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International Journal of Current Research
Vol. 7, Issue, 11, pp.22691-22695, November, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

REVIEW ARTICLE

HEALTH BELIEF MODEL: A THEORETICAL FRAMEWORK FOR THE DEVELOPMENT OF HOME SAFETY SUPERVISORY PROGRAM IN CHILDHOOD INJURY PREVENTION

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ARTICLE INFO

Article History:
Received 19th August, 2015
Received in revised form
08th September, 2015
Accepted 09th October, 2015
Published online 30th November, 2015

Key words:
Children,
Caregivers',
Childhood injury,
Health Belief Model,
Susceptibility,
Severity.

ABSTRACT

Children of all age groups are at high risk for accidents and injuries. The truth is that majority of the injuries happening to children below the age of five happen at home and they are to a maximum level preventable. Physiological characteristics and age appropriate curiosity make them suffer injury. One of the oldest theories which address the behavioral change is Health Belief Model (HBM). In this article the authors are explaining the way they managed to develop an instrument for injury assessment in children with a view to prepare a home safety supervisory program for caregivers. The authors considered HBM as a frame work for this work. This article will act as a guide for future researchers in the preparation of intervention programs keeping theoretical framework as model.

***Citation*:** Renu, G., Anice George, Mamatha S Pai, Baby S Nayak, Suneel C Mundkur, Dinesh M Nayak and Shashidhara, Y.N. 2015. "Health Belief Model: A Theoretical Framework for the Development of Home Safety Supervisory Program in Childhood Injury Prevention", *International Journal of Current Research,* 7, (11), 22691-22695.

INTRODUCTION

Injury is one of the leading causes of death and burden of disease in all age groups, all over the world. Every day around the world, almost 16,000 people die from injuries (Sivamani, Balraj, & Muliyil, 2009). In a day almost 19,000 children below the age of five are dying all over the world. As per UN agency report, India is top in that list of countries with 16.55 lakh of such deaths in 2011. Children below the age of 19 die from an unintentional injury and 9.2 million children are treated in the Emergency Department for an unintentional injury (PTI, 2012). Unintentional injury is the leading cause of childhood mortality and morbidity in the world. An injured child encompass physical, mental, emotional and financial consequences to family, community and society (Taylor, 2011).

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Childhood injuries among children living in the lower and middle income country are three times higher the risk of mortality than those who live in high income countries (Bartlett, 2002; Peden, 2008). Children below five years are having the anatomical and physiological character difference, restricted mobility and curiosity of the age which make them suffer more injury than the older children.

Many countries like Iraq, Bangladesh and Pakistan along with India have found a significant burden of injuries in the younger age group (Naghavi *et al*., 2010; Rahman, Rahman, Linnan, Giersing, & Shafinaz, 2004; Razzak, Luby, Laflamme, & Chotani, 2004). Minimizing the load of childhood injury is an international health goal; the most important of this agenda is an interdisciplinary perspective. Just like how the diseases are preventable many of the childhood home injuries are also preventable. In this context behavioral sciences play a major role in the injury prevention strategy development.

Many injures happen for the children are closely associated and it is visible or invisible to the child.

Importance of Health Belief Model (HBM)

HBM is one of the very frequently used theoretical model in the health behavior change. As on August 10th 2015 in PubMed search on usage of health belief model brought out621 full articles and in CINHAL Plus gave 607 full text articles. These two search results itself proved the considerable high usage of this theory than any other behavioral theory. One of the major reason for this can be this theory is the first theories in the field (Hochbaum *et al.,* 1952). Another important reason can be its applicability in any setting in community, home or even in hospital (Lajunen & Rasanen, 2004).

The family is ''a unit where the interaction of persons occurs'' (Walsh, 2007). Hence, the relationship paths between mother, father, caregivers and children, all are straight or accidental (arbitrate or fair). Straight effect can be between the caregiver and the child interactions. In many situations the type of injury will be directly related to the caregivers' inability to maintain day to day caring activities at home like supervision during play and bathing of the child. Indirect effects include those directed through a caregiver; the demands of caring for the injured child may lead to lack of attention to other members of the family. According to the HBM, all human beings will perform a behavior when they themselves understand the benefit of the behavior to their satisfaction (Assari, 2011).

Frameworks for Planning an Injury Prevention Program

Planning an intervention on injury prevention is seeking the attention in recent years. Ineffective planning is the major reason for the poor injury control and low health promotion activities in the early times (Howat, Jones, Hall, Cross, & Stevenson, 1997). This in turn leads to provide lot of attention for different models in injury prevention models.

Community Based Interventions Success

There are many common elements for all successful community and home based interventions. The use of many strategies together with the background of theory of behavioral change is essential for success. In a community and home based intervention programs, the design and the evaluation methodology used will directly decide the effectiveness of the program. Interventions are highly effective when they are coherent into the community, home and the methods are customized to address the special community attributes (Taylor, 2011). RCTs' bring out the most informative and reliable results. In the recent years community especially home based intervention programs are gaining its momentum in the protection of health, prevention of injury and promotion of safety (Cao, Chen, & Wang, 2014). The highlight of community based projects is the member participation and collaboration with local group establishments. Education in any form is an indispensable content of any home- based injury prevention intervention program and is effective for reducing the injury among children below the age of five years, who spent most of their time at houses. In this article the researcher is trying to explain the utilization of health belief model in the preparatory phase of intervention. Childhood injuries at home is an iceberg of a phenomenon (Renu & George, 2014). From the previous reviews and personal experience of working with children, the researchers felt the need of developing an intervention for the child safety at home. The best used behavior changed model for this aspect is Health Belief Model so researchers incorporated the model in the measurement and interventional package development.

Health Belief Model

The Health Belief Model (HBM) (Janz & Becker, 1984) originated in 1950s as a systematic method to explain and predict preventive health behavior (Cheraghi, Poorolajal, Hazavehi, & Rezapur-Shahkolai, 2014; Murray-Johnson *et al*., 2005). Rosen stock's model focuses on the two different aspects of health behavior they are the perception of threat and behavioral evaluation. Anticipated consequences of injury and injury susceptibility are the two important components of threat perception of any of the home safety program. Two definite sets of beliefs takes the charge of behavioral change: they are the barriers and benefits which later affect the injury incidence. Besides to threat perception and behavioral evaluation, "cues to action" component was also included in the HBM. "Cues to action" refers to triggers to change injury related likelihood of behaviors (Lajunen & Rasanen, 2004).HBM are composed by 5 factors (Hochbaum *et al*., 1952). Each factor in HBM theory and how it can be used in the preparation of a home safety program is explained next.

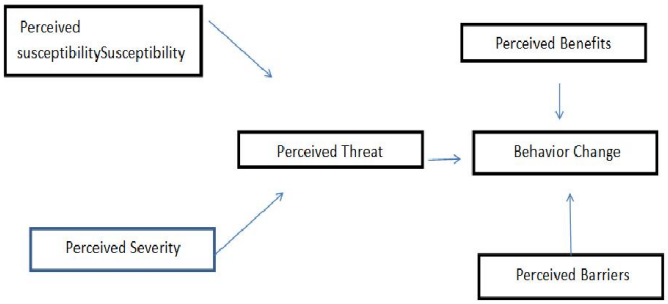

Fig.1. Health Belief Model Concepts (Hochbaum and Rosenstock 1952)

Theoretical Constructs

In the Health Belief Model the perceived seriousness and perceived susceptibility together considered as perceived threat. These two in a situation is completely depend on the early understanding of the situation; for instance the injury to a child if the caregivers consider the pain and suffering to the child and financial and other family burden going to have because of injury she/he consider it as threat Fig. 1.

Perceived Susceptibility: (PSUS)–The model foresee that individuals who identify themselves are prone to a health problem will occupy in behaviors to minimize their risk of developing the health problem (Janz and Becker, 1984). The caregiver is having his/ her own feeling of probability of experiencing home injuries. The people who are considering themselves as low risk of injury may deny that they are at risk

of contracting injury. Those individuals consider themselves at the high extreme of susceptibility will really take proper measure to prevent injuries.

Perceived severity (PSER): It is a verbal assessment of seriousness of the problem and what are the future consequences of it (Janz & Becker, 1984).

According to this model those individual who think a problem is major will enroll in activities which reduce the occurrence (or reduce its severity). Perceived seriousness is the one where caregivers think that injury with knife on a child will cause pain, and a burn from fire wood can cause life long deformity. A care giver may think a fall during the child play is a developmental need, at the same time she feel if the child fall and break the hand or leg it will cause major financial burden. It is very necessary to consider the emotional and financial burdens while considering the seriousness of childhood injuries.

Perceived Benefits (PBEN): Perceived benefits refer to an individual's assessment of the value or efficacy of engaging in a health-promoting behavior to decrease risk of disease (Cao *et al*., 2014). Any human being who believes that an action will decrease the susceptibility to a health issue or decrease the seriousness then the person will involve in a behavior regardless of effectiveness of action. The caregivers who believe that keeping cribs near floor will prevent the child falling from crib are more likely to practice that than those who do not believe in it. The action for preventing childhood injury is the next step to foresee after an individual identify the susceptibility of injuries and admit the consequences. A person will direct his action based on his/her beliefs of action.

Perceived Barrier (PBER): Perceived barriers refer to an individual's estimation of the hurdle for behavior change. In a life threatening situation if the individual believe that a particular action will minimize the risk, then also barriers will prevent him from those actions. The common barriers expressed by the caregivers' are financial burden and difficulty or unpleasant in performing the change of action.

Modifying Behaviors (MBE): The perceptions of each individual will vary with their demographic characteristics and psychosocial variable (Morrongiello, Zdzieborski, Sandomierski & Munroe, 2013). The term perceptions include the perceived seriousness, susceptibility, benefits and barriers. The demographic variables can be age, sex, number of children in the house. Psychosocial factors include the family income, caregivers' educational status and house facilities.

Cues to Action (CTA): All health promoting behaviors are in need of a trigger or cue. These cues can come from within or from outside. Internal cues can be pain. External cue can be information, advices and motivation from others (Cao *et al*., 2014). A caregivers' recognition of the levels of susceptibility and seriousness decide the force of action. The difference between benefits and barriers says the way of action. In the Health Belief Model "Perceived barriers" are proved to be the most powerful dimensions by various study designs and behaviors. "Perceived Susceptibility" is considered to be a stronger contributor in understanding Preventive Health Behavior (Janz & Becker, 1984). The outcome measure influence the program's effectiveness, therefore, injury rates should be used whenever possible. Whatever is the outcome selected the assessment of program effectiveness require careful and thorough statistical analyses through the control of dummy effects which happen as repeated measure overtime effect (Taylor, 2011).

All community interventions on the basis of HBM have been proved effective in bringing out behavioral changes in caregivers (Carpenter, 2010; Zhang, Dalal, & Wang, 2013). Many systematic reviews have proved the effectiveness of HBM (Carpenter, 2010; Webb, Sniehotta, & Michie, 2010; Zhang *et al*., 2013). The HBM makes sure the behavioral changes are very critical social cognitive determinants of behavior so interventions should directly centered on them.

Measurement Instruments and Intervention Program using HBM Concepts

After a detailed literature search and discussion with expert researchers and subject experts the tools were developed to assess the home safety and injury history of children. In these tools it was taken care all the aspects of the constructs.

Table 1. Example of Item Mapping of Injury History and Home Safety Using Health Belief Model

PSUS	Running to the road/street A hit by a vehicle	Threat perception
PSER	A burn from fire wood A burn for electric iron	
PBEN	Matches and lighters away from child reach Bucket and water source always covered	
PBA	Pot in the fire have handle away from entrance Fire place is down	Behavioral Evaluation
CTA	Video on Safe home safe Child Simulation on Safety at home Poster on Safe Home safe Child	Community Education Home Safety

Community Education Component

The community education component of the intervention pogramme consist of two parts

Video

A 10 minute video which demonstrate the common unsafe environment in the house and how children get injured in the house. The video also demonstrate how to overcome the unsafe environments in the house and make the home a child safe place. The preparation of the video itself is a separate article. The video was prepared considering the present setting of the study and common safe and unsafe practices involved by the study samples. The preparation has followed all the steps of visual media preparation.

Simulation

The second part of the intervention there is a simulated setting in the place where the common unsafe practice of the part of the community is depicted and along with that the safe environment also shown. Eg.

A bucket with water is kept open as unsafe and a bucket with water is covered and kept as safe. The simulation was planned on the basis of the principle of education "if I hear I forget if I see I remember and if I practice I learn."

Home Safety Component

The home safety component of the intervention program consist of four parts Aself reported home safety assessment where the caregivers express their feeling of the particular situation is safe or unsafe in the house. This provides the caregiver a chance for self assessment. It also gives an opportunity for the researcher to identify the understanding of caregivers' on safety at home. The item in this tool takes care of perceived barriers and perceived benefits. An observation of the safety of home environment is carried out by the researcher, which makes sure the safety practices of the caregivers'. This assessment will help the researcher to plan the home tutorial which is the guidance to make the unsafe environment as safe. The HBM concepts of perceived barriers and perceived benefits are taken care in this tool too.

Home tutorial: Based on the assessment of the observed safety and self reported safety the researcher guides and directs the caregiver the changes or modification which they can practice to make the home a child safe place. This part of the intervention is on the basis of cues to action.

A poster: of safe and unsafe environment was given in all houses included in the study and it was fixed on the wall. Eight common unsafe practices were taken into consideration in the preparation of the poster. This intervention phase is taking care of the cues to action.

DISCUSSION

Health Belief Model (HBM) is all around the scheme of an individual's readiness to change which results from their perceived susceptibility and seriousness to an adverse health outcome. A multisystem, flexible approach is needed to booster community and family resources than focus on individual defaults. When we plan the caregiver focused safety interventions for injury prevention, the researcher should make very clear the differences of individual, family and community differences. The advantages of this article are it includes applying theory-based intervention, in all the phases of the development.

HBM is an important model since it helps in predicting the behavior. This is a very useful model because it helps to understand health behavior, predicts the future behavior it directs the potential modifiable behavior. Russell, (1991) developed a tool to assesses injury prevention education programs for caregivers. The objective of this tool was to measure the maternal childhood injury health beliefs and social influence. The tool was developed based on the Health Belief Model, and composed of six scales that measure injury susceptibility and seriousness, benefits and barriers of injury prevention, self-efficacy of injury prevention performance, and social influence. The tool demonstrated high scores of validity and reliability.

Even though many studies support the effectiveness of HBM in behavioral change there are evidences questioning the predictive power of this model on behavior change (Armitage & Conner, 2010). There is no visible meta-analysis on interventions on caregivers' to check the HBM's power and effectiveness on childhood injury prevention or on home safety intervention programme. Studies recommends the use of health belief theory in implementing the programs. But applying the concepts in preparatory phase is not well explained in published articles. The researcher assumes that increasing perceived severity, perceived susceptibility, perceived benefits, perceived barriers and cues to action and modifying factors will increase the caregivers' participation and involvement in care.

Summary

In summary, the community-based efforts can effectively change the behaviors of caregivers. To maximize the likelihood of success, efforts should be targeted broadly to increase caregivers' awareness of the importance of making the minor changes in the home environment and increasing the supervision of children. The programme provide informational and instrumental support with a minimal financial burden. More studies needed to examine the use of Health Belief Model in the developmental phase of the interventional programme. The examination of HBM with other useful models also a thought provoking area.

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