of drivers. In addition, the vehicle usage type, driving location and driving times were critical determinants of seat belt use. The need to ensure drivers' personal safety and to comply with traffic regulations explain high seat belt use while discomfort and forgetfulness generally explain for non-use of seat belts. The paper cautions against complacency and suggests practical and effective strategies to continuously reduce the dangers associated with road traffic accidents.

Keywords: Seatbelt, Road side observations, Self-reported attitudinal surveys, Accra Metropolis, Ghana

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Introduction

An estimated 1.25 million lives are lost through road traffic accidents annually. By 2030, injuries from road traffic accidents will be the 7th major cause of death globally (WHO, 2016). In economic terms, road traffic crashes lead to an estimated USD 518 billion per annum (Peden et al., 2004; Jacobs et al., 2000). However, when seat belts are used consistently, traffic-related fatalities and injuries are reduced significantly (Popoola et al., 2013; Evans and Bloomfield, 2004; Cummings et al., 2003). In fact, the seat belt can save about 40-50% of front-seated and 25-75% of rear-seated car occupants respectively (Popoola et al., 2013; WHO, 2009). Seat belt use in the rich and industrialised countries of North America and Western Europe are generally high, with Routley et al., (2007) reporting compliance rates to be as high as 79% and 95% respectively for front and rear-seat car occupants.

Among the poor and non-industrialised countries, notably Africa, earlier studies have produced varied results. Olukuga and Noah (2005) report that as high as 81% of South African drivers are seat belt compliant, while in Nigeria the use of seat belt is very low; with Benin City recording 18.7% (Sangowawa et al., 2010), and 27.3% in Makurdi (Popoola et al., 2013). It is therefore not surprising that, with about 28.3 deaths per 100,000 people, Africa's traffic-related deaths remain the highest globally, even though the number of motor vehicles on the continent are relatively fewer. Also, studies have shown that about 1-3% of Africa's gross national productivity is used to cover accident-related costs (Peltzer, 2011; Peden et al., 2004; Odero et al., 1997).

As one of the many poor African countries, seat belt usage appears to be very low in Ghana, with earlier studies, including Densu and Salifu (2013) and Afukaar et al., (2010) concluding that only 18.6% and 17.6% respectively of drivers consistently buckled up in Kumasi – Ghana's second largest city.

Meanwhile, there are laws, notably, the Road Traffic Act of 2004 (Act 683) and the Road Traffic Regulations of 2012 (LI 2180) which mandate seat belt use by car users. Among other regulations, section 13 of Act 683, for instance, states:

A person of 18 years or above who:

a) Drives a motor vehicle on a road, or

b) Sits on the front or rear seat of a motor vehicle being driven on a road without wearing a seat belt *commits an offence* [emphasis mine] and is liable on summary conviction to a fine not exceeding 100 penalty units[1] or to a term of imprisonment not exceeding 6 months or to both.

Also, Section 119 of LI 2180 affirms the earlier provisions noted in the Act 683. Among others, it states:

a) A person shall not drive a motor vehicle, unless the motor vehicle is fitted with a seatbelt.

b) A person shall not drive a motor vehicle on a road or sit in the front or rear seat of a motor vehicle being driven on a road without wearing a seatbelt.

These laws, however, are seldom enforced (WHO, 2009), resulting in increasing road traffic deaths and injuries. For instance, between January and June 2017, road traffic accidents in Ghana resulted in 1059 deaths and 5997 injuries (National Road Safety Commission, 2017). This translates into a marginal increase by 2.4% (deaths) and 13.1% (injuries) compared to statistics tallied at the end of the first two quarters of 2016 (i.e. 1034 deaths and 5302 injuries respectively).

As indicated earlier, studies on seat belt use by motorists in Ghana seem to have been restricted exclusively in the Kumasi metropolis. Emphasising only the patterns of seat belt use, these earlier studies have not empirically and adequately explained the factors that account for the observed low seat belt use in the country. This leads to a gap in the existing body of literature that needs to be filled. Therefore, this present paper contributes to the existing body of literature by using evidence from Accra – Ghana's national capital which happens to be the most motorised, and recording the most road traffic deaths and injuries in the country. The relevance of this paper is further underscored by the fact that the findings could assist the government of Ghana, working through the Ministry of Transport and its allied agency –the National Road Safety Commission as well as other non-governmental agencies to come up with relevant, effective policies and strategies to implement the National Road Safety Strategic Plan (NRSS III).

[1] 1 penalty unit is equivalent of GHS 12 or USD 2.7 as at 25th April, 2018

The paper specifically focuses first, on the current level of seat belt use by drivers and second, the reasons for the use or non-use of seat belts. The sole focus on drivers and the explanatory factors behind the use of seat belt in this paper is justified by the fact that by engendering safe attitudes among drivers, which includes seat-belting, drivers could as well positively influence passengers to buckle up. Again, earlier studies have not empirically answered the 'why' question regarding seat belt use.

Methods and Materials

To ascertain motorists' compliance to seat belt use, primary data was collected at selected busy corridors in Accra (Ghana's capital since 1877) and home to about 2.3 million inhabitants as at 2015 (The CIA World Fact book, 2018). Drivers were purposefully selected at survey locations outside of the inner city (along the Liberation Road; between the University of Ghana and the Ghana Standards Authority office; the Lagos Avenue Road; from the Ghana Standards Authority office through the Emmanuel Eye Clinic area). Another survey was conducted with other motorists within the inner city, thus, along the Ring Road Central (i.e. between the Danquah Circle and the Police Headquarters). *see figure 1*

Reconnaissance surveys revealed that the selected study sites were normally characterised by heavy vehicular traffic, especially during peak hour travels.

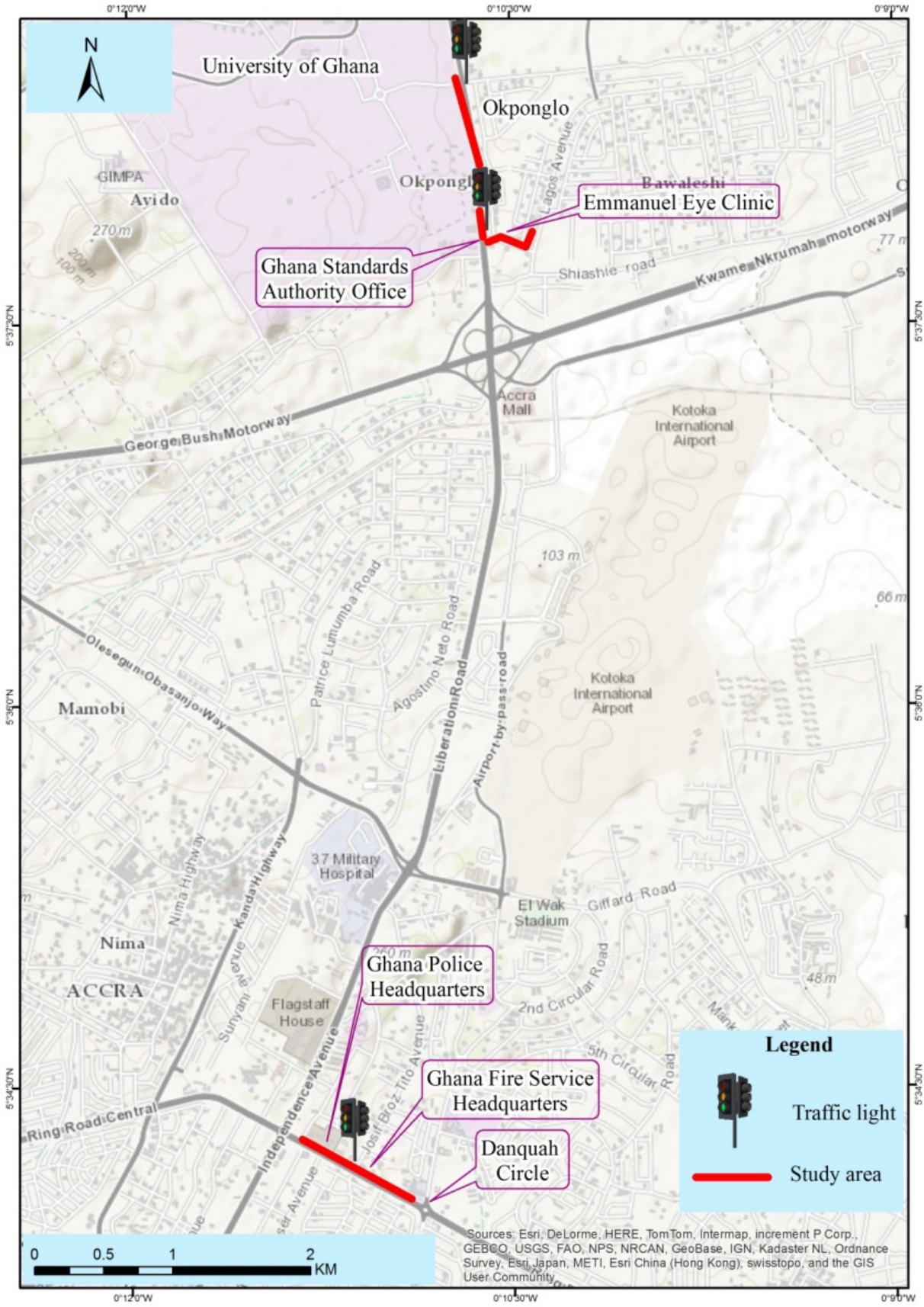

Figure 1: An annotated map of the study area

Data was again generated through direct roadside observations simultaneously with short self-reported attitudinal surveys. This is because while the former provides a less biased source of information on seat belt use (Afukaar et al., 2010; Eby et al., 2001; Li et al., 1999), the latter, on the other hand, provides insights into the personal characteristics of survey respondents and their attitudes towards seat belt use (following after Densu and Salifu, 2013; Christmas et al., 2008). Three days (i.e. 11th, 13th and 15th of April 2016) were earmarked for the field exercises.

Data was collected during the morning (06:00hrs-08:00hrs) and evening (17:00hrs-19:00hrs)—the peak periods—by final year students reading Transportation Geography at the University of Ghana under the direct supervision of the author. Formal instructions by the author, as well as practical in-house demonstrations with the students, ensured that the actual field interviews and observations took less time and resulted in higher participation by respondents, as has been cautioned by Popoola et al. (2013) and Odero (1996).

The observations generated data on seat belt use status of drivers. In addition, sampled drivers were interviewed with questionnaires on items such as their attitudes towards the safety of other passengers regarding their seat belt usage. Socio-demographic data on gender, age and education were also collected. The data was analysed using SPSS 18 software. The analyses include cross-tabulations to show variations in seat belt use according to vehicle classification, gender, age, level of education, survey location as well as trip periods. The Pearson's chi-square was used to test the statistical significance between seat belt use and these independent variables. The Odds Ratio was calculated using the Forced Entry Method in logistic regression analysis. This allows all the predictor variables to be tested simultaneously while controlling for multi-collinearity.

Results

Overview of Respondents

A total of five hundred and fifteen (515) cars were surveyed and their drivers interviewed. In terms of the vehicle types that were observed, the trotro[2] (39.2%) dominated. Trotros and taxis which serve as collective public transport for commercial purposes (70.9%) were found to constitute a majority percentage of the total sample. Majority of the survey respondents were

[2] Trotro (singular) or trotros (plural) is a local Ghanaian word, deriving its meaning from 'Three Pence', which used to be the public transport fares charged for commuting in Bedford 'mummy trucks' sometime back in the late 1950s and 1960s in GAMA (see Agyemang, 2015; Abane, 2011)

males (93.8%). The median age of surveyed drivers was 36 years. 'Young drivers', that is, those who were 36 years and below dominated the sample (55.9%). Most of the drivers (67.2%) had 'low' educational background. This means that their highest educational status is at the senior high school level (SHS). Drivers who had attained higher education at the tertiary level were in the minority. Drivers who were observed along the Lagos Avenue Road (42.9%) in Accra constituted a majority of the total.

Patterns of Seat Belt Compliance

Table 1 shows compliance level of seat belt usage by respondents. As high as 84.1% of drivers were observed to have buckled up their seat belts. Seat belt use among private car drivers was significantly ($p<0.05$) higher than commercial drivers. This notwithstanding, it is remarkable to note that as high as 81.6% of sampled commercial drivers use seat belts. Table 1 further shows a statistically significant relationship between gender and seat belt use ($p<0.05$); education and seat belt use ($p<0.05$) as well as trip periods and seat belt use ($p<0.05$). This implies that gender, level of education, together with the time (during the day) motorists drive significantly predict the use of seat belts or otherwise. Age of respondents and survey locations were however not found to be significant predictors of seat belt use.

Table 1: Observed seat belt use among selected drivers in the Accra metropolis

Descriptor	No. Observed	No. (%) belted	p-value
All Vehicles	515	433 (84.1)	
Vehicle classification			0.01
Commercial	365	298 (81.6)	
Private	150	135 (90.0)	
Gender			0.04
Male	483	402 (83.2)	
Female	32	31 (96.9)	
Age groups			0.65
Young	288	244 (84.7)	
Old	227	189 (83.3)	
Level of education			0.02
Low	346	282 (81.5)	
High	169	151 (89.3)	
Survey location			0.17
Inner City	168	136 (81.0)	
Outer City	347	297 (85.6)	
Trip periods			0.02
Morning	307	267 (87.0)	
Evening	208	166 (79.8)	

In order to identify subgroups that were less likely to use seat belts, person/vehicle characteristics (i.e. gender, age groups, education and vehicle classification) were regressed separately, while adjusting for travel characteristics (i.e. survey locations and trip periods). This was done basically to ascertain how the use of seat belt varies across these person/vehicle characteristics in the respective study locations and times of the day respondents were observed driving. The result is presented in Table 2.

Table 2: Logistic regression analysis of variables associated with observed seat belt use in Accra

Predictors	Subgroups	Study Site (Outer City)			Trip Period (Evening)		
		Odds ratio	P- value	95% CI (%)	*Odds ratio*	P-value	95% CI (%)
Vehicle classification	Commercial	*2.13*	**0.01****	1.20-3.78	0.58	**0.04****	0.33-0.98
	Private	0.58	0.35	0.18-1.84	0.96	0.95	0.29-3.23
Gender	Male	1.34	0.25	0.81-2.22	0.63	0.06	0.39-1.03
	Female	0.00	0.99	-	0.00	0.99	-
Age	Young	1.96	0.05	0.99-3.85	0.89	0.75	0.45-1.77
	Old	0.81	0.60	0.37-1.77	*0.45*	***0.03****	0.22-0.92
Level of education	Low	1.60	0.11	0.91-2.82	*0.50*	***0.02****	0.28-0.88
	High	0.46	0.25	0.13-1.70	1.72	0.37	0.53-5.54

Note: the reference categories for Study location and Trip period are 'Inner City' and 'Morning' respectively. **Significant at 5% level of significance

With respect to trip periods, drivers generally are less inclined to buckle up at night than in the morning. For instance, Table 2 shows that commercial vehicle drivers are 1.7 times less likely to buckle up in the evening than in the morning. Again, drivers who are aged 36 years and above were 2 times less likely to use the seat belt in the evening than in the morning. Also, drivers with low education background were 2 times less likely to buckle up in the evening than in the morning.

With respect to geographical location, outer city commercial drivers were two (2) times more likely to buckle up compared to their counterparts who drive in the inner city. This means that driving within inner city roads reduced the tendency to wear seat belts among surveyed commercial drivers.

Table 3: Driver's reasons for use or non-use of car seat belts

	Reasons	Frequency	Percent
Drivers in Seat Belt	Personal safety during accidents	347	54.6
	Adherence to the law on seat belt use	168	26.5
	Personal habit	47	7.4
	Prior conviction for violating law on seat belt	35	5.5
	Automatic prompters in vehicle	14	2.2
	Response to road safety campaigns on seat belt	13	2.0
	Significant others (e.g. family and peers)	5	0.8
	Influence of other drivers	5	0.8
	Driving over longer distances	1	0.2
	Total responses	635	100
Drivers not in Seat Belt	Lack of comfort when in seat belt	26	50.0
	Forgetfulness	10	19.2
	Fear of strangulation during accidents	4	7.7
	Perception of road being safe	4	7.7
	Faulty/non-availability of seat belts	3	5.8
	Lack of trust in safety and design of seat belts	2	3.8
	Presence of airbags in car	2	3.8
	Short trip distance	1	1.9
	Sheer disinterest in wearing seat belt	1	1.9
	Belief in God's protection against accidents	0	0.0
	Total responses	52	100

Table 3 shows results of the attitudinal survey on the part of respondents. Drivers who use seat belts did so to ensure their own survival during accidents (54.6%), and to avoid arrest and prosecution for non-adherence to the traffic regulations (26.5%). On the other hand, non-users of seat belts generally ascribed discomfort (50%) and forgetfulness (19.2%) as key factors for not buckling up.

Some non-users of seat belts were of the view that seat belts, instead of saving, could be the cause of death to their users and that, the roads were too safe to warrant buckling up. Strangely, none of the respondents thought religion had a part to play in their decision not to buckle up, even though Ghanaians are generally known to be religious.

Discussion

Though road traffic accidents are inevitable, it has been proven that consistent use of seat belt while driving can mitigate fatalities and serious injuries. In many poor countries, seat belt use by drivers is reportedly low, particularly among commercial drivers (Afukaar et al., 2010; Popoola et al., 2010; Kim and Yamashita, 2007). While acknowledging the fact that, the percentage use of seat belts among private car users is higher, facts also revealed that, over 81% of commercial drivers sampled in Accra buckle up, which is not only surprising but it happens to challenge previous reports. This may suggest that, perhaps, the concerted road safety campaigns rolled out by the National Road Safety Commission and efforts to ensure compliance with road safety regulations principally by the Ghana Police Service, through the Motor Transport and Traffic Department (MTTD) and the Visibility Unit, seem to be yielding results. Buttressing this claim, majority of drivers that comply to the use of seat belt cited road safety consciousness and fear of arrests.

The use of seat belts was lower among male drivers compared to female drivers. This is because females generally are risk-averse and have high-risk perception levels (Afukaar et al., 2010; SIRC, 2004; WHO, 2002; Mizell, 1997). This may influence their decision to consistently buckle up when driving compared to males. Commercial drivers and older drivers (i.e. those above 36 years), as well as drivers who are less educated were found to default in use of seat belts, particularly during the night.

Commercial drivers usually work for long hours under stressful conditions during the day. They may, therefore, be less attentive to observing basic road safety rules, including buckling up, since their primary focus could be just getting home to have a rest. The night is usually

associated with poor or reduced visibility; a situation that could hamper effective enforcement of seat belt laws by the security agencies. This may explain why non-compliant drivers to seat belt use in Accra 'simply forget' or were 'too tired' to buckle up.

Age is usually assumed to be associated with experience. Thus, while young drivers (i.e. those between 18-36 years) are generally known to be less experienced, underestimate traffic-related risks and indulge in sensation-seeking behaviours, which include less use of seat belts (Zhang et al., 2016; Afukaar et al., 2010; Rhodes & Pivik, 2011; Steinberg, 2008; Boyer, 2006; Deery, 1999; Brown & Groeger, 1988), one expects older drivers, by reason of the many years of driving experience, to be very much aware of traffic-related risks, and ensure that they are consistently buckled up when driving. However, a noteworthy observation made in this study is that of a reduced likelihood among older drivers to buckle up, particularly at night. Perhaps, older drivers, contrary to expectations, now overestimate their sense of 'being-in-control', therefore decide not to wear seat belts particularly at night when tiredness may have set in and when law enforcement is also generally minimal. Further studies are therefore needed to understand why this negative attitude is emerging.

The data also revealed that drivers with less formal education hardly use seat belt, similar to the study by Kulanthayan et al., (2004). Higher level of education usually translates into high salaried jobs, and the opportunity to buy newer cars with in-built safety prompters to make drivers buckle up. This could explain why seat belt usage among the less educated drivers is relatively low. It has been proven elsewhere in Ghana that "media popularization of seat belt use is generally low" (Afukaar et al., (2010, p. 287). The implication of this finding is that more efforts need to be done to adequately inform drivers, particularly the less educated on the need to stay safe through consistent use of seat belts.

Challenging earlier studies (Kulanthayan et al., 2004; Kim & Kim, 2003; Williams, et. al, 1996), this study discovered less use of seat belts among drivers within the inner-city. In the attitudinal survey, discomfort was cited as one of the constraining factors to the use of seat belt. Driving within the inner city of Accra is characterised by recurring traffic congestion with its associated heat, noise, and stress. Drivers may, therefore, take off their seat belts to minimise their perceived level of discomfort when stuck in traffic. Again, the slow movements could potentially make inner-city drivers lower their perception of risks to accidents such that seat belts are not needed any longer.

Conclusion

In a nutshell, this paper improves the body of existing knowledge by demonstrating that, contrary to earlier studies conducted in Kumasi-Ghana and in some other cities within the West African sub-region, seat belt use is remarkably high among drivers in Accra. The paper also found evidence to conclude that, among other reasons, the need to promote personal safety and comply with road traffic regulations are the principal factors which promote the use of seat belt. Policy actors responsible for the effective implementation of the Road Safety Strategic Plan (NRSS III) must therefore capitalise on these noteworthy gains by further encouraging more positive behaviour among drivers. To this end, the on-going public sensitization must be sustained through the media, unionised driver groups and door-to-door campaigns in public places of worship and social gatherings. Based on the findings of this study, it is recommended that, the public outreach on road safety must emphasise on the personal safety benefits drivers stand to derive through their consistent use of seat belts. Also, the threat of possible arrest for non-compliance with road safety regulations, including seat belt use, must be highlighted. Moreover, the campaigns must also specifically target low seat belt-wearing segments of the population, including male, commercial drivers, and inner-city drivers. Finally, the law enforcement agencies must be equipped with adequate lighting devices at night to improve visibility to aid their law enforcement activities.

This study acknowledges two basic limitations. First, data generated over a three-day period and only within the working days may not reflect the complete pattern of seat belt use in Accra. Future studies should explore use of seat belt during weekends; when social activities such as funerals and parties may produce a totally different pattern of seat belt usage among car users, compared to what have been reported presently. Also, the use of students, rather than professional data enumerators can introduce some errors in the primary data. However, in view of the extensive formal and in-house demonstrations conducted prior to the field survey, this limitation may not have significantly affected the quality of the data.

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References

Abane, A.M., (2011). Travel behaviour in Ghana: empirical observations from four metropolitan areas. Journal of Transport Geography 19, 313–322. http://dx.doi.org/10.1016/j.jtrangeo.2010.03.002

Act 683 (2004). Road Traffic Act, Republic of Ghana.

Afukaar, F.K., Damsere-Dery, J., & Ackaah, W., (2010). Observed seat belt use in Kumasi metropolis. *Journal of Prevention & Intervention in the Community*, 38(4), 280-289 DOI: 10.1080/10852352.2010.509020

Agyemang, E., (2015). The bus rapid transit system in the Greater Accra Metropolitan Area, Ghana: looking back to look forward. *Norwegian Journal of Geography* 69 (1), 28–37. http://dx.doi.org/10.1080/00291951.2014.992808.

Boyer, T.W., (2006). The development of risk-taking: A multi-perspective review. *Developmental Review* 26 (3), 291-345.

Brown, I.D., & Groeger, J.A. (1988). Risk perception and decision taking during the transition between novice and experienced driver status. *Ergonomics* 31, 585–97.

Christmas, S., Young, D., & Cuerden, R., (2008). "Strapping Yarn: Why People do and do not wear seat belts." Road Safety Research Report, 98, Department for Transport, London

Cummings, P., Wells, J.D., & Rivara, F.P. (2003). Estimating seat belt effectiveness using matched-pair cohort methods. *Accident Analysis & Prevention*; 35:143–149.

Deery, H.A. (1999). Hazard and risk perception among young novice drivers. *Journal of Safety Research*, 30 (4), 225-236. https://doi.org/10.1016/S0022-4375(99)00018-3

Densu, S. N., & Salifu, M., (2013). Attitudes towards seatbelts use in Kumasi, Ghana. *International Journal of Civil Structural Engineering Research* 2 (1), 1-15.

Eby, D.W., Kostyniuk, L.P., & Vivoda, J.M., (2001). Restraints use patterns for older child passengers in Michigan: 1984 to 1998. *Accident Analysis & Prevention*, 32, 235-242

Evans L. & Bloomfield, M.I., (2004). Traffic Safety, Science Serving Society, p. 1-18

Jacobs, G., Thomas, A. A., & Astrop, A., (2000). Estimating global road fatalities. Crowthorne, Transport Research Laboratory (TRL Report 445).

Kim, K., & Yamashita, E.Y., (2007). Attitudes of commercial motor vehicle drivers towards safety belts. *Accident Analysis Prevention*; 39:1097–106

Kim, S., & Kim, K. (2003). Personal, temporal and spatial characteristics of seriously injured crash-involved seat belt non-users in Hawaii. *Accident Analysis and Prevention Journal*, 35, 121-130

Kulanthayan, S., Law, T.H., Raha, A.R., & Radin, R.S., (2004). Seat belt use among car users in Malaysia. *IATSS Research*, 28 (1), 19-25, https://doi.org/10.1016/S0386-1112(14)60088-1

LI 2180., (2012). Road Traffic Regulations, Republic of Ghana

Li, L., Kim, K., & Nitz, L., (1999). Predictors of safety belt use among crash-involved drivers

and front seat passengers: Adjusting for over-reporting. *Accident Analysis Prevention* 31, 631-638.

Mizell, L., (1997). Aggressive driving. Washington, D.C.: American Automobile Association Foundation for Traffic Safety.

Nambisan, S.S., & Vasudevan,V., (2007). Is seat belt usage by front seat passengers related to seat belt usage by their drivers? *Journal of Safety Research* 38 (5), 545-555 https://doi.org/10.1016/j.jsr.2007.06.002

National Road Safety Commission (2017). Motor Accident Returns. Motor Traffic and Transport Department of Ghana Police Service, Accra.

Odero, W., Garner, P. & Zwi, A., (1997). Road traffic injuries in developing countries: A comprehensive review of epidemiological studies. *Tropical Medicine International Health*. 2,445-460.

Odero, W., (1996). Conducting a roadside survey of drivers in Kenya: Methods and experiences. *Health Policy Plan*, 11(3), 329–331. Oxford University Press.

Olukoga, A., & Noah, M., (2005). The use of seat belt by motor vehicle occupants in South Africa. *Traffic Injury Prevention*, 6(4), 398-400. PubMed PMID: 16266949.

Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A.A., Jarawan, E., & Mathers, C. (Eds.) (2004). World Report on Road Traffic Injury Prevention, World Health Organization,Geneva.http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/index.html (accessed 23.08.2016).

Peltzer, K., (2011). Chapter 35-Road use behaviour in Sub-Saharan Africa. Handbook of Traffic Psychology, 503-518. Academic Press. doi:10.1016/B978-0-12-381984-0.10035-9

Popoola, S.O., Oluwadiya, K.S., Kortor, J.N., Denen-Akaa, P., & Onyemaechi, N.O.C., (2013). Compliance with seat belt use in Makurdi, Nigeria: An observational study. *Annals of Medical and Health Sciences Research*, 3(3), 427–432. doi: 10.4103/2141-9248.117950.

Rhodes, N., & Pivik, K. (2011). Age and gender differences in risky driving: The roles of positive affect and risk perception. *Accident Analysis and Prevention*, 43 (3), 923-931. https://doi.org/10.1016/j.aap.2010.11.015

Routley, V., Ozanne-Smith, J., Li, D., Hu, X., Wang, P., & Qin Y., (2007). Pattern of seat belt wearing in Nanjing, China. *Injury Prevention* 13:388–93.

Sangowawa, A.O., Alagh, B.T., Ekanem, S.E., Ebong, I.P., Faseru, B., Adekunle, B.J, et al., (2010). An observational study of seatbelt use among vehicle occupants in Nigeria. *Injury Prevention*, 16,85–89.

Social Issues Research Centre (SIRC) (2004). Sex differences in driving and insurance risk: An analysis of the social and psychological differences between men and women that are relevant to their driving behaviour *www.sirc.org/publik/driving.pdf (accessed* 09.08.2016)

Steinberg, L., (2008). A social neuroscience perspective on adolescent risk-taking. *Developmental Review* 28 (1), 78-106.

The CIA World Fact Book (2018). Ghana: People and Society https://www.cia.gov/library/publications/the-world-factbook/geos/gh.html (accessed 25.04.2018).

Williams, A.F., Reinfurt, D., & Wells, J.K. (1996). Increasing seat belt use in North Carolina. *Journal of Safety Research* 27, 33-41.

World Health Organisation (WHO) (2016). Road traffic injuries. Geneva http://www.who.int/mediacentre/factsheets/fs358/en/ (accessed 19.08.2016)

World Health Organization (WHO) (2009). Global Status Report on Road Safety: Time for Action. Geneva www.who.int/violence_injury_prevention/road_safety_status/2009 (accessed 23.08.2017)

World Health Organisation (WHO) (2002). Gender and Road Traffic Injuries. Department of Gender and Women's Health. Geneva http://apps.who.int/features/factfiles/women/en/index.html (accessed 23.08.2017)

Zhang, L., Zhang, C., & Shang, L., (2016). Sensation-seeking and domain-specific risk-taking behaviour among adolescents: Risk perceptions and expected benefits as mediators. *Personality and Individual Differences*, 101, 299-305. doi: 10.1016/j.paid.2016.06.002