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Effectiveness of Structural Education Programme on Prevention of Road Traffic Accidents among Health Science Students

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ABSTRACT

Background: Road traffic accidents are primarily caused by ignorance and negligence, and they rank among the top causes of mortality and disability among youngsters. Thus, training and instruction in traffic safety for youngsters should play a significant role in ensuring their safety. **Objectives**: This study was conducted to assess the effectiveness of a structured teaching program on preventing road traffic accidents in students. **Methods**: Enumerative sampling was used in a pre-experimental one-group pretest and post-test design. The study included 200 students in Lalitpur, Nepal. Structured knowledge questionnaires were developed. The data was analyzed using descriptive and inferential statistics. **Results**: The pre-test average knowledge scores were found to be correlated with a number of sociodemographic variables, such as age, religion, educational attainment, employment status, family structure, commute time, mode of transportation, type of accident encountered, being exposed to information on averting traffic accidents, and information source. Among these, the mother's ($\chi2$ = 14.82), father's ($\chi2$ = 9.80), family type ($\chi2$ = 7.50), traveling distance ($\chi2$ = 12.46), mode of transportation ($\chi2$ = 6.89), number of accidents encountered ($\chi2$ = 5.66), being exposed to information about road traffic accidents ($\chi2$ = 25.96), and the source of the information ($\chi2$ = 27.87) were found to be significantly correlated. **Conclusion**: The samples' understanding of all facets of traffic accidents was insufficient. The results of the study show that the Structural Teaching Program was successful in improving student's understanding of how to prevent traffic accidents.

KEYWORDS

Prevention, Road Traffic Accidents, Students

INTRODUCTION

An accident that occurs on a road or one that is accessible to public transportation and results in one or more people being killed or injured while at least one moving vehicle is considered a road traffic accident (RTA) (Mamo DE, 2023). Around 1.35 million people worldwide died or suffer disabilities as a result of traffic accidents each year, which is seriously concerning for medical facilities and the public's health. With an estimated 1.3 million fatalities, 93% of road traffic injury-related deaths in 2019 occurred in low- and middle-income countries. By 2030, it's predicted that road accidents would rank as the sixth leading cause of mortality globally. Major health concerns are caused by automobile

accidents worldwide. Approximately 3700 people die in traffic accidents every day, with cyclists, motorcyclists, and pedestrians accounting for half of these deaths. These road users are vulnerable, and health institutions are concerned about the 1.35 million individuals who are killed or crippled in traffic accidents annually (Ahmed et al, 2023).

Numerous factors put younger people at risk for harm from traffic accidents. Young people are more vulnerable to significant head injuries in the event of a traffic accident than adults because of their limitations in terms of their physical, cognitive, and social development. Young kids can be impulsive as well, and because of their limited attention spans, they find it difficult to handle multiple challenges at once. Adolescent children are more likely to take chances as they become older, jeopardizing their safety when driving. Generally speaking, the unique requirements of youngers are not given enough consideration while planning highways. RTA is the leading cause of death for children and young adults aged 5 to 29 worldwide. Moreover, young people die from traffic accidents in low- and middle-income nations three times more frequently than in high-income nations. Injury from vehicles accidents can be prevented (WHO, 2023).

Fifty-five percent of child fatalities were caused by traffic accidents and in nearly all of these cases, the youngster's risky behavior was implicated. In addition to causing the parents and other affected parties immense distress and sorrow, these traffic accident deaths involve children in good health who may have been expected to have successful lives. That being said, there is growing recognition that preventing accidents in children is a significant public health concern. (Raut SM & Haridas SV, 2020).

Over all other natural catastrophes combined, including floods and landslides, the government lists RTAs as the leading cause of death in Nepal each year. Traffic accidents have become a daily occurrence, frequently resulting in horrific fatalities and life-threatening injuries. The Nepal Police Headquarters records show that in the final seven months of the current fiscal year (from mid-July, 2023 to mid-February, 2024), 1,303 people have already lost their lives in various traffic accidents and 3,643 passengers suffered serious injuries within the same period. Similarly, through the end of 2023/20, 12,542 people lost their lives in traffic accidents throughout the course of the previous five years. After accounting for seven months of the current fiscal year and the prior five years' deaths, a staggering 13,845 people have died overall (Khatri P, 2024).

During FY 2070/71 to FY 2079/80, there were 76752 accidents. Motorcycles and scooters (54675) and cars, jeeps, and vans (46928) were the most frequently involved vehicles in accidents; together, they accounted for about 75% of all accidents. Male deaths (1360) were three times more than female fatalities (409). A total of 969 deaths occurred within the age range of 16 to 35, accounting for 55% of all mortality victims. The greatest number of accidents (31473) occurred between 12:00pm to 18:00 pm, with reckless driving being the main contributing factor. Over speeding, drinking alcohol, reckless pedestrian behavior, poor road conditions, and the physical and emotional health of the driver are additional factors that contribute to traffic accidents. (Gautam S & Joshi B, 2024).

Most of the time, people are the ones who are at fault. First-year bachelor and diploma level students are enrolled from various regions of the nation. They should be taught about safety measures and traffic laws in order to stop these accident and early deaths. The major goal of road safety is to inform students in order to improve their understanding of safety-related issues, shape their driving habits, and get them ready for new safety regulations. The purpose of this study was to evaluate the understanding of the instructional education module on road traffic accidents' prevention among students studying in first year diploma level health students.

METHODS

Study design: A pre-experimental one-group pretest and post-test design was used to evaluate the effectiveness of structured education programme on prevention of RTAs among students.

Study setting and population: The e study was conducted at Asian College for Advance Studies, Lalitpur, Nepal. The study's intended population consists of first year bachelor of pharmacy (BPharm), Bachelor of Public Health (BPH), Bachelor of Science in Nursing (BSc Nursing), Diploma In Pharmacy (DPharm), Certificate Medical Laboratory Technology (CMLT) and Radiography students. Subject availability and the feasibility of the study's execution are the selection criteria.

Sample size: There were 200 students in the study sample.

Sampling technique: An enumerative sampling method was applied.

Selection criteria for the sample: The study includes students who are ready to taking part in the study, are present during the time of data collection and are studying in the first year or first semester of bachelor of pharmacy (BPharm), Bachelor of Public Health (BPH), Bachelor of Science in Nursing (BSc Nursing), Diploma In Pharmacy (DPharm), Certificate Medical Laboratory Technology (CMLT) and Radiography course. The study excludes the Post Basic Bachelor of Nursing Science (PBNS) students and other courses.

Variables

Dependent variables: knowledge of students on prevention of road traffic accidents.

Independent variable: structured teaching program on knowledge regarding prevention of road traffic accidents among students.

Attribute variables: Sociodemographic factors includes age, religion, parents' educational and profession, number of siblings, family type, distance from home to college, mode of transportation, recreational activities, types of accidents the participants have experienced, exposure to prior information on the topic, and information source.

Data collection strategy: Both a structured questionnaire and a structured teaching program were created. The study's instruments included a structured knowledge questionnaire, a sociodemographic data collection form, and a structured education session on RTA prevention. The multiple-choice questions have a maximum of three distracters and only one right response. A score of one is awarded for a correct response, and zero for an incorrect one. Therefore, the highest score that could be obtained from this questionnaire was 27. The score of knowledge that was obtained varied and included as in Table 1.

Table1: Score of Knowledge

Score of Knowledge	Number of items	Percentage
Insufficient knowledge	0 – 13	≤50 % Score
Moderately knowledgeable	14 – 20	51 – 75 % Score
Adequate knowledge	21 – 27	76 – 100 % Score

Official consent was obtained from the Asian College for Advance Studies, Lalitpur. Samples were chosen in accordance with the specified inclusion requirements. Confidentiality was maintained and the written consent was obtained from the participants. All 200 students were given a questionnaire. In between, uncertainties were answered. The test took about 30 minutes to finish on average. After the study was completed, structured teaching was given along with a brief synopsis of its goals and contents. Every respondent took a post-test on the fifth day. The Instructional Teaching Programme (STP) was developed as; general information on road traffic accidents, its causes, prevention road traffic accidents and rules to enhance road safety.

The split half approach was used to determine the structured knowledge questionnaire's reliability. Twenty samples that met the inclusion requirements were given the tool in order to determine its reliability. The correlation formula for the Karl Pearson product moment was applied to determine the tool's reliability. The results showed that the instrument is reliable for use, with a reliability coefficient of "r" = 0.9540.

DATA ANALYSIS

Based on the study's objective, analysis of the gathered data was done using both descriptive and inferential statistics. The mean, standard deviation, and "t" test were used to compute the knowledge score both before and after the STP were administered. The threshold for significance was established at less than 0.05. A paired "t" test was used to evaluate the effectiveness of STP. The chi square test was used to determine the association between sociodemographic factors and pre-test knowledge score.

RESULTS

Respondents' socio demographic information

According to the results, 73 (36.5%) of the respondents were between the ages of 15 to 16, 66 (33%) were between the ages of 17 to 18, and 61 (30.5%) were between the ages of 19 and older. Among all respondents, 66 (33%) were female and 134 (67%) were male. Most of those respondents, 196 (98%) were Hindus, while the remaining 4 (2%) were converts to other religions. Regarding the distance between home and college, 87 (43.5%) of the respondents lived less than 3 km away, 53 (26.3%) lived between 3 and 5 km, and 60 (30%) lived more than 6 km away. About how they got to college, 113 (56.5%) of the respondents said they took public transportation, 17 (8.5%) said they rode motorcycles and scooters, and 70 (35%) said they relied on other forms of transportation. The majority of respondents, 46.7%, prefer playing games outside in their free time, while 35% prefer playing games indoors and 18.3% prefer to do other things with their time. In terms of the mothers' educational background, 74 (37%) were illiterate, 63 (31.7%) had completed a bachelor's degree or higher, and 63 (31.7%) had completed SLC. Mothers' employment status was as follows: 97 (48.5%) were employed, while 103 (51.5%) were unemployed. Of the fathers, 33 (16.5%) had a bachelor's

degree, 73 (36.5%) had completed SLC, and 94 (47%) were literate. The fathers were all working. All responders, when asked if they had ever experienced a little or big accident, unanimously stated that they had. Most of 107 (53.5%) of respondents reported falling off their bicycle while riding, and 93 (46.5%) said they had experienced other minor or major accidents. This information relates to the sort of minor or major accident that was encountered. In terms of information on preventing road traffic accidents, 37 (18.5%) of respondents said they had learned it from their parents, 6 (3.0%) from television, and 157 (78.5%) of respondents said they had not received any information at all.

Pre-test knowledge on road traffic accident prevention

Table 2:- Pre-test knowledge of respondents regarding preventing road traffic accidents (n=200)

Level of Knowledge	Score Category	Respondents	
		Number	Percent
Inadequate	≤ 50 % Score	134	67.0
Moderate	51 - 75 % Score	66	33.0
Adequate	> 75 % Score	0	0.0

The information in the above table illustrates how students are categorized based on their pre-test understanding of how to prevent road traffic accidents. The findings showed that 67% of the samples had inadequate knowledge (≤50% scores), while 33% of the samples had relatively adequate knowledge (51-75% scores). It was concerning to see that, in the pre-test, none of the respondents scored higher than 75% on the knowledge scale for preventing traffic accidents. The participants had the highest mean scores (40.7%) in the area of road safety rules, followed by general RTA information (35.4%), RTA prevention (32.4%), and RTA causes (29.7%) on the pre-test mean knowledge scores on the prevention of RTAs among students. The respondents lacked sufficient knowledge of the designated areas of road traffic accidents, as indicated by the mean percentage aspect-wise pre-test knowledge score.

Post-test knowledge on Road Traffic Accidents prevention

Table 3: Post-test knowledge of respondents regarding preventing road traffic accidents (n=200)

Level of Knowledge	Score Category	Respondents	
		Number	Percent
Inadequate	≤ 50 % Score	0	0.0
Moderate	51 - 75 % Score	42	21.0
Adequate	> 75 % Score	158	79.0

The information displayed in the table 2 is the total mean of respondent's post-test knowledge scores on preventing traffic accidents. In terms of the selected traffic accident features, 21% of the samples had gained relatively enough knowledge and 79% had gained sufficient information. The respondents scored the highest on the general information section (87.5%), the road safety regulations (86.9%), the RTA prevention section (85.0%), and the RTA causes section (82.8%). The respondents exhibited sufficient knowledge in the chosen areas of road traffic accidents, as indicated by the mean percentage of aspect-wise post-test knowledge.

Comparison of respondents' mean pre-test and post-test knowledge scores to assess the effectiveness of structural education programme on road traffic accidents prevention

Table 4: Comparison of respondents' mean knowledge about preventing road traffic accidents before and after the test (n=200)

Aspects	Maximum Score	Respondents Knowledge				Paired- 't' Test
		Mean	SD	Mean (%)	SD (%)	
Pre-test	27	10.27	6.2	34.2	20.8	21.75*
Post-test	27	25.60	3.3	85.3	11.1	
Enhancement	27	15.33	5.5	51.1	18.2	

* Significant at 5% level t (0.05, 59d.f) = 1.96

At the 5% level of significance, the data in the previous table showed that the mean post-test knowledge scores (85.3%) were significantly higher than the mean pre-test knowledge scores (34.2%).

The association between the respondents' selected sociodemographic characteristics and their mean pre-test knowledge scores about RTA prevention

To find out how respondents' pre-test knowledge scores about preventing traffic accidents relate to the selected socio-demographic factors such as; age, religion, parents' educational and professional status, number of siblings, family type, distance from home to college, mode of transportation, leisure activities, types of accidents the participants have ever experienced, exposure to prior information on the topic, and information source, a null hypothesis ($H0_1$) was developed. This indicates that there is no significant correlation between the selected sociodemographic factors and the students' pre-test knowledge levels about RTA prevention.

The calculated χ2value (6.89) for the college transportation method is determined to be higher than the table value (5.99, 2d.f) at the 0.05 level of significance. It suggests that there is a significant relationship between students' mean pre-test knowledge of traffic accident prevention and how they get to college. Regarding the sort of accident that the respondents have ever experienced, the computed χ2value (5.66) is found to be bigger than the table value (3.84, 1d.f) at the 0.05 level of significance. Consequently, the study hypothesis is supported and the null hypothesis is rejected. The sort of accident ever encountered and the schoolchildren's mean pre-test knowledge level on preventing road traffic accidents are significantly correlated, according to this finding.

Concerning the information previously received about preventing traffic accidents, the resulting χ2value (25.97) is found to be, at the 0.05 level of significance, more than the table value (3.84, 1d.f). As a result, the study hypothesis is supported and the null hypothesis is rejected. Consequently, there is a strong relationship between the students' prior exposure to material on the topic and their mean pre-test knowledge level about preventing traffic accidents. At the 0.05 level of significance, the resulting χ2value (27.88) for the source of data on RTA prevention is determined to be greater than the table value (5.99, 2d.f). Thus, the null hypothesis is rejected and the research hypothesis is accepted. Hence, the mean pre-test and the information source for preventing traffic accidents have a substantial correlation.

DISCUSSION

In order to address the noteworthy results of the data analysis in line with the study, it was found that students' mean pre-test knowledge score on preventing traffic accidents was insufficient. The study found that the majority of the samples (66.7%) had inadequate knowledge (≤50% scores) about preventing RTA, whereas 33.3% of the samples had quite sufficient knowledge (51–75%). It was concerning to see that none of the responders (>75% scores) knew enough about preventing traffic accidents. The results of other studies on examining the effectiveness of an education-based road safety intervention and the design and delivery mechanisms that promote road safety in young people corroborate these findings. These studies found that after the training, there was a considerable improvement in road safety knowledge, attitudes, and purposeful behaviors, according to a statistical analysis of the questionnaires. It improves road safety knowledge, attitudes, and behavioral intentions (Waring S, Almond L & Halsall L, 2024).

Following the implementation of the structured education program, the mean post-test knowledge score revealed that 35% of the samples had somewhat adequate knowledge and 65% of the samples had gained adequate knowledge about the avoidance of traffic accidents. The outcome demonstrated that all schoolchildren had acquired information about preventing road traffic accidents that ranged from somewhat adequate to adequate following the administration of the STP. When the mean knowledge scores of students were compared between the pre- and post-tests for preventing traffic accidents, the overall mean improved to 15.33 with a standard deviation of ± 5.5. A mean percentage enhancement score of 51.1% is observed, with a standard deviation of ± 18.2. After performing the paired "t" test, the "t" value that was obtained was 21.75 [t (0.05, 59 d.f) = 1.96]. This implies that students' understanding was enhanced by the structured education program.

An association was found between the average knowledge scores from the pre-test and certain socio-demographic factors, including age, religion, level of education, employment status, family structure, commute time, mode of transportation, type of accident experienced, exposing on information about preventing traffic accidents, and information source. Of these, there was a significant correlation found between the mother's ($\chi2 = 14.83$), father's ($\chi2 = 9.80$), family type ($\chi2 = 7.50$), distance traveled ($\chi2 = 12.47$), mode of transportation ($\chi2 = 6.89$), number of accidents experienced ($\chi2 = 5.66$), exposure to information about traffic accidents ($\chi2 = 25.97$), and the source of the information ($\chi2 = 27.88$). There was no significant correlation found between pre-test knowledge and other socio-demographic characteristics, including age, religion, mother's occupation, and the number of siblings. Similar studies conducted on effectiveness of structured teaching program on road safety measures among primary school children in selected school at Bangalore and kottayam indicate that the sociodemographic factors, such as the control group's religion, mother's and father's educational status, and degree of knowledge, are significantly correlated. The amount of knowledge and sociodemographic factors, such as the educational status of the mother and father, are significantly correlated in the experimental group (Mathew TA, 2024), (Anujalekshmi V L, Anju Philip, 2015) and (Ismail HN, Khairani Az & Abdullah SMS, 2019).

CONCLUSION

Road traffic accidents are becoming more commonplace worldwide, with an ever-increasing occurrence of these incidents. The most vulnerable population to traffic-related injuries, which are a leading cause of death and disability globally, is children. Man, the car, and the road are the factors. It is clear from the etiological elements outlined that road safety education cannot be avoided. A

significant percentage of children acted safer after instruction, suggesting that even relatively short training can result in improvements in pedestrian behavior, albeit only temporarily.

Among those aged 0 to 14, road accidents account for one-third of unintentional deaths, and for those aged 5 to 14, they account for more than half. Their sheer number can frequently overshadow the statistics from other incidents, making it challenging to identify which other accident categories have the greatest effects on children and adolescents. Childhood is known as the "formative years" of life since it is the time when most growth takes place and skills are learned. Colleges offer a special environment for the early identification and avoidance of traffic accidents. Road safety education needs to be included in schools immediately in order to assist students succeed in the future. It is important to teach young students the fundamentals of error-avoidant driving so they will grow up to believe that it is their own responsibility to keep everyone safe.

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