Factors Associated with Mothers' Beliefs and Practices Concerning Injury Prevention in Under-Five Children, Based on Health Belief Model

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ABSTRACT

Background: Injuries are the first leading but predictable, avoidable and preventable cause of death among under-five-year children worldwide. The present study aimed to identify the factors associated with mothers' beliefs and practices concerning injury prevention in under-five-year children.

Methods: This cross-sectional study was conducted from August to October 2011 in Hamadan County, the west of Iran, enrolling 580 mothers with at least one under five-year child. The data collection instrument was a questionnaire including 85 questions regarding demographic characteristics; knowledge; practices; Health Belief Model (HBM) constructs; and history of injury occurrence among the children. The reliability of the questionnaire was evaluated by a pilot study using Cronbach's alpha coefficient. Data had been collected through interview with mothers, by trained interviewers.

Results: Almost 22.59% of mothers reported at least one injury in their under-five-year children. Of 131 injuries occurred, 85 cases were mild, 23 cases were moderate, and 23 cases were severe. About 52.67% of injuries occurred in boys, 37.41% in less than one-year children, 73.28% at home, and 61.07% when the children were playing game. Fall (24.28%), burn (20.61%) and poisoning (14.50%) were the common causes of injuries. There was a positive correlation between mothers' practices and knowledge, perceived benefits, cues to action and self-efficacy and a negative correlation between mothers' practices and perceived susceptibility, severity, and barriers.

Conclusion: Knowledge, perceived severity, perceived barriers, cues to action, and self-efficacy of mothers toward the injuries in children were among the most important predictive constructs, which may be used for planning educating programs.

Introduction

Injury is a major public health problem worldwide and an important leading cause of death among under-five-year children. In recent decades, the mortality and morbidity of infectious diseases among children have decreased in the world. On the other hand, injuries have become the first leading cause of death in the first five years of life and the most common cause of death among the children worldwide.

More than 95% of injuries in children occur in low and middle-income countries. Although the prevalence of injuries resulting in death is very low in developed countries, but injury is still the main leading cause of death among children worldwide. About 875,000 children die annually from injuries which make 40% of all deaths among the children in the world. Furthermore, tens million children need hospitalization due to injuries most of which suffer from long-term morbidity or permanent disability.

In Iran, the mortality rate of children in less than five years old was 72 per 1000 in 1999 but decreased to 35 per 1000 in 2006. Nonetheless, the children are still at risk.
risk of injuries resulted from life style, technology, environment and social determinants.

Injuries in children have specific characteristics. For instance, globally, injuries are more common in boys than in girls. In addition, majority of the injuries in children occur at home. The most common causes of injuries among children are fall, burn, and poisoning.

Most injuries in children are predictable, avoidable and preventable. Injury prevention is an unavoidable part of every child care program and an important responsibility of both parents and caregivers. Thus, in order to achieve this goal, a documented curriculum is necessary for controlling and preventing injuries in children. Using health education theories may be helpful for developing educational programs in order to prevent injuries and reduce mortality in children and improve their quality of life. Health education theories can help the researchers in different ways including data collection, needs assessment, designing program, content development and evaluation of implemented programs at various levels of prevention.

Health Belief Model (HBM) is a predictive model for behavior and attitude with a number of constructs. The constructs of perceived susceptibility and perceived severity help subject to understand the health threat while other constructs of triggering behavior such as perceived benefits, perceived barriers, self-efficacy and cues to action help the subject in doing or avoiding a health behavior. Health education based on HBM can enhance knowledge of the subjects, change their health beliefs and improve their behaviors regarding preventive programs.

Identification of factors associated with injuries in children is fundamental step for developing preventive program. For this purpose the health education theories such as HBM can help the policy makers in designing, implementing and evaluating educational interventions for improving the knowledge and attitude of parents and caregivers. Accordingly, the present study was conducted to identify the factors associated with mothers' beliefs and practices concerning injury prevention in children.

**Methods**

This cross-sectional study was conducted from August to October 2011 in selected health centers of Hamadan County, the west of Iran. The Local Human Subject Review Board of Hamadan University of Medical Sciences approved this study. The subjects participated voluntarily in this study, after giving verbal informed consent. There are 51 health centers in Hamadan County. We randomly selected 12 centers (eight from urban area and four from rural area) using table of random numbers. Then, we enrolled 580 mothers with at least one child under five years old who had medical record in the selected health centers. Data were collected through interview with mothers, by trained interviewers. The response rate was 95%.

We used a questionnaire using HBM constructs. It included three parts. The first part was related to the demographic characteristics of the participants (11 questions). The second part was related to knowledge (15 questions), practice (20 questions), and HBM constructs including perceived susceptibility (5 questions), perceived severity (5 questions), perceived benefits (5 questions), perceived barriers (5 questions), cues to action (4 questions), and self-efficacy (4 questions). The questions concerning knowledge were four choices, the questions regarding practice were two choices (Yes/No), and the questions concerning HBM constructs were six choices (ranging from "Strongly disagree" to "Strongly agree") using Likert scale. The third part was related to history of injury occurrence among under five-year children (11 questions). The injuries were classified into three levels including: (a) mild injury which needs home treatment during the last month; (b) moderate injury which needs outpatient treatment or hospitalization less than 24 hours during the last three months; (c) sever injury which needs hospitalization more than 24 hours during the last 12 months.

The validity of the questionnaire was approved by the experts in the field. The reliability of the questionnaire was evaluated by a pilot study of 30 samples using Cronbach's alpha coefficient. The score of alpha for total questionnaire was 0.84, and that of each construct were as follows: knowledge (0.77), perceived susceptibility (0.72), perceived severity (0.71), perceived benefits (0.81), perceived barriers (0.63), cues to action (0.73), and self-efficacy (0.77).

The correlation between each HBM construct and mothers' practices was assessed using linear regression model. The correlation between each independent variable and HBM constructs was assessed using t-test and one-way ANOVA. All statistical analyses were performed at 0.05 significant levels, using Stata 11 statistical package (StataCorp, College Station, TX, USA).

**Results**

The distribution of demographic characteristics of the participants is shown in Table 1. Most of the participants (92.07%) were housewife with education level of high school (41.38%). Most of them (55%) had one child. Most of the children (39.61%) aged 12 to 35 months. The proportion of girls was a little more than boys (51.72% versus 48.28%).

Almost 22.59% (131 out of 580) of mothers reported at least one injury in their under five-year children. Of 131 injuries occurred among under five-year children, 85 cases (64.86%) were mild, 23 cases (17.57%) were moderate, and 23 cases (17.57%) were severe. About 52.67% of injuries occurred in boys and 47.33% in girls. Majority of the injuries (73.28%) had occurred at home. Most of
of the injuries (37.41%) occurred in children aged one to 11 months and 12 to 35 months (37.41% and 35.12% respectively). Fall (24.28%), burn (20.61%) and poisoning (14.50%) were the most common causes of injuries. Most of the injuries (61.07%) occurred when the children were playing game.

Table 1: Distribution of demographic characteristics of the participants (n=580)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mothers’ occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>534</td>
<td>92.07</td>
</tr>
<tr>
<td>Working</td>
<td>46</td>
<td>7.93</td>
</tr>
<tr>
<td><strong>Mothers’ educational level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No schooling</td>
<td>8</td>
<td>1.38</td>
</tr>
<tr>
<td>Primary school (grade 1 to 5)</td>
<td>128</td>
<td>22.07</td>
</tr>
<tr>
<td>Middle school (grade 6 to 8)</td>
<td>133</td>
<td>22.93</td>
</tr>
<tr>
<td>High school (grade 9 to 12)/Diploma</td>
<td>240</td>
<td>41.38</td>
</tr>
<tr>
<td>University</td>
<td>71</td>
<td>12.28</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>396</td>
<td>68.28</td>
</tr>
<tr>
<td>Rural</td>
<td>184</td>
<td>31.72</td>
</tr>
<tr>
<td><strong>Household members</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>319</td>
<td>55.00</td>
</tr>
<tr>
<td>4</td>
<td>187</td>
<td>32.24</td>
</tr>
<tr>
<td>5</td>
<td>63</td>
<td>10.86</td>
</tr>
<tr>
<td>≥6</td>
<td>11</td>
<td>1.89</td>
</tr>
<tr>
<td><strong>Number of under 5-year children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>542</td>
<td>93.45</td>
</tr>
<tr>
<td>2</td>
<td>38</td>
<td>6.55</td>
</tr>
<tr>
<td><strong>Age of under 5-year children (month)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-11</td>
<td>187</td>
<td>30.61</td>
</tr>
<tr>
<td>12-35</td>
<td>242</td>
<td>39.61</td>
</tr>
<tr>
<td>36-60</td>
<td>182</td>
<td>29.78</td>
</tr>
<tr>
<td><strong>Gender of under 5-year children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>316</td>
<td>51.72</td>
</tr>
<tr>
<td>Male</td>
<td>295</td>
<td>48.28</td>
</tr>
</tbody>
</table>

The mean scores of mothers’ knowledge, practice and HBM constructs concerning injury prevention in under five-year children are shown in Table 2. The mean score of knowledge was 43.51% and that of practice was 71.41%. Among the HBM constructs, perceived benefits and perceived barriers had the highest and lowest scores (86.98% versus 59.39% respectively). Health care workers had the most important role in cues to action toward preventing injuries in under five-year children.

Table 3 shows the correlation between mean score of mothers’ knowledge and HBM constructs concerning injury prevention in under five-year children using linear regression model. There was a positive correlation between mothers’ practice and knowledge, perceived benefits, cues to action and self-efficacy. According to these results, the score of mothers’ practice improved 0.13% per one percent increase in the score of knowledge, 0.09% per one percent increase in the score of perceived benefits, 0.16% per one percent increase in the score of cues to action, and 0.18% per one percent increase in the score of self-efficacy. On the other hand, there was a negative correlation between mothers’ practice and perceived susceptibility, perceived severity, and perceived barriers. Based on these results, the mothers’ practice score decreased 0.01% per one percent increase in the score of perceived susceptibility, 0.11% per one percent increase in the score of perceived severity, 0.10% per one percent increase in the score of perceived barriers.

The comparison of the mean score of mothers’ knowledge, practice and HBM constructs and the severity of injuries in under five-year children are shown in Table 4. There was not statistically significant difference between severity of injuries and mothers’ knowledge and HBM constructs. However, there was a statistically significant difference between severity of injuries and mothers’ practices. (P=0.004).

Discussion

We indicated that incidence of injuries was higher in boys than in girls. Other evidence confirms our findings. According to the WHO report, fetal injuries in boys are 24% higher than in girls. Rezapur-Shahkolai et al. conducted a cross-sectional study in Twiserkan and indicated that prevalence of injuries were higher in boys than in girls (77.6% versus 22.4% respectively). MacInnes et al. conducted a similar study in Glasgow and estimated the prevalence of injuries 159 per 1000 in boys and 123 per 1000 in girls. The difference between rate of injuries in boys and girls may be due to the different types of physical activities, behaviors, and playing in boys and girls. Improvement of the parents’ knowledge of high risk behaviors and situations related to the injuries of children especially in boys may be helpful in harm reduction and injury prevention among children.
Table 3: The correlation between mean score of mothers’ knowledge and HBM constructs and mothers’ practices toward preventing injuries in under-five-year children using simple linear regression model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-test</th>
<th>P value</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>0.13</td>
<td>0.36</td>
<td>3.75</td>
<td>0.001</td>
<td>0.06 - 0.20</td>
</tr>
<tr>
<td>Constant</td>
<td>65.66</td>
<td>1.64</td>
<td>39.97</td>
<td>0.001</td>
<td>62.45 - 68.69</td>
</tr>
<tr>
<td>Perceived susceptibility</td>
<td>-0.01</td>
<td>0.04</td>
<td>-0.27</td>
<td>0.789</td>
<td>-0.09 - 0.07</td>
</tr>
<tr>
<td>Constant</td>
<td>72.22</td>
<td>3.11</td>
<td>23.24</td>
<td>0.001</td>
<td>66.12 - 78.33</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>-0.11</td>
<td>0.03</td>
<td>-3.36</td>
<td>0.001</td>
<td>-0.18 - -0.05</td>
</tr>
<tr>
<td>Constant</td>
<td>79.63</td>
<td>2.51</td>
<td>31.71</td>
<td>0.001</td>
<td>74.70 - 84.56</td>
</tr>
<tr>
<td>Perceived barriers</td>
<td>-0.10</td>
<td>0.03</td>
<td>-3.25</td>
<td>0.001</td>
<td>-0.16 - -0.04</td>
</tr>
<tr>
<td>Constant</td>
<td>77.16</td>
<td>1.86</td>
<td>41.51</td>
<td>0.001</td>
<td>73.51 - 80.81</td>
</tr>
<tr>
<td>Perceived benefits</td>
<td>0.09</td>
<td>0.05</td>
<td>1.93</td>
<td>0.054</td>
<td>-0.01 - 0.19</td>
</tr>
<tr>
<td>Constant</td>
<td>63.20</td>
<td>4.29</td>
<td>14.72</td>
<td>0.001</td>
<td>54.77 - 71.63</td>
</tr>
<tr>
<td>Cues to action</td>
<td>0.16</td>
<td>0.05</td>
<td>3.40</td>
<td>0.001</td>
<td>0.07 - 0.26</td>
</tr>
<tr>
<td>Constant</td>
<td>57.97</td>
<td>3.99</td>
<td>14.52</td>
<td>0.001</td>
<td>50.13 - 65.81</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.18</td>
<td>0.04</td>
<td>4.87</td>
<td>0.001</td>
<td>0.11 - 0.25</td>
</tr>
<tr>
<td>Constant</td>
<td>58.51</td>
<td>2.71</td>
<td>21.63</td>
<td>0.001</td>
<td>53.20 - 63.82</td>
</tr>
</tbody>
</table>

Table 4: The comparison of the mean score of mothers’ knowledge, practice and HBM constructs and the severity of injuries in under-five-year children by region using two-way ANOVA

<table>
<thead>
<tr>
<th>Variables</th>
<th>Urban Mean %</th>
<th>Urban SD</th>
<th>Rural Mean %</th>
<th>Rural SD</th>
<th>Total Mean %</th>
<th>Total SD</th>
<th>P value</th>
</tr>
</thead>
</table>

Knowledge
No injury
Mild injury
Moderate injury
Severe injury
P value

Perceived susceptibility
No injury
Mild injury
Moderate injury
Severe injury
P value

Perceived severity
No injury
Mild injury
Moderate injury
Severe injury
P value

Perceived barriers
No injury
Mild injury
Moderate injury
Severe injury
P value

Perceived benefits
No injury
Mild injury
Moderate injury
Severe injury
P value

Cues to action
No injury
Mild injury
Moderate injury
Severe injury
P value

Self-efficacy
No injury
Mild injury
Moderate injury
Severe injury
P value

Practice
No injury
Mild injury
Moderate injury
Severe injury
P value

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We indicated that majority of the injuries occurred in children aged one to 11 months and 12 to 35 months, mostly at home, particularly during playing game. A similar study showed similar results. The authors indicated that most of the injuries occurred in children aged 12 to 35 months. They also reported that 62% of the injuries occurred at home. Several reasons have been posed to explain the reason of injuries in these age groups including curiosity and lack of understanding of dangerous situations, the high speed of development of capabilities and acquisition of multiple ability to do various activities, and above all of these, the neglect of parents or child-care providers and lack of their adequate supervision of children’s activities and playing game.

According to our findings, fall, burn and poisoning were the most common causes of injuries. MacInnes et al reported that fall was the most leading cause of injuries (41%) in the first five years of life. In addition, Flavin et al carried out a similar study in Kingston City in Canada and reported that fall was the main cause of 54% of the injuries among under five-year children.

Our findings indicated that the mean score of mothers’ knowledge about methods of injury prevention and harm reduction among under five-year children was low. This can make children susceptible to multiple injuries of various types. On the other hand, we found that mean score of knowledge in mothers whose children had experienced injury was higher than those mother without history of injury in their children. One reason is that the mothers’ experience and knowledge improved after injury. However, we have to improve mothers’ knowledge and attitude toward injuries before they occur. Furthermore, 73% of the injuries occurred at home while mothers were busy with household chores. Since lack of attention and supervision by mothers or caregivers is one of the most important causes of injuries in children at home, this issue have to be the focus of especial attention and to be emphasized in any educational program for mothers and caregivers to prevent and control injuries in children.

The results of this study revealed that perceived severity, perceived barriers; cues to action, and self-efficacy were among the most important predictive constructs of HBM which may be used for planning preventive program. Accordingly, the more the mean score of these constructs is, the more score of mothers’ practices toward preventing injuries will be. Indeed, the educational program should focus on these constructs in order to improve the mothers’ understanding about the consequences of the injuries and the benefits of preventive measures. Ross et al used HBM constructs for assessing the attitude of students toward using helmet when cycling and indicated that perceived severity, perceived benefits, and perceived barriers were the strongest predictive factors for using helmet. These results indicate that some HBM constructs play an important role in adopting preventive behaviors. Therefore, in planning educational programs for mothers and caregivers in order to reduce the injuries in children, we should emphasize on the effective constructs including perceived severity, perceived benefits, and perceived barriers, cues to action, and self-efficacy.

In addition, health care workers were introduced by mothers as the first cues to action for preventive programs. Thus, this group can play an important role in educational program to improve the mothers’ knowledge about proper care of children. Rezapur-Shahkolai et al carried out a cross-sectional study to assess unintentional injuries in the rural population of Twiserkan district, Iran and indicated that health care workers play an important role in educational programs for people.

Only 12.28% of mothers had higher education. This may explain why the mean score of mothers’ knowledge was low. In addition, this should be considered by policy makers who plan preventive program to develop educating programs appropriate to the understanding of the audiences.

An important limitation of this study was due to the checklist of mothers’ practice which was based on self-reporting. This may prone the results to information bias. Despite this limitation, appropriate sample size and high response rate (95%) were the strengths of this study. Furthermore, classification the reference period into three levels, for different severity of injuries, including the past one month for mild; three months for moderate; and twelve months for severe injuries, helped to minimize the recall bias in this study.

Conclusion

The results of this study showed that most injuries in under five-year children occurred at home. Furthermore, knowledge and, regarding the HBM constructs, perceived severity, perceived barriers, cues to action, and self-efficacy of mothers toward the injuries in children were among the most important predictive constructs, which may be used for planning educating programs. Thus, we can use health educations theories such as the HBM in order to plan and develop training program for preventing and controlling injuries in under five-year children. The findings of current study will help policy makers, who plan interventional programs for preventing and controlling injuries in children, to know on which factors concerning to mothers’ beliefs and practices should be focused more.

Acknowledgments

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Conflict of interest statement

The authors declare that they have no conflicts of interest.
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References