

Investigating the impact of traffic safety training on reducing risks and casualties of traffic accidents of elementary schools' pupils in villages of Salfehgan Arak axis in 2012 based on Health Belief Model (HBM)

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Abstract

With regards to the very harmful impacts of traffic accidents on the body of society, one of the fundamental policies that actually are the infrastructure of discussion of reducing accidents is the subject of training traffic culture. The general aim of this study is to investigate the relationship of done trainings on the number of accidents and casualties of pupils' school zone. The statistical population of this research is elementary schools' pupils of villages of Salfehgan Arak axis (village of Ghale No- Malek Abad, Masoumiye, Karchan city) and selected sample is 109 students and 10 teachers of these schools. The method of research is field and through questionnaire distributed randomly between pupils that have passed traffic safety training courses. The results show the correctness of hypothesis; it means that there is a significant difference between knowledge factors and perceived susceptibility and perceived severity, as well as change of behavior before and after the training.

Keywords: Education, Traffic safety, reducing the risks, traffic accidents, Elementary students, Arak villages

1. Introduction

Immunization design of school zone was implemented with emphasis on training of children and adolescents (by priority of elementary and secondary schools' pupils) as base groups in order to increase safety and development of traffic culture during long-term in three parts of training, physical immunization of schools and use of safety equipment in rural roads in 1999 in Gilan experimentally and since 2001 also officially in all provinces of the country. This plan developed till in 2009, at 2,000 schools and by covering 500 thousand pupils by priority of elementary and secondary schools in zone across the country was implemented. During implementing this plan, almost 1.5 million pupils and about 8 million hours, educational activity has been carried out. The plan is done every year with the beginning of the school year and reopening of schools according to the plans and schedules as well as organizing and immunization instruction of residential areas and crossings and school zone. Training plan and immunization of school zone aims to convince the authorities to not build and building new school zone and also increase students' knowledge about everyday traffic risks and physical immunization of these schools. Training students due to lack of required knowledge among them is essential and holding training courses planned has been effective in increasing their awareness and can lead to behavior modification and will be followed reduction of road accidents and casualties. Almost "all students who travel daily from home to school and vice versa, they are considered a particular group of pedestrians, then it should be noted that the passage of pedestrians and students due to position of some schools that are placed in roads margin and main roads are associated with various risks. As a result, providing desirable training to pupils can realize the following objectives:

1. Accidents Reduction 2. Help to reduce traffic congestion 3. Environmental supervision and protection 4. Efficiency of operations and productivity 5.Reducing infractions 6. Increasing safety 7. Consent of people 8. Saving energy

The above-mentioned objectives, reduce accidents and casualties of driving in school zone is considered more than others, because losses arising from two aforementioned points are a lot. So training programs to achieve the above objective are placed on the agenda of the organization and road transport and review and determine its impact on the achievement of the objectives is formed the research's subject. According to analyzes conducted, no studies are done to investigate the effect of training on the behavior of pedestrians or at least there isn't a lot of records in this field. So in this paper, we aim to explain the importance and necessity of this research based on assumptions raised and targets that is based on the health belief model to increase awareness, sensitivity, intensity and behavior modification of pupils after provided trainings.

2. Definition of concepts

Training is considered as one of the basic elements of behavior modification. Determine the efficacy of training as an inalienable principle has an important role in reforming training processes (identification, design, and implementation). Efficacy of training is as process of describing a phenomenon and judge about its merit [2]. Today, training is considered the first step in the development of economic, social, political and cultural of communities and is considered one of the basic indicators of progress of each system [1] Importance of training will be apparent when take attention to the fact that the development requires growing qualitative and qualified manpower [3].

Pupils training due to lack of necessary knowledge and holding training courses planned is necessary among them that will follow behavioral modifications and reducing road accidents and casualties. In the meantime, the importance of training role in learning safety points and rules and driving rules has a

special place. Meanwhile, traffic schools – transportation towns - Traffic Park and so help to solve the training gap of rules in students' books [4].

2-1 Training: is in standard level of the performance or behavior of employees through the teaching and practice [5].

2-2 Safety: the users traffic from road and street.

2-3 Traffic: An international word that refers to transit and year of vehicle in streets and roads.

2-4 Accident: An unpredictable accident including a motor vehicle or pedestrian, animal and fix objects that may result in financial or physical losses.

2-5 Pupils: male and female students aged 12-10 years old who are studying in the elementary school.

2-6 School zone: Schools that placed within the scopes of protection strip 100 meters after privacy approved by roads or have direct access to the roads covered by the Ministry of Transportation.

2-7 Perceived susceptibility

Perceived susceptibility referring to the subjective belief of an individual about a disease or accident and adverse conditions caused by acting to a particular behavior [6].

2-8 Perceived severity

Perceived severity is related to person's subjective belief about the extent of a damage that can be created resulting in a harmful illness or accident obtained from a particular behavior [6].

2-9 Changing behavior

Changing behavior includes the perceived benefits, beliefs in the benefits of the proposed methods to reduce the risk or harmful condition caused by certain behavior and also the perceived barriers, beliefs regarding actual costs caused by following a new behavior. In this regard, some guides are raised to act that as a catalyst cause person's need feeling to act and subsequently, the self-efficacy means confidence of person in its ability to track the behavior [6].

2-10. Attitude:

Creating positive and proper attitude in individuals can be made by the justification programs. Exist these programs is essential to achieve organizational goals. Training programs should be prepared and implemented towards shape the attitudes of pupils till through their support to training activities, cooperation sense and synergy and their loyalty toward training provided increased.

2-11. Knowledge:

Pupils training must be performed in order to create and promote awareness of trainees.

2-12 Theoretic training (theory): all trainings that are provided in order to promote knowledge of the traffic to pupils (according to age group and educational) by teacher, coach and the police (qualified people) in class environment and school in different ways.

2-13 Practical trainings (applied): This method of training is done in practical and operational trainings in a traffic simulated environment (parking traffic, traffic facilities built in the school environment, etc.) and in some cases in actual traffic environment with respect to and attention to safety issues by expert or police.

3-Research method

In this study we intend to investigate the impact of traffic safety training on reducing risks and casualties of traffic accidents of elementary schools' pupils in villages of Salfechgan Arak axis (villages of Ghale No- Malek Abad- Masoumiye- Karchan city) in 2012 based on Health Belief Model (HBM) so in this study, it was tried to use the conceptual model (1) in accordance with HBM (Health Belief Model). So in this study, we want to investigate the effect of independent variables: the training needs and expectation

of the training course (traffic knowledge) on the dependent variables, created attitude (perceived susceptibility, severity) and traffic changing behavior that lead to reduce accidents. On this basis, conceptual model of hypotheses are defined as follows:

1. There is a difference between knowledge before and after training.
2. There is a difference between perceived susceptibility before and after training.
3. There is a difference between perceived severity before and after training.
4. There is a difference between changing behavior before and after training.

3-1Research objectives

3-1-1General objectives

The aim of this thesis is to evaluate the association of training with reducing accidents of trained pupils. These objectives can be studied in two dimensions:

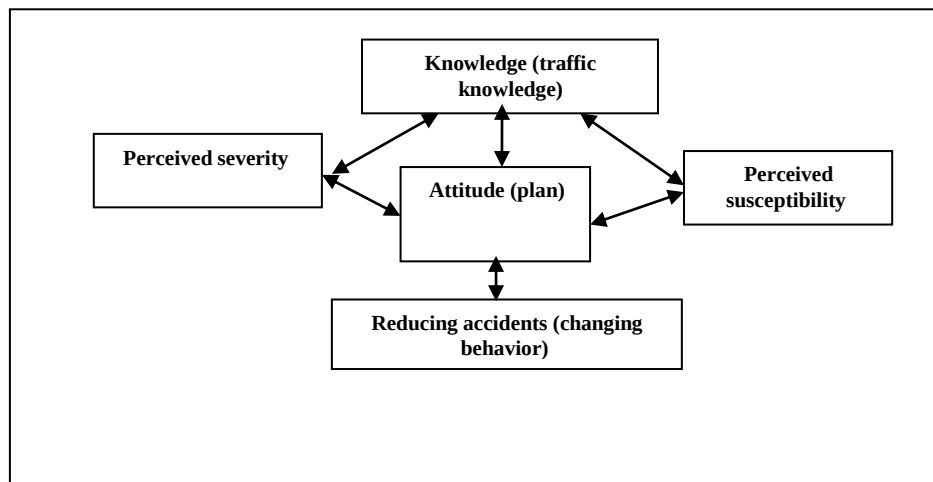
3-1-2Details objectives:

1. Determining the level of knowledge before and after training
2. Determine the level of perceived susceptibility before and after training
3. Determine the level of perceived severity before and after training
4. Determine the level of created changing behavior before and after training

3-1-3Practical objectives:

These objectives include: 1. Familiarity of pupils with the concept of traffic and constituent elements of it 2. Familiarity of them with safety tips of traffic 3. Familiarity with traffic signs, principles and tips of safety 4. Familiarity with the tasks of pedestrian and identifying types of vehicles, risks and accidents caused by them, as well as creating a culture of traffic safety in different academic sections of pupils. Given the raised hypotheses, the following conceptual model is suggested to problem-solving that the origin of this theory dates back to 1950s and since then it has been tested in a variety of situations. Based on numerous tests done on it over the years, this model has been developed and from other theories to strengthen the predictive and explained potential has borrowed [6].

Figure (1) the theoretical framework and research model (Safari, Shojaeezadeh, 2009, p 61)



In the present study attempted to through descriptive and inferential statistics, required information of questions obtained, to be able to investigate the impact of traffic safety training on reducing risks and casualties of traffic accidents of elementary schools' pupils in villages of Salfechgan Arak axis (villages of Ghale No- Malek Abad- Masoumiye- Karchan city).

3-2. spatial, time domain and research subject

Spatial domain of research: elementary schools in villages of Salfechgan Arak axis (villages of Ghale No- Malek Abad- Masoumiye- Karchan city).

Time domain of research: The study has been implemented in the academic year 2011-2012
 Thematic domain of research: Investigating training for elementary schools' pupils in villages of Salfechgan Arak axis (villages of Ghale No- Malek Abad- Masoumiye- Karchan city).

The population is pupils and teachers of elementary schools in villages of Salfechgan Arak axis (villages of Ghale No- Malek Abad- Masoumiye- Karchan city). 109 people randomly were selected 1,100 students and 10 teachers of these schools were selected. In the present study due to savings in time, cost and manpower, the questionnaire is used as the main tool for data collection. This study that is based on the proposed model, Patricia Hdge and Dennis Moss, for pupils' questionnaire, 20 questions is designed referring to the questionnaire Patricia Hdge and Dennis Moss that in the questionnaire of pupils, variables of knowledge 5 questions, perceived susceptibility 5 questions , perceived severity 4 questions, attitude and changing behavior 6 questions are in the questionnaire separately. In addition to teachers' questionnaire, 12 questions including variables of knowledge about 3 questions, perceived susceptibility 2 questions, perceived severity 2 questions and changing behavior 5 questions are considered. The 5-point Likert is used for response options. In this research, field and library research methods are used to collect data. According to this that the research questionnaire is prepared from source of Patricia Hdge and Dennis Moss and under the supervision of qualified professionals and experts and with cooperation of transportation system and terminals have been developed so the validity of this research is established. In this study, Cronbach's alpha coefficient is used to assess the validity of the questionnaire. Using computers and software spss, Cronbach's alpha coefficient was calculated. Cronbach's alpha value obtained for the questionnaire before and after the research training of pupils in Table 1 is shown.

Table 1. Cronbach's alpha value

Line	Dimensions	Number of questions	Cronbach's alpha value
1	Questionnaire related to before training	20	0.776
2	Questionnaire related to after training	20	0.802

4. Data analysis:

In the data describing part of the research, first we express a brief description of demographic data of individuals.

In the part of information related to gender of students, it was specified that 57 percent of respondents have been male and 43.3 percent have been female. In the part of information related to education of students, it was specified that 34 percent has been in fourth grade and 34.9 percent has been in fifth grade and 31.1 percent of them has been in sixth grade. In the part of information related to teachers, it was

specified that 40% of teachers have Associate Degree, 40 percent have Bachelor and 40 percent have master's degree. In the part of information related to the experience of teachers, it was specified that 10 percent of respondents haven't had previous educational experience and 90 percent of individuals have previous training experience. In order to evaluate the view of teachers about the educational program implemented, we investigate the average of response to questions raised about the training program that its results are as follows.

For this purpose, we have divided the average of response of teachers into three groups: less than 3, equal to 3 and greater than 3 and we determine frequency and percentage of frequency of these cases based on the variables of knowledge, susceptibility, severity and changing behavior.

Information related to average of response of teachers to questions related to variable of knowledge show that all teachers that they are 10 people have average of response more than 3 and this means that all teachers in response to questions that investigate the impact of training program on the knowledge of students, have chosen high and very high option. Information related to average of response of teachers to questions related to variable of susceptibility showed that from all the teachers that the number of them is 10 teachers, 1 teacher has average of response equal to 1 and 9 teachers has average of response greater than 3. This means that 90% of teachers in response to questions that investigate the impact of educational program on perceived susceptibility of pupils, have chosen high and very high option. Information on average of response of teachers to questions related to the variable of severity shows that from the total teachers that are 10 teachers, 1 teacher has average of response equal to 1 and 9 teachers have average of response more than 3 and this means that 90% of teachers in response to questions that investigate the impact of educational program on pupils' perceived severity, have chosen high and very high option.

Information on average of response of teachers to questions related to the variable of changing behavior shows that from the total teachers that are 10 teachers, 2 teachers has average of response less than 1 and 8 teachers have average of response more than 3 and this means that 80% of teachers in response to questions that investigate the impact of educational program on pupils' changing behavior, have chosen high and very high option. However, according to information given, we analyze the pupils' data. In this study, using primary data collected from a questionnaire of survey variables calculated then for conducting research, tests of comparing paired average is used. This test is used when a group at two different times or steps is tested and difference of averages of this group is important in this process. A statement that is used for this method commonly is "before" and "after"; for example blood pressure of those who use certain drug, their blood pressure will be measured before and after treatment and to know that the medicine is effective or not, paired t-test is used.

In addition, note that the Wilcoxon test is a nonparametric test and is used for cases that two samples are related or duplicate measurements performed on one sample. This test is similar to paired t-test when cannot consider normal distribution for data. In the following, formulas related to two tests: (1) paired and (2) Wilcoxon is visible.

$$t = \frac{d}{sd/\sqrt{n}} \quad (1)$$

$$z = \frac{T - \frac{n(n+1)}{4}}{\sqrt{\frac{n(n+1)(2n+1)}{24}}} \quad (2)$$

(d) is difference of pairs and (S_d) is standard deviation. In addition, value of (T) is equal to the sum of ratings of variables that have experienced increase or decrease of score, also (n) is the sample volume. Now, Kolmogorov – Smirnov test (according to figure 2) is used to examine the given claims about data distribution of a quantitative variable.

The statistical hypothesis corresponding to this test is as follows:

H0: Variables have normal distribution.

H1: Variables not have normal distribution.

Figure 2 - Kolmogorov – Smirnov (Ks) related to factors

Indicators	Perceived knowledge before training	Perceived susceptibility before training	Perceived severity before training	Perceived changing behavior before training	Perceived knowledge after training	Perceived susceptibility after training	Perceived severity after training	Perceived changing behavior after training
Number	106	106	106	106	106	106	106	106
Average	2.0792	2.8981	1.8726	1.9984	3.9811	3.4019	4.1722	4.0157
Standard deviation	.34551	.33608	.36228	.25665	.59171	.49028	.66131	.75646
The absolute value of highest standard deviation	.130	.164	.147	.148	.119	.104	.133	.143
The most positive deviation	.130	.164	.123	.148	.082	.086	.105	.097
The most negative deviation	-.127	-.119	-.147	-.125	-.119	-.104	-.133	-.143
Kolmogorov-Smirnov	1.340	1.687	1.512	1.529	1.225	1.075	1.373	1.469
The significance level	.055	.007	.021	.019	.099	.198	.046	.027

According to the output of figure (2), for variables of perceived susceptibility before training, perceived severity before training, perceived changing behavior before training, perceived severity after training and

perceived changing behavior after training (P- value<0.05), so cannot accept H0 and H1 indicating non-normality of data will be confirmed so the distribution of these variables is not normal.

Given the non-normality of variable distribution can use the nonparametric methods to the comparison test of paired averages. By taking a look to the raised assumptions, we find it is better to used average comparison test with two samples related to nonparametric method, for this test compares the average of a group of respondents before and after the test. Wilcoxon test is non-parametric tests that are used to evaluate the similarity of two related samples. This test that is known signed ranks test as McNemar test, is appropriate for plans before and after run or two examples of a society [7].

Similar to test, t, Wilcoxon test includes the difference between measurements, so this test needs the data be at the distance measurement level. On the other hand, this test not requires the underwriters related to the distribution of sizes, in the null hypothesis and equality of distribution of two populations, it is expected that about half of the paired differences is positive and half is negative, and it is expected that positive and negative differences be the same size. So if the size of difference is rated from small to large and ignore the differences of zero, as a rule, expected to total positive and negative ratings be equal. Because it is expected against any positive difference is existed a negative difference with the same size. So ratings that positive or negative rating is given to them will be almost equal, so the sum of these ratings will be the same [8].

This test examines the difference between groups. So Wilcoxon test also indicates which component of a pair is bigger than another component and also the absolute value ranks the differences [7]. In interpreting the results of Wilcoxon test to find out whether the difference of variable studied in two different before and after outsourcing is different or not, should use the results of table as (test statistic): According to the Z test and comparing significant level of 0.05 should say statistically, is there a difference between the variable before and after training? In interpreting the results of Wilcoxon test, in addition to determine the significance or lack of differentiation in two stages, before and after training, we can infer knowledge, perceived susceptibility, perceived severity and changing behavior, in which two times is more and in which time is less. To achieve this, we can use the results in table entitled Ranks.

4-1Results of first hypothesis test

Hypotheses 1 "There is a significant difference between knowledge before and after training"

H0: There isn't a significant difference between knowledge before and after training.

H1: There is a significant difference between knowledge before and after training.

$$\left\{ \begin{array}{l} H_0: \mu_d = 0 \\ H_1: \mu_d \neq 0 \end{array} \right.$$

Then, using a significance level of the table (2) we specify significance of difference or no difference of average of knowledge before and after the training then with the help of the table (3), we determine the quality of difference between knowledge before and after training.

According to Table 2, the test value for all hypotheses is: z (-8.948) and z (-6.838) and z (-8.947) and z (8.913-) and significant level for all them sig = 0.000, that at the error level of smaller than of 0.05, all of them are significant, it should be said statistically with confidence of 95% there is a difference between average (knowledge, perceived susceptibility and severity, and changing behavior created) before training and after training.

According to the results of table (3) about the quality of difference between (knowledge, perceived susceptibility and severity, and created changing behavior) before and after training, it should be said in

106 cases of ratings in the knowledge part, the average of positive ratings is higher than average of negative ratings ie 106 cases:

$0 < \text{knowledge before and after training}$

Which is above inequality is equivalent to:

knowledge before training $<$ knowledge after training

According to Table (3) we see that for perceived susceptibility and severity, and created changing behavior, average of positive ratings in, 79,105 and 104 cases are more than averages of negative ratings therefore:

Perceived severity before training $<$ Perceived severity after training

Perceived susceptibility before training $>$ perceived susceptibility after training

Created changing behavior before training $>$ Created changing behavior after training

Due to the difference of average (knowledge, perceived susceptibility and severity and behavior change created) before and after training at 95 percent confidence level and results of Table (3), we conclude (knowledge, perceived susceptibility and severity and behavior change created) after further training is more than (knowledge, perceived susceptibility and severity and changing behavior created) before training so training affects(knowledge, perceived susceptibility and severity and changing behavior created) the pupils and increases all of them to pupils.

5. Conclusion

The results of inferential statistics about the first hypotheses indicated that there is a difference between traffic knowledge before and after training also from the view of teachers, all believed training has impact on traffic knowledge of pupils. The overall result would be that the level of knowledge after training is greater than the knowledge before training.

In the following, it is suggested since the application of the scheme is to increase pupils' knowledge, it is necessary to act toward its expansion in all provinces and schools in addition to training immunization plans and familiarizing pupils with required traffic skills, a part of additional training should be in schools. The results of inferential statistics for the second, third and fourth hypotheses show the difference between perceived susceptibility and severity, and created changing behavior, before and after training as amount of them after training is more than amount of them before training in order to complete the above conclusion is suggested for the second hypothesis should be created some shows with safe content by art groups in schools and competitions (poetry, painting, writing, crafting and traffic games) Also for the third hypothesis, how to play videos and traffic animations varied should be associated with showing injuries and fatalities of accidents and the plan of police assistance should be implemented for safety of students from the road and street, especially in school zone.

Also, in order to conclude the fourth hypothesis, the top students will be awarded in the field of traffic laws and regulations or should build and design a traffic personality that is symbol of traffic safety including those proposed for future research: investigating the implementation of the education power towards culture of traffic of students, investigating the risk of accidents of pupils as a pedestrian in different age groups and investigating the effect and the role of family in the training and promotion of traffic culture of pupils can be named and some limitations of this research could include: Lack of specific information regarding the accident of pupils, different statistical sources and non-assimilated in

the field of pedestrian accidents and lack of specific statistics from school zone of country. The features of this study is that it doesn't have the same sample conducted because studied research often have been as general and state and based on accidents statistics of school zone that these statistics have been used in this study (Law-medical statistics -Statistical Yearbook of Transport and Terminals).

6. Appendices

Table 2

Knowledge before and after training	
Z static	-8.948
Significant level	0.000
Perceived susceptibility before and after training	
Z static	-6.838a
Significant level	.000
Perceived severity before and after training	
Z static	-8.947a
Significant level	0.000
Perceived changing behavior before and after training	
Z static	-8.913a
Significant level	0.000

Table 3

		Number	Average of rating	Sum ratings
Knowledge before and after training	Negative ratings	0 ^a	.00	.00
	Positive ratings	106 ^b	53/50	5671
	Total	0 ^c		
		Number	Average of rating	Sum ratings
Perceived susceptibility before and after training	Negative ratings	29/07		407/00
	Positive ratings	79 ^b	50/18	3964/00
	Equal rating	13 ^c		
	Total	106		

		Number	Average of rating	Sum ratings
Perceived severity before and after training	Negative ratings	1^a	1.00	1.00
	Positive ratings	105^b	54.00	5670.00
	Equal rating	0^c		
	Total	106		
		Number	Average of rating	Sum ratings
Perceived changing behavior before and after training	Negative ratings	2^a	4.75	9.50
	Positive ratings	104^b	54.44	5661.50
	Equal rating	0^c		
	Total	106		

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