The Effect of Educational Intervention in Promoting Safe Behaviors in a Sample of Iranian Primary School Students: An Application of the Health Belief Model

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Abstract

Purpose: Road traffic accidents account for the biggest mortality rate in Iran and children are among the main victims of these accidents. The present study was conducted to assess the effect of an educational intervention based on the Health Belief Model on behaviors associated with obeying traffic regulations in primary school students during the academic year 2014-15 in Khorramabad, Iran.

Methods: The present quasi-experimental has a pre-post-intervention design and was conducted on 106 sixth-grade primary school students selected through multi-stage sampling and divided into an intervention and a control group. The students were assessed before, a week after and two months after the intervention. Data were collected using a two-part questionnaire containing a demographic section and a section with items on the constructs of the Health Belief Model. The data obtained were then analyzed in SPSS-20.

Results: The mean scores of perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy and cues to action significantly improved in the intervention group compared to the control group (P<0.01).

Conclusion: An educational intervention based the Health Belief Model managed to effectively improve behaviors associated with obeying traffic regulations.

Keywords: educational intervention, traffic, safe behaviors, primary school students

1. Introduction

Accidents have become major global economic, social and health risk factors across the world today (Sharma, 2008). Accident is taken to refer to an unpredictable event that often occurs during transport and in the workplace, the living habitat or recreational centers and causes harm (Brussoni et al., 2015). Road traffic accidents claim an annual of 1.3 million lives and injure 20 to 50 million across the world (Puvanachandra et al., 2012), account for the biggest mortality rate due to unintentional injuries (Sim & Ng, 2005) and are expected to rank as the fifth leading cause of death by 2030 (Fathi Shamsi, Shamsi, Khorsandi, & Ranjbaran, 2015). In Iran, road traffic accidents are the cause of an annual of more than 48,000 deaths, 300 thousand hospital stays exceeding one day and nearly 3 million injuries requiring outpatient care (Farhadi, Roshanaei, Bashirian, & Rezapoor Shahkelaei, 2014).

The 14-million student population of the country and the demands dictated by their young age and inexperience make students prone to accidents and injuries at school and during the school commute (Vojdani Aram, Roshanaei, Hazavei, Karimi Shahanjarini, & Rezapoor Shahkelaei, 2014). As one of the most vulnerable groups of the population, children are at a greater risk of road accidents due to their inexperience, frisky and impetuous nature and the lack of distance estimation abilities for oncoming vehicles and unfamiliarity with the risks these accidents pose (Vojdani-Aram, Roshanaei, Hazavehei, Karimi-Shahanjarini, & Rezapur-Shahkolai, 2015). Several studies have shown that children under the age of 11 are more prone to sidewalk injuries while older children are more prone to bicycle and motorcycle injuries (Jaber-Gaderi et al., 2008; Nazari et al., 2008; Zargar,

Sayyer Roudsarib, Shadman, & Kavianie and Payam Tarighib, 2003).

Accepting accidents as preventable events has caused the adoption of preventive measures and therefore the reduction of accident-related mortality rates in some countries (Naghavi & Akbari, 2002). Although many factors are involved in causing accidents, people and their unsafe conduct (not fastening the seat belt, not wearing helmets, etc.) account for the majority of accidents (Rezapur Shahkolai, Farhadi, Bashirian, & Roshanaei, 2013). Several studies have shown that education is one of the main issues required for resolving traffic problems (Jaber-Gaderi et al., 2008; Jackson, 1997; Nazari et al., 2008; Nordberg, 2000) and that all age groups should be trained in order to improve the culture of safety in the community. This improvement requires the implementation of appropriate educational measures, the promotion of safe conduct and the building of a standard road safety culture (Rezapur Shahkolai et al., 2013). The Health Belief Model (HBM) provides an extensive framework for planning and implementing educational interventions (Hazavehei, Taghdisi, & Saidi, 2007) and involves extensive empirical support for predicting a wide range of health and safety behaviors, especially in the case of intentional and unintentional accidents (Cao, Chen, & Wang, 2014; Cheraghi, Poorolajal, Hazavehi, & Rezapur-Shahkolai, 2014; Hazavehei et al., 2007; Rezapur Shahkolai et al., 2013; Vojdani-Aram et al., 2015). This model focuses on the individual's behavior as a function of his knowledge and attitude toward behavior, according to the theoretical bases which the individual adopts preventive health behaviors only when he is convinced of factors such as perceived susceptibility (the individual's perception of his vulnerability or predisposition to a disease or health condition), perceived severity (his belief in the severity of a condition and its consequences), perceived benefits (his belief in the effectiveness of adopting preventive behaviors), perceived barriers (his belief in the negative aspects of the behaviors), cues to action (environmental stimuli such as health messages, people's suggestions, etc.) and self-efficacy (the individual's trust in his own ability for the successful performance of the intended behavior) (Rosenstock & Stretcher, 2008). Using this model enables health educators to help individuals develop a realistic perspective to danger (Cheraghi et al., 2014). The present study was conducted to promote safe behaviors in students.

2. Materials and Methods

The present randomized clinical trial was conducted on 106 sixth-grade primary school students in Khorramabad to determine the effect of an educational intervention based on the HBM. The study inclusion criteria consisted of having no known mental disorders and being willing to participate in the study.

Sampling was performed through the stratified multistage method. In the first stage, the schools were categorized based on their education districts (districts 1 and 2 of the city) and their students' gender (boys' school and girls' school). In each category, four schools were randomly selected for undergoing the intervention (two boys' schools and two girls' schools) and four as the controls (two boys' schools and two girls' schools). For the last stage, samples were selected randomly from the sixth-grade students in each school.

To assess the performance of safe behaviors and the constructs of the HBM, the traffic regulation behaviors questionnaire was used, which has a confirmed validity and reliability according to previous studies (Heshmati et al., 2013). This questionnaire contains a demographic details' section with 7 items, an HBM constructs' section with a total of 26 items divided between perceived susceptibility (4 items), perceived severity (6 items), perceived benefits (5 items), perceived barriers (6 items) and self-efficacy (5 items), which are scored based on a 5-point Likert scale with options ranging from totally agree to totally disagree and which are given scores of 0 to 4, with each construct worth 100 points, and a final section on behavior, which has 12 items, each receiving a score from 0 to 4 for the answers of "always, often, occasionally, rarely and never". The reliability of this tool was assessed once again through measuring its internal consistency, which gave a Cronbach's alpha of 0.77.

After obtaining permission from the authorities at the Ministry of Education for carrying out the proposed intervention and after the students' parents gave their informed consents for the participation of their children in the study, the self-reporting pretest was completed. After analyzing the initial data, the educational content of the intervention was developed in three domains, including cognitive, emotional and behavioral domains, and based on the general objectives of the research and the HBM, and was focused on introducing the students to traffic regulations. The educational intervention was then performed over three sessions of 30 to 45 minutes using group discussion and Q&A. Visual cards were used as cues to action. To observe the ethical codes of conducting clinical research, the control group also received educational pamphlets on traffic regulations at the end of the intervention.

Data were analyzed in SPSS using the independent t-test, the one-way analysis of variance, the repeated measures ANOVA and the regression analysis.

3. Results

The 106 students examined were at an age range of 11 to 13 and had a mean age of 12.19±0.59 years in the intervention group and 12.26±0.66 years in the control group.

Before the intervention, the two groups matched in terms of their demographic variables, including their parents' age, level of education and occupation and their household size.

The one-way analysis of variance on the intra- and extra-group factors showed significant differences between the students in their perceived susceptibility (0.002), perceived severity (0.0001), perceived barriers (0.0001), perceived benefits (0.0001) and self-efficacy (0.0001) in the pretest, posttest and the follow-up.

The results of the present study showed that behaviors associated with obeying traffic regulations were positively and significantly related with some of the constructs of the HBM, including perceived benefits, perceived barriers, perceived susceptibility and self-efficacy, while they were not related with the construct of perceived severity (Table 1).

Table 1. The correlation between the constructs of the HBM and behaviors associated with obeying traffic regulations

Variances	perceived susceptibility	perceived severity	perceived benefits	perceived barriers	self-efficacy
safe behaviors	.29**	.14	.28**	.30**	.51**

**p<0.1.

The stepwise linear multivariate regression analysis showed a significant correlation between behaviors associated with obeying traffic regulations and the constructs of HBM (F was observed). In the first step of the regression analysis and the first model, of the 34.4% explanation coefficient of the criterion variable, self-efficacy was inserted into the equation as a predicting variable and had a coefficient of 0.505 and thus explained 25.5% of the variance in the criterion variable. In the second step and the second model, the addition of perceived susceptibility with β=0.298 explained 8.9% of the variance in behaviors associated with obeying traffic regulations. The other predicting variables were eliminated from the model due to their insignificant regression coefficients.

The adjusted squared regression correlation coefficient was R^2=.255 in the first model and R^2=.089 in the second model, and each standard deviation unit of change in perceived susceptibility meant a 50% change in the standard deviation of safe behaviors (Table 2). The correlation between the criterion variable and the predicting variables was R=.505 in the first step and R=.587 in the second step (Table 2).

Table 2. The regression analysis of the subscales of the HBM constructs and their relationship with behaviors associated with obeying traffic regulations

variance	Model	R	R2	R2 Change	F	P	Model	β	Std. Error	Beta	t	P
safe behaviors	1	.505	.255	.255	35.66	.001	*Constant*	18.7	2.61	.505	7.18	.001
							self-efficacy	1.14	.19		5.97	.001
	2	.587	.344	.089	27.01	.001	*Constant*	9.39	3.52	.511	2.67	.009
							self-efficacy	1.16	.18		6.41	.001
							perceived susceptibility	.74	.20	.298	3.73	.001

Before carrying out the multivariate linear regression analysis, its assumptions were confirmed, including the normal distribution of the variables, the linear relationship between the criterion and the predicting variables and the homogeneity of the variance. The inter- and intra-participant analysis of variance with three repeated

measurements of behaviors associated with obeying traffic regulations in the intervention group and the control group showed significant differences between the pretest, posttest and follow-up scores in the constructs of HBM (Table 3).

Table 3. The mean and standard deviation of the pretest, posttest and follow-up scores in the intervention and control groups

variances	groups	before the intervention		a week after the intervention		Two months after the intervention		P Value
		M	SD	M	SD	M	SD	
perceived susceptibility	intervention	12.96	3.07	15.04	1.87	15.21	1.47	.001
	control	12.04	2.84	12.68	2.71	12.19	3.30	
perceived severity	intervention	14.21	4.69	21.62	3.83	22.32	2.30	.001
	control	15.04	4.25	16.62	4.25	16.21	3.39	
perceived benefits	intervention	15.32	3.19	17.83	2.11	18.62	1.94	.001
	control	14.47	3.21	14.94	3.12	14.98	3.12	
perceived barriers	intervention	16.45	4.20	20.19	3.04	20.62	2.64	.001
	control	15.42	4.30	15.62	3.78	14.91	3.35	
self-efficacy	intervention	13.13	3.42	18.23	2.38	18.30	2.41	.001
	control	13.38	3.10	13.58	3.08	13.28	3.77	
behavior	intervention	33.44	7.97	43.98	3.43	42.81	5.43	.001
	control	34.43	6.77	34.85	7.08	34.19	7.55	

The results obtained showed a significant relationship between the intra-participant and inter-group scores of the factors in the pretest, posttest and follow-up stages, indicating the effectiveness of the educational intervention based on the HBM on all the behaviors associated with obeying traffic regulations in the students. A statistical power of more than 0.8 suggests the adequacy of the sample size.

4. Discussion and Conclusion

The results of the present study confirmed the effectiveness of an educational intervention based on the HBM in improving behaviors associated with obeying traffic regulations. These behaviors were found to be positively and significantly correlated with constructs including perceived benefits, perceived barriers, perceived susceptibility and self-efficacy, which is consistent with the results obtained in similar studies (Heshmati, Behnampour, Binaei, & Khajavai, 2014; Morowatisharifabad, Momeni Sarvestani, Barkhordari Firoozabadi, & Fallahzadeh, 2012; Sadeghnejad, 2014).

In line with the findings of other studies, constructs including perceived susceptibility and self-efficacy were good predictors for behaviors associated with obeying traffic regulations (Chen, Chiu, Chih, & Yeh, 2015; Workagegn, Kiros, & Abebe, 2015). The mean scores of perceived susceptibility and perceived severity increased after the intervention, which is consistent with the findings of several other studies (Cao et al., 2014; Farma, Jalili, Zareban, & Pour, 2014; Joshi, Beckett, & Macfarlane, 1994; Vojdani-Aram et al., 2015).The students' understanding that they could be at risk for traffic accidents raised their perceived susceptibility and led to their better adherence to behaviors associated with obeying traffic regulations. The educator's greater emphasis on the severity of the complications arising from having traffic injuries can significantly increase students' perceived severity. These results were in line with the results of other studies (Abood, Black, & Feral, 2003; Jaber-Gaderi et al., 2008; Shojaezadeh, Naeimi, Noori, & Khalili Haghverdi, 2015).

The mean score of perceived benefits showed a significant increase in the intervention group after the intervention, which, according to the researcher, was due to the appropriate educational methods used to explain the benefits of obeying traffic regulations, including group discussion and lecture.

The mean score of perceived barriers also increased significantly in the intervention group after the intervention, and the students developed a greater understanding of how to overcome the barriers. These results were in line

with the results obtained in similar studies (Moodi, Mood, Sharifirad, Shahnazi, & Sharifzadeh, 2011; Shojaezadeh et al., 2015).

The results of the present study suggest that an education focused on fostering the understanding and perception of the benefits of obeying traffic regulations as opposed to perceiving their barriers encourages students to make greater efforts for overcoming their perceived barriers to obeying these regulations.

The mean score of self-efficacy showed a significant increase in the intervention group after the intervention, which is in line with the results of similar studies (Jackson, 1997; Kealey et al., 2009; Shahnazi, Sabooteh, Sharifirad, Mirkarimi, & Hassanzadeh, 2015; Tavassoli et al., 2015). Fostering the belief in the students that they can perform safe behaviors improves their chances of obeying traffic regulations (Farma et al., 2014; Hajian, Vakilian, Najabadi, Hosseini, & Mirzaei, 2011; Jackson, 1997; Nazari et al., 2008; Rosenstock & Stretcher, 2008).

The mean scores of safe behaviors associated with obeying traffic regulations increased significantly in the intervention group after the intervention, which is in line with the results of other studies.

The results of the present study are indicative of the positive effect of an educational intervention in cognitive, attitude and behavioral domains of obeying traffic regulations. Given that schools provide an appropriate setting for improving the understanding of the factors affecting students' behaviors, and since students act as a communication link between schools and parents, other educational interventions using different behavioral models are recommended to be conducted to help identify the factors affecting obeying traffic regulations and the building of a traffic culture in the society.

Acknowledgements

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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