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Using health belief model on preventive behaviors related to road traffic injuries among primary school students

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Abstract

One of the suitable and beneficial methods in promoting behaviors of road traffic injury prevention could be the application of educational programs. Therefore, the aim of this study was to determine the effect of health belief model on preventive behaviors related to road traffic injuries among primary school students. 100 participants was randomly selected among fourth- and fifth-grade primary school students. The participants were divided into the control and intervention groups. The intervention group participated in educational program, while the control group did not receive any education. Data were collected before and two months after the intervention using a check list for recording the observation of students' behavior when crossing a simulated street at school, and also a self-administered questionnaire. The questionnaire consisted of items on demographic information, knowledge, structures of Health belief model, and performance of students in relation to road traffic injury prevention. The results of this study showed that there was no significant difference between two groups in demographic characteristics, except for father's employment and education level. The knowledge of students increased after the intervention. Also, the scores on self-reported and observed performances between two groups had a significant difference after the intervention. According to the results of this study, it can be concluded that planning an educational intervention based on health belief model could promote knowledge and performance of students in relation to road traffic injury prevention.

Keywords: Health Education, Injury, Traffic, Student

Introduction

Road Traffic Injury (RTI) is one of the most important causes of mortality in many countries. Almost 1.24 million people annually lose their life and another 20 to 50 million sustain non-fatal injuries as a result of road traffic crashes [1]. Road traffic related deaths are increasing in low- and middle-income countries [2]. 62% of traffic injuries were related to 10 countries and Iran is one of them [3]. In Iran, road traffic injuries are one of the most important causes of mortality [4], and the most vulnerable groups in traffic injuries are pedestrians and riders [3]. It is reported that among pedestrians, 25% of traffic injuries are related to children

aged in primary school [5]. Because of specific physical, psychological, and behavioral characteristics and unsuitable recreational environments, children are a vulnerable group in the most crashes [6]. As a result, educating people regarding effective and continues preventive behaviors related to road traffic injuries is necessary for promoting public health [7]. To this end, it should be paid attention to the effectiveness of health education programs in changing human behavior [8]. Health Belief Model (HBM) is one of the helpful models for studying behaviors. This model mostly focuses on the promotion of personal past experiences to change a belief [9]. In fact, this model helps identify behaviors and find those behaviors that need to be changed and facilities making decision to this end [10]. Constructs of this model are as follows: 1) perceived susceptibility: based on personal belief, how much possible is a disease or especial condition to occur for him/her, 2) perceived severity: the personal perception about the severity and seriousness of the disease or consequences of health problem such as death, disability, and social consequences (in work, daily life, and social interactions), 3) perceived benefits: personal opinions about the usefulness of the recommended behaviors in reducing the risk or severity of the disease, 4) perceived barriers: the personal idea about real and psychological costs of recommended behaviors, 5) perceived self-efficacy: the personal perception about his ability to successfully perform a particular behavior and, 6) cues to action: stimulus for feeling the need of performing a health action [9].

In Iran, some studies have been conducted to find variables affecting preventive behaviors related to injuries using Health Belief Model, e.g., a study on the effectiveness of educating mothers in the injury prevention among children aged <5 years [11]. The results of this study showed that educational program, based on Health Belief Model, was effective in promoting preventive behaviors related to injuries [11]. Therefore, the aim of this study was to assess Health Belief Model effect on preventive behaviors related to road traffic injuries among primary school students in Hamadan city.

Method

In this study, a sample of 100 students was selected among fourth- and fifth-grade primary school students (with the mean age of 10.53±0.50) in Hamadan, a city in the west of Iran, in 2013-2014. The participants were divided into the control and intervention groups. This randomized trial was conducted in four schools (two boy's schools and two girl's schools which randomly were selected). The sample schools were located near each other in the main streets. To respect ethical principles, the informed consent was obtained from the school principals, students participating in the study, and their parents. The intervention group received educational program, while the control group did not receive any education. Before conducting the study, in order to evaluate the knowledge level about protective actions against traffic injuries and also the model-constructs measurment, a pre-test was applied on both groups using a prepared check list and questionnaires. Then, the pre-test results were analyzed considering the Health Belief Model constructs. Different educational methods such as lecture, question/answer, and booklet were employed for educational purpose. The booklet was designed based on scientific references and research articles in this field [11-20]. Four educational sessions were held for the intervention group during two weeks (three theoretical sessions and one practical session). Each session lasted between 40 and 60 minutes and was conducted by one member of the research team. To educate the road crossing behvior in the practical session, which was held in school environment, a street simulating the real lined street with virtual traffic lights was prepared.

One month after the intervention, for persistence and review of educational program, an extra session was held. Finally, after two months, the intervention effects on knowledge, performance, and HBM constructs were studied in the post-test and compared to

the results of control group.

Data were collected using a questionnaire, made by the research team, which included 16 questions about background and demographic characteristics and 13 multiple-choice questions about knowledge. Also, the participant's behaviors were assessed by two manners including: 1) self-reported protective performance against traffic injuries by 10 true/false questions and, 2) observed protective performance against traffic injuries by observing the participant's behavior when crossing the simulated street at school. A check list was used to record the observations which consisted of five behavioral items (including using pedestrian crossing, crossing only when the pedestrian light is green, stop when the pedestrian light is red, looking to the left before beginning to cross, stop when arrived in the middle of the street then looking to the right before continue crossing). Each question had two choices of Yes or No.

The constructs of Health Belief Model including perceived susceptibility (four questions), perceived severity (five questions), perceived benefits (four questions), perceived barriers (seven questions), and perceived self-efficacy (four questions) were measured on a Likert scale (strongly agree, somewhat agree, disagree). Cues to action included seven questions, six of them were about the person who trained the participants about behavioral tips of traffic injury prevention. Each of these questions had seven choices. The remained question was about the person whom the participants would like to learn behavioral tips of traffic injury prevention from? In this part, the students were allowed to choice more than one answer.

Using Kuder-Richardson and Cronbach's alpha coefficients, the validity and reliability of the questionnaire were measured by the research team before data collection (the reliability coefficients (Cronbach's alpha) for all variables was $\geq$ 70% except knowledge that was 61%). The rate of students' participation in this study was 98%. After the completion of post-test, for respect to ethical principles, one educational session using booklet was held for the students in the control group.

Finally, data related to both groups before and 8 weeks after the educational intervention were coded and analyzed by statistical methods of Chi-square and T-test in SPSS-19 software. The $p<0.05$ was regarded as the significance level.

Results

Two months after the intervention, two students left the control group, therefore the remaining participants in the intervention and control groups were 50 and 48, respectively.

Table 1 shows the demographic characteristics of the participants. According to these results, the most of students' fathers had education level of "lower than diploma" in both intervention and control groups (58% and 81.2%, respectively). Also, the most of students' mothers had education level of "lower than diploma" (58% and 77.1% in the intervention and control groups, respectively).

Table 1 also indicates that the most of students' fathers and mothers were self-employed and housewife, respectively. The majority of participants reported that they walked to school, together with their friends, without any vehicle.

Regarding demographic characteristics, there were almost no significant differences between groups ($p>0.05$). Only, there were significant differences between groups regarding fathers' education level ($p=0.047$) and fathers' occupation ($p=0.022$).

According to the results of Table 2, it is found that before education, there was no significant difference in the mean score of knowledge between two groups ($p=0.190$), but after the education, this difference was significant ($p<0.001$). There was no significant difference in the mean scores of perceived susceptibility, severity, benefits, barriers, and self-efficacy between the groups. Although, after the education, the mean score of perception increased, the increasment was not significant. The results showed that before the education, there

was not any significant difference in the self-reported protective performance score between two groups (p=0.247); but after the education, this difference became significant (p<0.001). Also, the score of the observed students' behavior of crossing the street between two groups was not significantly diferent before the intervention (p=0.287), whereas it had a significant difference after the education (p<0.001).

Table 1 *Demographic characteristics of participants*

Demographic characteristic	Control group	Intervention group	p-value
	Number (%)	Number (%)	
Fathers' education level			
Lower than diploma	39 (81.2)	29 (58)	0.047
Diploma	6 (12.5)	15 (30)	
Higher than diploma	3 (6.2)	6 (12)	
Mothers' education level			
Lower than diploma	37 (77.1)	29 (58)	0.124
Diploma	8 (16.7)	15 (30)	
Higher than diploma	3 (6.2)	6 (12)	
Father's occupation			
Labour	11 (22.9)	14 (28)	0.022
Officeholder	5 (10.4)	11 (32)	
Self-employed	32 (66.7)	20 (40)	
Retired	0 (0)	1 (2)	
Other	0 (0)	4 (8)	
Mother's occupation			
Housewife	41 (85.4)	44(88)	0.466
Officeholder	2 (4.2)	2 (4)	
Self-employmed	5 (10.4)	2 (4)	
Retired	0 (0)	1 (2)	
Other	0 (0)	1 (2)	
How to get to school			
On foot with adults	0 (0)	5 (10)	0.804
By vehicle with adults	2 (4.2)	7 (14)	
On foot with friends	41 (85.4)	25 (50)	
On foot alone	5 (10.4)	9 (18)	
By school bus	0 (0)	2 (4)	
Other	0 (0)	2 (4)	

Table 2 *Comparison of mean scores of knowledge, performance, and Health Belief Model constructs before and after the intervention*

Model constructs	Before intervention		p-value	After intervention		p-value
	Control group	Intervention group		Control group	Intervention group	
Knowledge	57.69	52.77	0.190	57.53	88.31	0.001
Perceived susceptibility	84.44	83.69	0.822	87.50	89.93	0.467
Perceived severity	83.52	83.73	0.947	86.11	89.62	0.294
Perceived benefits	85.59	90.50	0.161	89.58	92.33	0.398
Perceived barriers	79.56	79.14	0.918	79.26	78.79	0.947
Perceived self-efficacy	89.24	91.50	0.518	91.13	93.67	0.346
Self-reported protective performance	39.73	44.54	0.247	41.23	71.14	0.001
Observed road crossing behavior	39.18	34.40	0.287	49.39	71.20	0.001

Discussion

The results of this study showed that before the intervention, there was no significant difference in knowledge between the control and intervention groups, i.e. the knowledge level of two groups were similar. But after the intervention, due to delivering information about traffic injuries and prevention, the students' knowledge had a significant increase in the intervention group. Also, the difference of knowledge level between two groups was significant after the intervention. Although our results are not in agreement with the findings of Abedi et al [21]. several researches confirmed that Health Belief Model is a suitable model for awareness promotion and are in agreement with our study. According to the Pirzadeh et al. study, after making an intervention based on Health Belief Model, the knowledge level of intermediate students about nutrition-related action increased from 33.71 to 71.59, but in the control group, it increased from 29.42 to 51.70. This increase was statistically significant for both groups [22]. In the current study, before the educational intervention, the mean score of perceived susceptibility, severity, benefits, barriers, and self-efficacy had not any significant differences between two groups. Although after the intervention, the scores of perception increased, these increases were not significant. These results were in disagreement with the findings of Cao et al [23].

Before the educational intervention, the score of protective performance against injuries had not any significant difference between the control and intervention groups; however, after the intervention, this difference became significant. These results were in agreement with the findings of Cheraghi et al [11]. and in agreement with those of Hazavei et al. The latter study showed that the action scores in the intervention group, educated based on Health Belief Model, before and after the intervention were 38.57 and 65.9, respectively, while in the control group they were 39.06 and 40, respectively. Therefore, there was a significant difference after the intervention [24]. In the Park et al. study, with using Health Belief Model, it was stated that women in the intervention group interested in the participation in screening test of Pap smear more than women in the control group, after making the intervention [25].

The current study also showed that before the intervention, there was not any significant difference in the score of road crossing behavior of students between the control and intervention groups, but after the intervention, this difference became significant. These findings are approved by the findings of other studies. For instance, Oxley et al. in china showed that education of safety tips for primary school students led to the increased skill of crossing the street [26]. Hajimiri et al., in a study on 56 women having 3-6 years old children, showed that after educational intervention, based on Health Belief Model,

mothers action score about brushing their children teeth increased to 20.45 [27]. Based on Zarei et al., after the educational intervention, the students' action to oral health increased [28]. One of the limitations of this study was using self-reporting tool via filling out the questionnaire by students. For decreasing this limitation, as the strong point of this study, the street crossing behavior of student was observed by researcher using check list. Also, the correct street crossing behavior was educated to the participants practically in a stimulated environment at school. However, it could be better if this practical section of education was performed in an educational specified traffic environment such as traffic park, which was not practical in this study; because the study was conducted in winter and therefore the suitable facilities were not available.

Conclusion

According to the findings of the present study, education based on Health Belief Model is effective on preventive behaviors related to road traffic injuries among primary school students.

The present study results showed that children and students need to be educated in the field of road traffic injury prevention and this education can improve their protective bevahiors in this important field.

This study also showed the positive effect of education using Health Belief Model on the promotion of knowledge and behavior related to road traffic injury prevention among students whom were studied. Therefore, educational interventions based on Health Belief Model could help to promote the effect of educational programs among study population. Consequently, using appropriate health promotion programs and using suitable methods and models for changing behaviors, and also pay more attention to be continuing these programs, may have important role for improving preventive behaviors regarding road traffic injuries among students.

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Contribution

Study design: FRSH, ME, SMMH, AM

Data collection and analysis: ME, FRSH, ME, AM

Manuscript preparation: FRSH, ME, SMMH, AM

Conflict of Interest

The authors declare that they have no competing interests.

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