Seat Belt Survey Along Petroleum Training Institute Road (PTI -Road) Effurun, Delta State

Farouq A.U
Industrial Safety and Environmental Technology
Department
Petroleum Training Institute, Effurun
Delta State, Nigeria
fadoukan@gmail.com

Suru H.U
Industrial Safety and Environmental Technology
Department
Petroleum Training Institute, Effurun
Delta State, Nigeria
hsuru2000@yahoo.com

Abstract—Survey of seat belt compliance was carried out along PTI Road by using physical observation (counting) from PTI Junction to Alegbo Junction in Effurun Delta State targeted at Drivers, front seat and rear seat passengers on board any moving vehicles. In addition, 70 questionnaires were distributed, 51 were retrieved and analyzed. The data were analyzed using chi-square. The results revealed that 2001 persons were Drivers, out of which 1880 (93.95%) were in compliance and 121 (6.05%) non-compliance, 1671 of the persons were front seat passengers, out of which 901 (53.92%) were in compliance and 770 (46.08%) non-compliance. The rear seat passengers were 2661, out of which only 16 (0.60%) were in compliance and 2646 (99.40%) non-compliance. Average compliance for the entire survey (Drives, front and rear seats passengers) was 2797 (44.17%) compliance and 3536 (55.83%) non-compliance. The chi-square revealed chi-square statistic (4123.8408), the p-value <0.00001, coefficient of contingency C (0.627987); seat belts compliance was contingent upon the passenger seating position. The chi-square statistic (0.028); the p-value (0.998763), coefficient of contingency C (0.02342474); compliance with the use of seat belt was independent of Ages of the respondents. The chi-square statistic (0.0107); p-value (0.917616), result is not significant at p<0.05, 0.10 and 0.01. The coefficient of contingency C (0.014483): this implies that seat belt compliance was not contingent upon the passenger sex. The chi-square statistic (0.0713); p-value (0.99504); result was not significant at p<0.05. The coefficient of correlation C (0.03736); seat belt compliance was independent of occupational status. Finally, chi-square statistic (41.3388), p-value < 0.00001, coefficient of correlation C (0.3735), seat belts compliance was contingent upon the level of awareness and reasoning of passengers of the importance of seat belt buckling. It can be deduced that Drivers have the highest compliance of 1881 (93.95%) out of 2001 passengers, followed by Front seat passengers 901 (53.92%) out of 1671 passengers, while the Rear seat passengers have the least compliance of only 16 (0.06%) out of 2661 passengers. It is concluded that Seating positions and level of awareness or reasoning of seat belt importance were the major determining factors for Seat belt compliance in this study, while, Seat belt compliance was independent of age, sex and occupational status. It is recommended that research of this nature be carried out on the high way where the traffic pressures are higher than PTI Road.

I. INTRODUCTION

Road safety data in Nigeria is collected using crash templates at the scene of crash by road safety personnel on patrol, or upon receipt of a phone call at the toll-free emergency call Centre, or other forms of reporting to the agency or personnel. Police personnel also collect crash data during the investigation of a crash. In 2012, there were 13 262 reported road crashes, which caused the deaths of 6 092 persons, 1% more than in 2011. In 2013, there was a 2% increase in road traffic crashes, a 2% increase in injuries and a 6% increase in fatalities when compared with the 2012. Between 1990 and 2012, the number of fatalities decreased by 25%, while the number of people seriously injured increased by 73%. More recently (2000-2011), the number of fatalities decreased by 28.5% [1]. [2] examined the level of compliance with some basic road traffic regulations among commercial motorcyclists commonly called Okada riders in Samaru-Zaria in Northern Nigeria through structured questionnaire triangulated with observation and inspection. They found total (100%) compliance with minimum age limit, number plate registration and motorcycle engine capacity but found 64, 16 and 45 per cent compliance rate with driver license, crash helmet usage and legal passenger permissive respectively. Failure to wear a seat belt is one of the leading causes of road crash death. You are 10 times more likely to be killed in a road crash if you are not wearing a seat belt.1 The widespread use of seatbelts following legislation in the 1970s is regarded as having had a large and significant impact on the road toll, helping reduce this from over 3500 deaths in 1968 to around 2700 deaths per year 10 years later. Wearing a properly adjusted seat belt reduces the risk of fatal or serious injury by up to 50%. Statistics show that failure to wear a seat belt as a contributing factor in road crash deaths is at its

highest in 10 years. In Australia, approximately 20% of drivers and passengers killed in crashes (where seat belt use is known) are not wearing seat belts.3 On average around 150 people die nationally per year from this cause. Seat belt wearing surveys show that the wearing rates during normal driving are high with over 95% of drivers and front seat passengers using them. Back seat passengers have lower wearing rates (around 90%). Despite this, neglect for seat belts is still claiming lives [3]. Roadside observation methods were used to collect the data with teams of staff visiting each site. For the mobile phone survey, observations were made of drivers of cars, vans, taxis, Lorries, buses, minibuses and coaches. For the seat belt survey, observations were made of all occupants of cars, vans, taxis, private hire vehicles and lorries with observations of the driver only for buses, minibuses and coaches (Seat belt and mobile phone use surveys: Surveys took place in both morning (07:30 to 12:00) and afternoon sessions (13:30 to 18:00) with a half hour observation period every hour in each session. Sites were surveyed in half day sessions1 (either the morning or afternoon sessions). A number of sites were re-surveyed at the weekend so differences in mobile phone use or seat belt use between weekdays and weekends could be assessed [4]. A study on factors influencing the compliance behavior of seat belt use among cars conducted in Malaysia revealed that in terms of fatal road accidents, car drivers constitute about 9.0% and passengers 13.6% of fatalities. The major cause of car occupants' fatality in such accidents is head injuries, which consist of more than half (56.4%) of the fatalities. Thus restraining the head and body, the initial position is the most important injury control strategy for car users. The use of seat belts was deemed one of the most effective ways to reduce road accident fatalities in Malaysia and consequently the mandatory seat belt law was enforced in the early seventies [5]. A study by [6] evaluated a device that applied a sustained increase in accelerator pedal back force whenever drivers exceeded a preset speed criterion without buckling their seat belts. This force was removed once the belt was fastened. Participants were 6 commercial drivers who operated carpet-cleaning vans. The treatment was associated with an immediate sustained increase in seat belt compliance to 100%. Occasionally, drivers initially did not buckle during a trip and encountered the force. In all instances, they buckled within less than 25 s. Drivers indicated that they were impressed with the device and would not drive very long unbelted with the pedal force in place. The frequency of seatbelt usage and its related factors among drivers involved in a vehicle crash was studied. All crash profiles recorded in a province from March 2010 to March 2011 were reviewed. Data were analyzed using binary and multinomial logistic regression. Of a total of 1427 motor vehicle crashes, a seatbelt was used by 58.2% of drivers. In the univariate analysis, the following were significantly associated with seatbelt use: driver age, education, and occupation along with front seat

passenger's sex and seatbelt use, type and make of vehicle, speed, road surface condition, and type of road. Whereas in the multivariate model, the following remained significant: driver education, seatbelt use by front seat passenger, and type of road. Furthermore, a restraining seatbelt protected drivers from severe injury and death. Unbelted drivers were 7 and 17.4 times more likely to experience injury and death respectively than belted drivers. The seatbelt wearing rate among the study participants was much lower than the 90% rate reported among Iranian drivers in 2010 [7].

According to the Federal Road Safety Corps (FRSC) Nigeria, seat-belt use has been compulsory in front seats and rear seats since 1997; however, enforcement regarding the use of seat belts in front seats only started in 2002. Enforcement regarding the use of seat belts in rear seats will start in 2015 [1]. Hence, study to find out the level of Seat Belt compliance by motorists and passengers along PTI Road Effurun, Delta State, Nigeria became desirable.

II. METHODOLOGY

The study was carried out along PTI Road by using physical observation (counting) from PTI Junction to Alegbo Junction. This road was chosen because of its high traffic activities and proximity to Petroleum Training Institute Effurun. The observation was carried out between the hours of 8:00 am to 9:00 am and 5:00 pm to 6:30 pm for a period of 15 days from 1st to 14th November 2015. The month of November was chosen because of its high traffic activities very year. The observation was targeted at drivers, front seat and rear seat passengers on board any moving vehicle. The observation window was 30 minutes in the morning session and 1 hour in the evening session. In addition, 70 copies of structured questionnaires were distributed and a total of 51 were retrieved and analyzed. All the data were analyzed in according to [8] and MS Excel.

III. RESULTS

In total, 2100 vehicles were inspected; 6333 persons. A total of two thousand and one 2001 (31.60%) of the persons inspected were Drivers, out of which (1880 (93.95%)) were in compliance and 121 (6.05%) non compliance. 1671 (26.39%) of the persons inspected were front seat passengers, out of which 901 (53.92%) were in compliance and 770 (46.08%) non-compliance. Whereas the rear seat passengers inspected were 2661 (42.02%), out of which only 16 (0.60%) were in compliance and remaining 2645 (99.40%) non-compliance. Total of two thousand seven hundred and ninety-seven passengers (Drives, front and rear seats passengers) 2797 (44.17%) were in compliance and the remaining three thousand five hundred and thirty-six 3536 (55.83%) non-compliance

(Table I.).

Table I: Survey on Seat Belt Compliance in 2100 Vehicles by Sitting Position

Sitting Position	No. of persons	% Part of Total	Compliance	%	Non – compliance	%
Driver	2001	31.60	1880	93.95	121	6.05
Front Seat	1671	26.39	901	53.92	770	46.08
Rear Seat	2661	42.02	16	0.60	2645	99.40
Total Persons	6333	100.00	2797	44.17	3536	55.83

Hypothesis – I

The null hypothesis Ho, is seat belt compliance is independent of passenger seating position in the vehicle.

Table I (a): Contingency table

Compliance	Seating Positions			Total
	Driver Seat	Front Seat Passenger	Rear Seat Passenger	
Yes	1880	901	16	2797
No	121	770	2645	3536
Total	2001	1671	2661	6333

The chi-square statistic is 4123.8408, the p-value is <0.00001, hence the result is significant at p<0.05. The coefficient of contingency C is 0.627987; The 0.05 critical value was obtained using Excel to be 5.991465, since the chi-square statistic exceeded the 0.05 critical value, there is a degree of relationship, association or dependence of seating positions to compliance with the use of seat belt. Hence, the hypothesis; Ho of independence was rejected and it was concluded that, seat belts compliance was contingent upon the passenger seating position.

Table II: Seat Belt Survey Questionnaire Results by Age of Respondents (n = 51)

Age	No. Of Persons	Yes	No	% Compliance	% Non-Compliance
20-30	21	11	10	42.31	40.00
31-40	20	10	10	38.46	40.00
41-50	8	4	4	15.38	16.00
51-60	2	1	1	3.85	4.00
Total	**51**	**26**	25	**100**	**100**

Total of fifty-one questionnaires were retrieved from respondents and analyzed as in table II above. The largest population by age was 21 persons, 11(42.31%) of the respondents of the ages of 20 - 30 years were in compliance, second largest was 20 persons 10 (38.46%) of the respondents of the ages of 31 – 40 years were in compliance; 8 of respondents were between the ages of 41 – 50, out which only 4 (15.38%) were in compliance and 2 respondents of the ages between 51 – 60 years old, out of which 1 (3.85%) was in compliance.

Hypothesis – II

The null hypothesis Ho, is seat belt compliance is independent of passenger Ages.

Table II (a): Contingency Table on Ages

Compliance	Ages				Total
	20-30	31-40	41-50	51-60	
Yes	11	10	4	1	26
No	10	10	4	1	25
Total	21	20	8	2	51

From the contingency table II (a), the chi-square statistic is 0.028; the p-value is 0.998763. The result is not significant at p<0.05. The coefficient of contingency C is 0.02342474. The 0.05 critical value is 7.814728. Since the chi-square statistic was less than the 0.05 critical value and very small coefficient of contingency, compliance with the use of seat belt is independent of Ages of the respondents. Hence, the hypothesis; Ho of independence was accepted and it was concluded that, seat belts compliance was not contingent upon the age of the passenger.

Table III: Seat Belt Survey Compliance by Sex of Respondents (n = 51)

Sex	Population	Yes	% compliance	No	% non compliance
Females	18	9	17.65	9	17.65
Males	33	17	33.33	16	31.37
Females & males	51	**26**	50.98	**25**	49.02

Out of the 51 respondents, 26 (50.98%) were in compliance, while 25 (49.02%) were non-compliance. And out of the 26 respondents in compliance, 9 of them (17.652%) were females and the remaining 17 (33.33%) were Males. Out of 25 respondents in non-compliance, 9 (17.65%) were females, while 16 (31.37%) respondents were males. It can be deduced that the male respondents have higher compliance percentage than the females (table III).

Hypothesis – III

The null hypothesis Ho is; Seat belt compliance is independent of passenger sex.

Table III (a): Contingency Table on Sex of Respondents

Compliance	Sex of Respondents		Total
	Females	**Males**	
Yes	9	17	26
No	9	16	25
Total	18	33	51

The chi-square statistic is 0.0107; p-value is 0.917616. The result is not significant at $p<0.05$, 0.10 and 0.01. The coefficient of contingency C is 0.014483: the 0.05 critical values is 3.8415, this implies that there is very small degree of relationship, association or dependence of sex on compliance with the use of seat belt. Hence, the null hypothesis; Ho of independence was accepted and it was concluded that, seat belts compliance was not contingent upon the passenger sex.

Table IV: Seat Belt Compliance by Status of Respondents (n = 51)

Occupation/ Status	No. Of Persons	% Part of Population	Yes	% Compliance by Status	No	% Non - Compliance by Status
Students	18	35.29	9	34.62	9	36.00
Business	11	21.57	6	23.08	5	20.00
Worker	18	35.29	9	34.62	9	36.00
Private	4	7.84	2	7.69	2	8.00
Total	51	100	26	100.00	25	100.00

The results extracted from the questionnaire based on the status of the respondents revealed 70.58% of the total respondents were Students and workers, each having (35.29%) and total of 36 respondents. Whereas, (34.62%) compliance each, and (36.00%) non-compliance for Students and Workers; followed by Business people (23.08%) compliance and (20%) non-compliance, while the least percentage compliance of (7.69%) and (8.00%) non-compliance was recorded under Private respondents as shown in table IV above.

Hypothesis – IV

The null hypothesis Ho, is Seat Belt compliance is independent of passenger occupational status.

Table IV. (a): Contingency Table on Occupational Status of Respondents

Compliance	Occupational Status				Total
	Students	**Business**	**Workers**	**Private**	
Yes	9	6	9	2	**26**
No	9	5	9	2	**25**
Total	18	11	18	4	**51**

The chi-square statistic is 0.0713; the p-value is 0.99504; the result is not significant at $p<0.05$. The coefficient of correlation C is 0.03736 and the 0.05 critical value is 7.814728. The null hypothesis cannot be rejected. It is concluded that seat belt compliance was independent of occupational status.

Table V: Seat Belt Survey Results Compliance by Reasoning

Reason for Complying	Yes	% Compliance	No	% Non - Compliance	Total %
Protection	18	35.29	33	64.71	100.00
Law	4	7.84	47	92.16	100.00
Comfort	4	7.84	47	92.16	100.00
Reduce injury	28	54.90	23	45.10	100.00
Reminded by driver	18	35.29	33	64.71	100.00

From table V above, total of 18 (35.29%) out of 51 respondents were in compliance because they believed seat belt as a means of protection, while 33 (64.71%) do not believe seat belt as means of protection. Only 4 (7.84%) respondents were aware there is law enforcing use of seat belt, while 47 (92.16%) do not know or they claimed not to know. Total of 4 (7.84%) respondents wore seat belt because of being comfortable when buckled up, while 47 (92.16%) were not comfortable when they buckled up. The survey revealed 28 (54.90%) out of 51 respondents believed seat belts can reduce or minimize injuries, while 23 (45.10%) do not believe seat belt can reduce injuries in case of accident. Total of 18 (35.29%) out of 51 respondents were reminded Driver to buckle up, while 33 (64.71%) out of the 51 respondents were not reminded by the Driver to buckle up their seat belts.

Hypothesis – V

The null hypothesis Ho, is Seat Belt compliance is independent of passenger level of awareness of the importance of buckling the seat belts.

Table V (a): Contingency Table on Reason of Respondents for Compliance

Compliance	Reason For Compliance					Total
	Protection	Law	Comfort	Reduce Injury	Reminded by Driver	
Yes	18	4	4	28	18	72
No	33	47	47	23	33	183
Total	51	51	51	51	51	255

The chi-square statistic is 41.3388. The p-value is < 0.00001. The result is significant at $p < .05$. The coefficient of correlation C is 0.3735 and the 0.05 critical value is 9.48773. Since the chi-square statistic exceeded the 0.05 critical value, there is a degree of relationship, association or dependence of the level of awareness of the passengers of the importance of buckling seat belt. Hence, the hypothesis; Ho of independence was rejected and it was concluded that, seat belts compliance was contingent upon the level of awareness and reasoning of passengers of the importance of seat belt buckling.

IV.   DISCUSSION

This research revealed that passenger seating position has a lot of bearing towards compliance with the use of seat belts among motorists. It was discovered in this research that Drivers have the highest compliance percentage with the use of seat belt (93.95%) which compares favorably with 98.2% Driver compliance in England and Scotland [4]. This compliance in Drivers was much higher than 52.3% in Benin Edo State [9]. The likely reasons for the high percentage compliance by Drivers could be the fact that majority of the motorists surveyed were from some of the corporate transportation companies along PTI Road Effurun, hence, most of them were well informed of the dangers of not wearing seat belts and they do receive pep talk about road safety and journey management every morning; and to the fact that Federal Road Safety Corps officers used to be on the major highways to enforce the use of seat belts.

The front seat passenger compliance of 53.92% and that of rear seat which was abysmally very low (0.60%) were very much lower than the Seat belt wearing rates of 96.7% of all front seat passengers and 90.6 % of all rear seat passengers using seat belts or child restraints in England and Scotland [4].
Forty-seven 47(80.39%) out of the 51 respondents to the questionnaire were between the ages of 20 to 40 years old, which comprises students, businessmen and workers. This could be as a result of their safety awareness. Most of the students among them were students from Petroleum Training Institute, hence their safety consciousness.

Survey by [10] indicated 88% of Drivers and 91% of Passengers use seat belts. It should be noted that New Jersey is a "primary enforcement law" state and motorists can be pulled over by the police and ticketed simply for not using their seat belts. If Nigeria will key in to this, enforcement should be adopted in order to improve on the general compliance of all the passengers. The 2007 use rate for all motorists (both drivers and front seat passengers) was slightly below the rate of 91% reported for the State of New Jersey in 2007 [10].

V. CONCLUSION

The survey revealed a general compliance of 2797(44.17%) compliance and 3536(55.38%) non-compliance out of total of 6333 passengers. The survey further revealed that drivers have the highest compliance of 1881 (93.95%) out of 2001 passengers, followed by Front seat passengers 901 (53.92%) out of 1671 passengers, while the Rear seat passengers have the least compliance of only 16 (0.06%) out of 2661 passengers.

It is concluded based on the chi-square that Seating positions and level of awareness or reasoning of seat belt importance were the major determining factors for Seat belt compliance in this study, while age, sex and occupational status were not statistically associated with Seat belt compliance.
It is recommended that research of this nature be carried out on the high way where the traffic pressures are higher than PTI Road.

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