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Effect of Safety Education Intervention on Knowledge of Road Accident Prevention among Drivers in Lagos State, Nigeria

Kayode V. Fowode[1], Ify L. Nwaogazie[2*], Brilliance O. Anyanwu[3]

[1]Centre for Occupational Health, Safety and Environment, University of Port Harcourt, Port Harcourt, Nigeria
[2]Department of Civil & Environmental Engineering, University of Port Harcourt, Port Harcourt, Nigeria
[3]Department of Environmental Health Sciences, College of Health Sciences, University of Sharjah, Sharjah, United Arab Emirates
Email: *ifynwaogazie@yahoo.com, ifeanyi.nwaogazie@uniport.edu.ng

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Abstract

The aim of this study is to assess the impact of safety education intervention on knowledge of road traffic accident prevention among drivers in Lagos State, Nigeria. This study adopted a pre-test and post-test quasi-experimental research design. A purposive sampling technique was adopted to select a total of 384 commercial drivers in Lagos State, to whom the questionnaires were served. Questionnaires were administered and retrieved before the safety training was conducted, and post-test was conducted thereafter. A response rate of 87.76% was obtained for 384 questionnaires distributed to drivers. Descriptive statistics, Analysis of Variance (ANOVA) and Pearson Correlation were carried out. Mean score of 2.50 was used as a criterion to accept or reject results. The results indicate that safety education had a positive impact on the knowledge of preventive measures for road traffic accident. It is recommended amongst others that; further measures should be developed to educate and enlighten commercial drivers on how they can comfortably avoid Road Traffic Accidents (RTAs).

Keywords

Road, Accident, Traffic, Knowledge, Safety Education, Intervention

1. Introduction

Every profession carries risks, albeit some are greater than others. One of the most dangerous jobs is driving. In developing nations such as Nigeria, adherence to safety practices has been a challenging issue. Road Traffic Accidents (RTAs) are a major cause of morbidity and mortality worldwide, but especially in low- and middle-income countries. The World Health Organization (WHO) esti-

mated that 1.17 million deaths occur each year worldwide due to road traffic accidents. A breakdown of the figure indicates however, that about 70 percent of the deaths occur in developing countries.

The increased rate of fatal road traffic accident worldwide has been attributed to population explosion and increased motorization. Moreover, there are noticeable side costs associated with road crashes including economic costs of lost, human cost, medical cost and insurance expenses [1]. According to [2], a loss of approximately 3% of Gross Domestic Product (GDP) is associated with RTAs. RTAs have emerged as a global health problem and are the ninth leading cause of global mortality, claiming over 1.2 million lives each year [3].

RTA constitutes the most serious problem to traffic and personal safety on the highways. It is predicted that by 2030, RTAs will become the seventh leading cause of death globally [4]. Road deaths and injuries despite being largely preventable are massively wasteful, destroying lives beyond those of the actual victims, limiting future productivity and draining money from economies. The current deficit and losses from road traffic crashes, including spending on road traffic related events have reduced the funds available to national governments for other sectors like health service and education [5].

In Nigeria, road transport is the dominant mode of movement for both freight and passenger traffic. The consequential effect of the negative externalities of transport is accident with its attendant injuries and fatalities capable of neutralizing its social and economic benefits if not well managed. Traffic fatalities from automobile crashes have been known to be high in developing countries in which Nigeria constitutes an integral part despite the much lower vehicle ownership in relation to population strength [6]. The incident has become a very disturbing phenomenon and the country is presently ranked among the world's highest.

As published by [7] more than 11,800 road traffic casualties were reported in Nigeria during the fourth quarter of 2021. Of those, around 10.2 thousand were injuries, while 1.7 thousand were registered deaths. In the previous quarter, approximately 8.8 thousand injuries and 1.4 thousand deaths, both resulting from road traffic crashes, were counted in the country. These human factors include speeding or driving too slowly, intoxication, drug use for either therapeutic or recreational purposes, fatigue, and impaired vision. Drivers' knowledge of their health status and safety on the road is correlated with these human characteristics [8]. Another related RTA studies with respect to the degree of knowledge and adherence to the recommended safe practice for driving and the risk of road traffic accidents among people with diabetes mellitus in Armenia is reported by [9].

Even while medical fitness is frequently conducted, incidentally, drivers, especially those in developing countries, may not be aware of the need for routine fitness testing [10]. Commercial drivers are not aware of how crucial fitness is to preserve a culture of safe driving. According to [7], this is because there is no law governing a driver's fitness in Nigeria, not enough public awareness of the value of a healthy driver, and insufficient enforcement of the highway code's requirements for a visual examination before issuing a license. Poor behavior will most

likely result from this ignorance.

Safety education is one of the pillars of road safety strategies and solutions for increasing road safety. In almost every country in the world road safety education is, to a certain extent, part of formal education system. It is also a constituent part of initiatives, programs and activities outside the formal education. The ultimate goal of road safety education is to reduce the number of crashes and casualties. [1] and [7] confirmed that an urgent action is needed to achieve the target for road safety as reflected in the newly adopted 2030 Agenda for sustainable development (goal 3 and 11) and reducing the global death and injuries from road traffic crashes by half by 2030.

The concept of road safety education has been found to be an important construct in driver education intervention [11]. Drivers' education programme is not only about teaching drivers how to drive but also aimed at developing appropriate behavior, attitudes and decision-making skills to enable them manage road traffic situation in a responsible and safe way to reduce road accident [12].

1.1. Statement of Problem

Despite the efforts of the concerned government agencies and parastatals in the fight to reduce the occurrences of road traffic accident in Lagos State, these efforts seemed not to be yielding the desired outcome as there continue to be accident cases within the state. Could this outcome be as a result of ineffective strategies adopted in the road safety education? Could there be other factors affecting the effectiveness of the safety education programmes for commercial drivers? What other strategy can the agencies involved use to mitigate these accidents occurrences? Is the current method of safety education effective? What other method can be used to educate drivers on road safety? In light of this, the researcher seeks to assess the impact of safety education intervention on knowledge towards road traffic accident prevention among drivers in Lagos State, Nigeria.

1.2. Aim of the Study

The aim of this study is to assess the impact of safety education intervention on knowledge of road traffic accident prevention among drivers in Lagos State, Nigeria. The following objectives have been stated:

1) To determine the knowledge of accident preventive measures before safety education.

2) To assess the knowledge of accident preventive measures after safety education.

3) To ascertain if there is a relationship between Awareness of accident prevention before and after safety education.

1.3. Hypothesis

Null Hypothesis, H01: Safety education has no significant influence on their knowledge of road traffic accident preventive measures.

2. Research Methodology

2.1. Research Design

This study adopted a pre-test and post-test quasi-experimental research design to determine the impact of safety education intervention on knowledge towards road traffic accident prevention among drivers in Lagos State, Nigeria. A quasi-experimental design often described as non-randomized control group pre-test & post-test intervention studies with the attribute of both experimental and non-experimental were used for this study.

2.2. Study Area

According to the 2006 census conducted by the National Population Commission (NPC) [13], Lagos has a population of over nine million, as against national population estimate of over 150 million. The population growth has a rate of about 600,000 per annum, with a density of approximately 4193 persons per sq. km in the urban areas of the Lagos metropolis. The average population density is over 20,000 people per sq·km.

The popular Oshodi bus station and Mile 2 bus stop were the site locations in Lagos. Lagos, which doubles as a port and "business" city, was Nigeria's second capitaltill 1991 after Calabar the first capital. Lagos State generates 25% of Nigeria's total Gross Domestic Product (GDP).

Lagos States was chosen as a case study area (see **Figure 1**), due to the numbers and volume of motor vehicles especially where commercial buses are a model of transportation, the pattern of population and the increase in exposure to the risk in road traffic safety which was termed "societal benefit and societal cost" [14].

2.3. Population of the Study

The participants for this study included commercial drivers in Lagos State, all of whom gave their consent before the start of the study. The sample was composed of participants, ranging in age from 19 to 55 years old. Participants' years of driving experience and education level were taken.

2.4. Sample and Sampling Techniques

The sample size of 384 was selected using Fishers' sample size determination [15]. Because the population of drivers in Lagos State is unknown, P was taken as 50% (maximum variability). Furthermore, the study desired a 95% confidence level and ± 5% precision (margin of error). The calculation of the sample size gave the minimum sample size of 384 drivers needed for the survey. The Fisher's equation is given in Equation (1).

$$N = \frac{Z^2 p(1-p)}{T^2} \tag{1}$$

where N = Sample size; Z = the abscissa of the normal curve that cuts off an area α at the tails, (1 – α) = the desired confidence level (*i.e.*, 95%); T = Tolerance

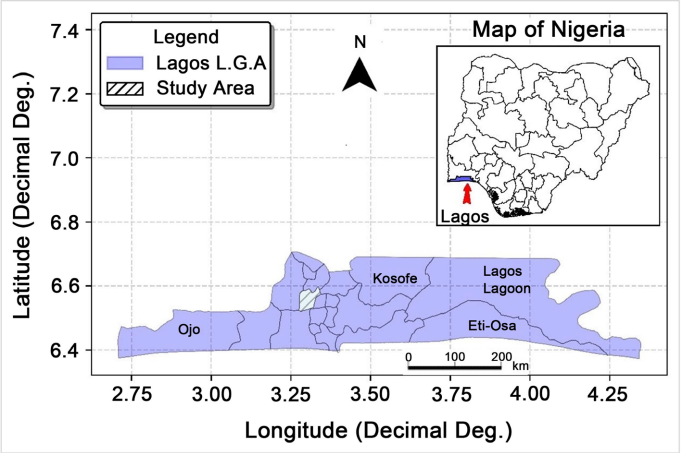

Figure 1. Map of study area.

error (or the desired level of precision)was taken to be 5% (0.05); and p = Estimated Proportion of an attribute that is present in the population without considering the finite population correction factor (fpc), herein taken as 50%.

Thus, N:

$$N = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2}$$

$$N = \frac{3.8416 \times 0.25}{0.0025}$$

$$N = \frac{0.9604}{0.0025}$$

$$N = 384.16 \sim 384$$

2.5. Data Collection and Quality Control

Questionnaires were administered and retrieved before the safety training was conducted (Pre-test). The same questionnaires were administered four weeks after the training (Post-test). This method was used taking into consideration the drivers' educational background and their inability to read English thereby necessitating the use of Pidgin English in interpreting the questionnaires. Data were collected in two phases; through the pre-test and post-test questionnaires.

The pre-test questionnaires were administered to the drivers after the purpose of the study has been explained to the respondents and retrieved immediately with the assistance of two safety officers trained for this task. The safety education intervention was conducted after the pre-test, while the same questionnaire was re-administered four weeks after (Post-test).

A total of three hundred and eighty-four (384) questionnaires were distributed to the sampled drivers for the study. All the questionnaires were filled and returned to the researcher. However, after collection and assessment of the returned questionnaires, only three hundred and thirty-seven (337) questionnaires were correctly completed for analysis which gave a response rate of 87.76%.

2.6. Data Analysis

Data were analyzed by using the statistical software XLSTAT 2016. First, descriptive statistics was carried out to determine the mean score, frequencies, standard deviation & skewness. Furthermore, the inferential statistics included analysis of variance (ANOVA) and Pearson correlation analysis, for the purpose of determining relationships amongst the variables.

3. Results

3.1. Demographic Distribution of Participants

Figure 2 displays the demographic distribution of the drivers sampled in the study. There are four segments of Figures 2(a)-(d). Figure 2(a) presents age brackets against number of drivers; while Figure 2(b) gives a distribution of the range of years of driving experience against number of drivers. Next, is Figure 2(c) that presents the distribution of the age brackets of drivers against level of education, (*i.e.*, primary education, secondary education and no formal education, respectively); and Figure 2(d), presents the distribution of age brackets of drivers against number of years of driving experience.

3.2. Research Objectives

3.2.1. Knowledge of Accident Preventive Measures before Safety Education

Table 1 displays the items developed to measure the knowledge of the respondents on accident preventive measures before safety education was carried out on them. Eight (8) items were developed, only one out of the eight developed items tested above the mean criterion mark of 2.50. Item one determined if training of drivers can help prevent road traffic accidents and it had a mean score value of 2.06 which was less than the mean criterion mark of 2.50. It was rejected. Item two sought to know if the provision of good road can prevent accident from happening and it had a mean score value of 2.28 which was less than the mean criterion mark of 2.50. It was rejected. Item three assessed if enforcement of traffic rules and regulations is an accident preventive method. This item had a mean score value of 2.18 which was less than the mean criterion mark of 2.50. It was rejected. Item four ascertained if wearing of seat belt before driving is an accident preventive method and it had a mean score value of 2.39 which was less than the mean criterion mark of 2.50. It was rejected. Item five measured if the awareness of road traffic hazards can help reduce accidents from occurring and it had a mean score value of 2.20 which was less than the mean criterion mark of 2.50. It was rejected. Item six ascertained if accident may not happen if the road is free from obstruction. This item had a mean score value of 2.26 which was less than the mean criterion mark of 2.50. It was rejected. Item seven measured to know if maintaining the car in good condition can help prevent accident from occurring. This item had a mean score value of 3.22 which was more than the mean criterion mark of 2.50. It was Accepted. Item eight

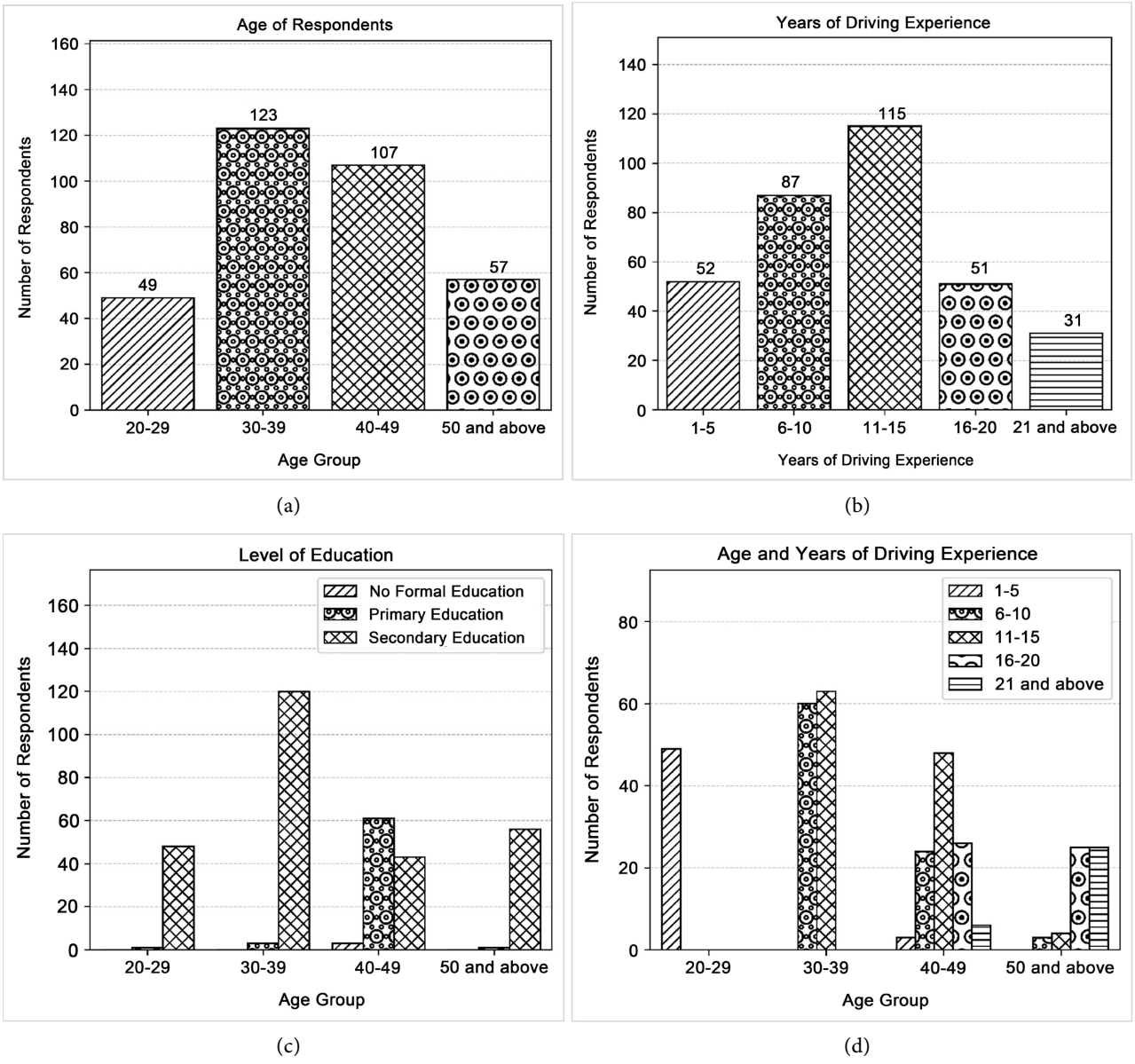

Figure 2. (a) Age of respondents; (b) Years of driving experience; (c) Level of education; (d) Age and years of driving.

Table 1. Knowledge of accident preventive measures before safety education.

S/N	Knowledge of Accident Preventive Measures	SA+	A	D	SD	Mean	Remark
1	Training of drivers can help prevent road traffic accident	9	3	324	0	2.06	Rejected
2	Provision of good road can prevent accident from happening	45	3	288	0	2.28	Rejected
3	Enforcement of traffic rules and regulations (e.g. speed limits) is an accident preventive method	27	6	303	0	2.18	Rejected
4	Wearing of seat belt before driving is an accident preventive method	7	117	210	0	2.39	Rejected
5	Awareness of road traffic hazards can help reduce accidents from occurring	30	6	300	0	2.20	Rejected

Continued

6	Accident may not happen if the road is free from obstruction	36	15	285	0	2.26	Rejected
7	Maintaining the car in good condition can help prevent accident from occurring	201	9	126	0	3.22	Accepted
8	Not driving under the influence of drugs and alcohol can help prevent accident from happening	60	3	270	0	2.38	Rejected
	Mean score					**2.37**	**Rejected**

[+]SA = Strongly Agree (weighting, W_{SA} = 4); A = Agree (W_A = 3); D = Disagree (W_D = 2); & SD = Strongly Disagree (W_{SD} = 1). Thus, mean of cumulative weighting = (4 + 3 + 2 + 1)/4 = 2.5.

determined if not driving under the influence of drugs and alcohol can help prevent accident from happening. This item had a mean score value of 2.38 which was less than the mean criterion mark of 2.50. It was rejected.

Taking the average mean score for knowledge of the respondents on accident preventive measures before safety education was given them, an average mean score of 2.37 was gotten which was less than the mean criterion mark of 2.50. It was rejected.

3.2.2. Knowledge of Accident Preventive Measures after Safety Education

Table 2 presents the items developed to measure the knowledge of the respondents on accident preventive measures after safety training was given to them. Eight (8) items were developed, they all tested above the mean criterion mark of 2.50, see column 7. Given that all the parameters described in column 2 have mean values (see column 7) greater meancriterion mark of 2.50, implies that they are all accepted (see column 8). Taking the average mean score for knowledge of the respondents on accident preventive measures after safety education was given them, an average mean score of 2.78 was gotten which was more than the mean criterion mark of 2.50. It was accepted.

Comparing the mean scores of the respondents on each item before and after safety education was conducted, there was an improvement on the knowledge of accident preventive measures on items 1, 2, 3, 4, 5 and 6 which had their mean scores increased from 2.06 to 3.0, 2.28 to 3.18, 2.18 to 3.40, 2.39 to 2.94, 2.20 to 3.02 and 2.26 to 3.17 respectively. While item 7did not have any significant change in the mean score. Thus, the safety education had a significant improvement on the knowledge of the respondents on accident preventive measures with an increase in the average mean score from 2.37 to 2.78.

3.3. Correlation between Awareness of Accident Prevention before and after Safety Education

The result of the Pearson correlation is presented in Table 3. The result from Table 3 showed that the coefficient of correlation before and after safety education was 0.026. The result indicates that there was no relationship between the two variables.

Table 2. Knowledge of accident preventive measures after safety education.

S/N	Knowledge of Accident Preventive Measures	SA	A	D	SD	Mean	Remark
1	Training of drivers can help prevent road traffic accident	3	330	2	0	3.0	Accepted
2	Provision of good road can prevent accident from happening	62	274		0	3.18	Accepted
3	Enforcement of traffic rules and regulations (e.g. speed limits) is an accident preventive method	114	164	3	0	3.40	Accepted
4	Wearing of seat belt before driving is an accident preventive method	15	285	36	0	2.94	Accepted
5	Awareness of road traffic hazards can help reduce accidents from occurring	9	325	1	0	3.02	Accepted
6	Accident may not happen if the road is free from obstruction	119	207	7	0	3.34	Accepted
7	Maintaining the car in good condition can help prevent accident from occurring	61	266	6	0	3.17	Accepted
8	Not driving under the influence of drugs and alcohol can help prevent accident from happening	72	262	2	0	3.21	Accepted
	Mean Score					**2.78**	**Accepted**

Table 3. Pearson correlation.

Variables	Before	After
Before	**1**	0.026
After	0.026	**1**

Values in bold are different from 0 with a significance level alpha = 0.05.

3.4. Research Hypothesis

Null Hypothesis, H_{01}: Safety education has no significant influence on their knowledge of road traffic accident preventive measures.

Table 4 displays the ANOVA table for measuring the influence of safety education on the knowledge of road traffic accident preventive measures of the drivers. The mean scores on safety parameters before and after safety training (Table 1 & Table 2) were used for the Analysis of Variance. From Table 4, a calculated f-value of 31.73579 was obtained which was greater than f-critical value of 4.60011 at 0.05 level of significance. Thus, the null hypothesis was rejected, and an alternative hypothesis was accepted which states that, safety education has a significant influence on the knowledge of road traffic accident prevention measures of drivers.

3.5. Discussion

On the impact of safety education on knowledge of road traffic accident prevention among drivers in Lagos State findings showed that, there was an improvement in the knowledge of accident preventive measures of the drivers after safety

Table 4. Influence of safety education on Knowledge of Road Traffic Accident Prevention Measures.

Groups	Count	Sum	Average	Variance		
Before Safety Education	8	18.97	2.37125	0.129184		
After Safety Education	8	25.26	3.1575	0.02665		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2.472756	1	2.472756	**31.73579**	6.17E−05	**4.60011**
Within Groups	1.090838	14	0.077917			
Total	3.563594	15				

education was conducted for them. Before safety education, the mean score for the drivers' knowledge of road traffic accident prevention measures was 2.37 and after safety education, the mean score was 2.78. There was about 17.3% improvement on the drivers' knowledge of road traffic accident prevention measures. Specifically, the drivers' knowledge of accident preventive measures was improved on their knowledge of traffic rules and regulations, not driving under the influence of any substance and wearing of seat belts before driving. This finding is supported by [16] that, there is substantial evidence that driving skills improve during training and several studies have suggested that higher order skills such as risk-assessment, hazard perception, situational awareness and the development of a responsible attitude contribute more to reducing crash risk than advanced driving skills [17].

More so, findings agree with [18] that, Information-based training such as hazard perception training have been shown to have significant effects on driver behaviour. The author reported in their study that hazard perception training significantly improved the hazard perception skills of drivers as well as reducing speeds and crash rates. Similarly, [19] showed that in general, safe driving behaviour of elderly drivers increased after training. Findings also agree with [20] and [21] that, hazard-perception ability has been found to predict crash involvement both retrospectively and prospectively. [21] further asserted that, drivers who failed a hazard-perception test (based on a receiver operating characteristic-curve-derived pass mark) had 25% more active crashes (defined, a priori, as crashes in which the driver's vehicle was moving, excluding parking or reversing) in the year following the test.

4. Conclusion

The study concluded that safety education intervention had a positive impact on the knowledge of preventive measures for road traffic accident. There was a reasonable improvement from the result of the pre-test to the results of the post-test for knowledge. Furthermore, the resultant effect of safety education on knowledge will significantly improve the knowledge of preventive measures of road traffic accident.

Conflicts of Interest

The authors declare no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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