Predictors of Unintentional Home Injury in Toddlers: Empirical Testing of A Causal Model

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Abstract: The purpose of this study was to test the Klommek Model of Unintentional Home Injury in Thai Toddlers, a model expanding the work of others. Most unintentional home injury to toddler studies have shown complicated interactions among child attributes, parental supervision attributes, and home physical hazards. However, no set of predictors of unintentional home injury has been clearly investigated empirically. This study's sample consisted of 247 mothers of 1-3 year-old children living in Bangkok. Mothers were interviewed with seven questionnaires: A Demographic Questionnaire, Child's Temperament for Injury Risk, Parental Protectiveness, Parental Supervision, Parental Tolerance for Child's Risk Taking, Parental Fate Belief, and Unintentional Home Injury in Toddlers. Additionally, mothers' homes were naturalistically observed, guided by The Home Physical Hazard Checklist. Data analysis used descriptive statistics and Structural Equation Modeling to explore direct and indirect effects on unintentional home injury risk in toddlers. Results indicate that child temperament had the greatest significant direct (positive) effect on unintentional home injury while parental supervision and protectiveness had significant direct negative effects. Parental supervision mediated the link between child temperament and parental protectiveness and unintentional home injury. Finally, a modified Model accounted for 37% of the overall variance in the prediction of unintentional home injury in Thai toddlers. In conclusion, while validation in other samples is warranted, these findings suggest that nurses and other health policy makers should target the caretakers of toddlers for education to prevent home injury.

Introduction

Unintentional injury is defined as any injury from unspecified causes from actions of a person or environment that make a wound or tissue damage to body parts of a human without purpose of harm.[1] Globally, unintentional injury is considered the foremost killer of young children. In 2012, Public Health England reported that 62 children aged 0-4 years died from unintentional injuries in and around the home, approximately 40,000 admitted to hospital, and

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around 450,000 attended emergency department.[2] Unintentional injury is not only depriving children of their lives but also leads to billions of dollars lost annually in medical care costs, loss of children's life quality, and parents' loss of productive work.[1,2] Thailand also has had a high child mortality and morbidity rate due to unintentional injury. During 2008-2009, 8.2% of injured children went to hospitals or clinics and 1.9 % of them were admitted to hospitals.[3] Specifically, in 2009, the leading cause of unintentional injury from drowning in children ages 0-4 years was higher than in children aged 10-14 years.[4] Unintentional injury has led to death, permanent disability, hospitalization, and non-hospital treatment in young children worldwide.

Unintentional injury among young children has been of interest for the disciplines of epidemiology, behavioral sciences, and psycho-sociology. Early studies emphasized epidemiology and included describing the characteristics of the host, the kinds of agents, and the elements of the environment which potentially influenced injury.[5] Knowledge was extended by psychological analysis that recognized the complex interchanges between individual behaviors and environmental hazards related to injury.[6] In addition, an empirical study found that children's attributes did not occur in isolation but rather were influential within a complex set of parental supervisory attributes, as well as the environmental and broader sociocultural contexts.[7,8] Therefore, it is likely that interrelationships among children's attributes, parental supervisory attributes, and environmental hazards explain unintentional injury in young children.

Conceptual Framework

The development of this model was guided by Garzon's conceptual framework[9] and other concepts from the literature reviewed.[7,10] These sources suggest that the main factors contributing to the unintentional home injury of toddlers include both risk and mediating factors. Risk factors related to unintentional home injury

in toddlers include child gender, child temperament, and home physical hazards. Male gender, difficult temperament, and low quality of housing are each positively associated with unintentional home injury in toddlers. Mediating factors extend this study's casual model beyond Garzon's framework by allowing for mediated relationships between child gender, child temperament, home physical hazards and unintentional home injury in toddlers. These mediating factors include parental supervisory attributes, particularly parental protectiveness, closeness of supervision, tolerance for child risk taking, and fate beliefs.[7,9,10] Parents provided less close supervision of boys than girls and were more tolerant of risk-taking in boys.[7] A child with a difficult temperament whose parents supervised closely had less injury than a child with an easier temperament with less supervision.[10] Parents provided closer supervision to young children living in high-risk environments than those in low-risk environments.[9] Moreover, parents, who showed a tendency to protect their children through modifying and removing home hazards had children with fewer injuries than parents who did not provide adequate protection.[9] Hence, all of these concepts, representing child, parent, and environmental characteristics, are proposed to have complex lin¡ks rather than individual or direct links to risk of injury.

Review of Literature

Unintentional home injury in toddlers: Risk of unintentional home injury in toddlers was defined as the likelihood of injury, not intentionally caused, to boys or girls aged 1 - 3 years old inside or around their home. Numerous investigators indicate that most unintentional injuries among toddlers occur in and around home.[11,12] Toddlers have particular kinds of injury due to their developmental stage. They have rapidly developing motor skills, identity, autonomy, and self-esteem while they still lack knowledge, experience, and decision-making skills to make a

reasoned judgment about safety, thus adding to their risk of unintentional injury.[13]

Children's gender: Gender has direct and indirect effects on unintentional home injury. Boys display riskier behaviors and a greater risk of injury than girls.[7] Morrongiello and colleagues[14] found that boys had more injuries than girls in playrooms and during dinnertime. Boys are also likely to have more injuries affecting the head and neck than girls. Parents supervise their boys less than girls and believe that boys hardly listen to their warnings.[14] Furthermore, parents believed that they were less able to control and protect boys from injury risk than girls even though boys were more prone to injuries.[14] Being boys are more significant in the prediction of unintentional injury occurrence, than being girls. Nonetheless, there were still other child characteristics involved in injury risk, such as a child's temperament.

Children's temperament: Children's temperament is defined as a relatively specific inborn characteristic or behavior that is not easily altered. Categories include: 1) a difficult temperament, referring to children who are highly active, unpredictable in their habits related to hunger, sleep, or elimination, and to have a negative approach to new stimuli in general life, are highly intense, and have negative moods; 2) an easy temperament refers to children who have regular or predictable habits, a positive approach to life in general, and are generally positive in mood; and 3) lastly, the slow to warm-up temperament which refers to children who have a low activity level, and low approachability, adaptability, and are mild in intensity with variable rhythmicity.[13] Empirical evidence indicates that a young child with difficult temperament is more likely to have unintentional injuries. A child's difficult temperament has been conceptualized and measured in a variety of ways but findings consistently show that more difficult characteristics, such as having a high level of sensation seeking, and less inhibitory control, were each associated with greater injury.[7] Furthermore, the effects of a child's difficult temperament interact with parental supervision in its influence on unintentional injury.

Children with difficult temperament tend to have parents who more closely supervise them whereas children who had high self-control had parents who provided less supervision.[15] Additionally, a child's difficult temperament interacted with parental supervision in its contribution to injury. Morrongiello and McArthur[7] pointed out that children who had high scores in behavioral intensity were more exposed to injury when they were not supervised than children with low intensity. Consequently, measurement of child temperament is an important for testing a predictive model for unintentional injury.

Home physical hazards: In the United States hazards causing injury to toddlers include non-gated stairways, accessible sharp instruments, and hot water tap temperatures over $49^{\circ}C$.[8] These hazards relate directly to the likelihood of specific types of injury. For example, children in homes that had hot substances lying on the floor or otherwise accessible hot liquids/objects around them are more likely to experience burns.[11] In Egypt, a study revealed that injured children had more home hazards from unsafe storage of sharp objects than non-injured children.[16] Similarly a study in China found that injured children were more likely than non-injured children to live in houses with improper storage of medicine and inappropriate placement of heating devices.[17]

Parental supervisory attributes: Recent research showed that the parental supervisory attributes related to unintentional child home injury were: parental protectiveness, closeness of supervision, tolerance of children's risk taking, and fate beliefs.[18] Parental protectiveness has been described as the ability of parents, as well as their specific behaviors and attitudes, that focus on keeping their children safe from injuries.[19] Parents' reports showed that parents who possessed strong attributes of protectiveness had children who experienced fewer injuries.[10] Morrongiello and colleagues[20] found that parents of non-injured children had higher protectiveness than parents of injured children.

Parental closeness of supervision has been defined as parental judgments about whether or not they need to supervise their child more closely or to provide directed or undirected supervision, or intermittent supervision of their children in each situation.[19] Numerous studies found that parents who had high scores for close supervision exposed their children to fewer injuries.[10,18] Similarly, the results of other studies of parental beliefs related to continuity of supervision found that mothers who could not constantly supervise their young children at home, but frequently checked on their children, had children who experienced fewer unintentional injuries requiring medical attention.[18]

Parental tolerance for children's risk taking was described as parents encouraging or letting their children approach new environments or enjoy doing something they were not supposed to do.[19] Research on the relationship between parental tolerance of child risk-taking and unintentional injuries among children found that parents who permitted their child to freely experiment with and explore their environment instead of focusing on their children's misbehavior and imposing discipline on them, had children who were exposed to more injuries.[10] Additionally, reasons given by parents who were tolerant of risk-taking which resulted in unintentional injuries included that the child would benefit from minor injuries that would teach their child about the consequences of risky behavior.[21]

Parental fate beliefs are defined as parents' beliefs that the injury status of their children is predominantly determined by luck or fate.[19] Parents who believed their child's injury was predominantly driven by luck or fate, had children who experienced more injuries than parents who believed that they could control their children's risk of injury.

The reviewed literature clearly revealed complicated interactions among child gender, child temperament, home physical hazards, parental supervisory attributes, and unintentional home injury. Therefore, building on the theoretical and empirical work of others, this study proposed the causal Klommek Model of Unintentional Home Injury in Thai Toddlers (hereafter 'the Model), and tested the direct and indirect effects among predictors of unintentional home injury in Thai toddlers. Study results can be used to guide development of a nursing intervention to prevent unintentional children injury in the home and the community. Additionally, a better understanding of the underlying causes of unintentional injury risk in toddlers at home is essential.

Study Hypotheses

This study tested the following hypotheses, which were drawn from the proposed Model, to identify key factors that are associated with unintentional home injury (UHI) in Thai toddlers. 1) Child gender, Child temperament, Home physical hazards, Parental tolerance for child's risk taking, and Parental fate beliefs each have direct positive effects on UHI, 2) Parental protectiveness and Parental supervision have direct negative effects on UHI, and 3) Child gender, child temperament, and home physical hazards influence UHI through parental protectiveness, supervision, tolerance for children's risk taking, and fate beliefs. See **Figure 1.**

Methods

Design: A descriptive model-testing, cross-sectional design.

Sample and Setting: The target sample consisted of 250 mothers and their 12-36 month old child residing in an urban district in Bangkok. Participants were drawn using a multi-stage stratified random sampling technique for selection of each included community, and convenience sampling for recruiting individual mother-child pairs (**Figure 2**). Data were collected from November 2013 to February 2014. The sample size reflects that Structural Equation Modeling (SEM) requires a minimum sample of 200-300 subjects to maintain power and obtain
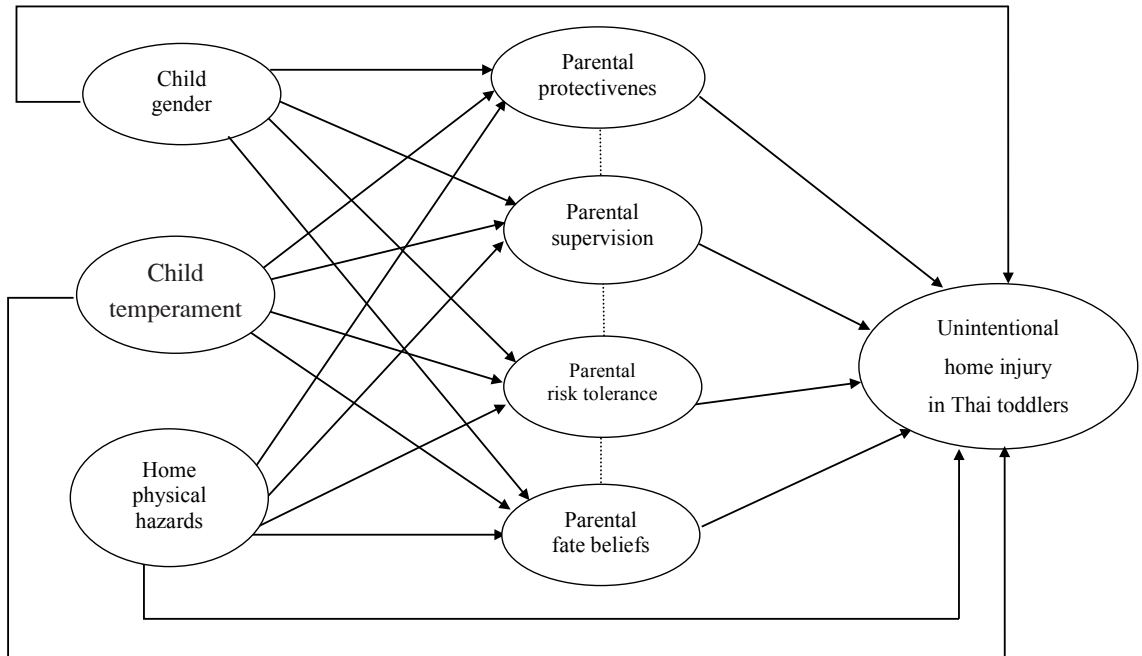
Figure 1 The hypothesized Klommek Model of Unintentional Home Injury in Thai Toddlers
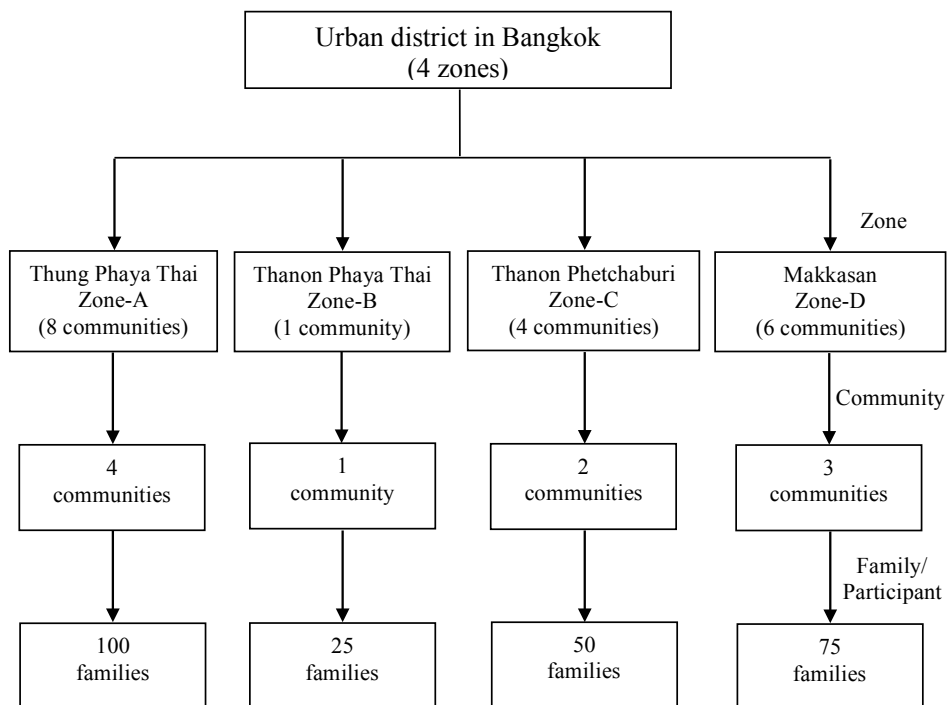

Figure 2 The multi‒stage stratified random sampling method used in this study

stable parameter estimates and standard errors.[22] Inclusion criteria were that mothers: were aged ≥18 years; had a healthy child in the requisite age range: resided in an urban district in Bangkok for at least 6 months; were the primary caretaker for the child who they had continuously reared for at least the most recent 6 months; were able to read and write in Thai; and willing to participate in the study. The urban area was selected because it is located in the inner group of Bangkok districts and it is a highly populated area packed with housing. Communities in the district are classified into three types according to population density and the condition of dwellings: 1) congested one-story wooden houses, 2) two-story wooden or half solid structures, and 3) apartments. Each community sampled for this study belonged to type one or two.

Ethical Considerations: Approval was received from the Institutional Review Board of the Faculty of Nursing, Burapha University, prior to data collection. Each potential participant was fully notified in writing and given a participative permission request. Potential participants could agree or refuse to join the study without any consequences. They were given the opportunity to discuss the purposes of the study and assured of the confidentiality of their answers. Identity concealment was accomplished by the assignment of code numbers to each participant and each questionnaire. The list showing the correspondence between the code numbers and participants' identifiers was kept separate from the data and will be destroyed after publication of the study findings.

Instruments: Eight questionnaires were completed by the child's mother or by a data collector based on an interview with the target child's mother and by the data collector's home observation. The questionnaires used were originally developed in English and included: the Child's Temperament for Injury Risk, the Home Physical Hazard Checklist, the Parental Protectiveness, the Parental Supervision, the Parental Tolerance for Child's Risk Taking, the Parental Fate Belief, and the Unintentional Home Injury in Toddlers. After receiving the permission of the instruments' authors, each questionnaire was translated into Thai and the translation validated by using back-translation and comparison of the new English version with the original English version. Additionally, the content validity and language suitability of the new Thai versions were verified by four experts in child injury. Then, a Content Validity Index (CVI) was calculated for each questionnaire and found to be acceptable. The CVIs of the Child's Temperament for Injury Risk, Home Physical Hazard Checklist, Parental Protectiveness, Parental Supervision, Parental Tolerance for Child's Risk Taking, Parental Fate Belief, and Unintentional Home Injury in Toddlers were .91, .94, 1.0, .89, .88, 1.00, and 1.00 respectively.

The Demographic Questionnaire, developed by the researcher, was used to collect information about the children's and mother's characteristics.

The Child's Temperament for Injury Risk was measured by the Injury Behavior Checklist.[23] This was used to measure expression of each child's risk-taking behavior (e.g. "Plays with fire", "Stands on chairs"). Each item ranged from 1 (not at all) to 5 (very often). The total sum of the scores ranged from 23 to 115, with high scores indicating children with a high level of risk taking behavior or a difficult temperament and a low score pointing to child with a low level of risk taking behavior or easy or slow to warm up temperament child. For this study, there was a total of 23 items with Cronbach's alpha of .91.

The Home Physical Hazard Checklist was measured by adaptation of the Home Injury Survey.[24] There were 2 parts used in this study. Part I records an observer's assessment of the home's general characteristics on 10 items (e.g. "Type of dwelling", "Home location"). Part II allows the observer to record yes/no indicating the presence or absence of 51 home physical hazards (e.g. "Are there stoves?", "Is there stairway?"). The total sum of the scores ranged from 0 to 51, with high scores indicated a high risk for child injury, and low scores indicated a low risk. Inter-observer reliability calculated for this study

was $r = .93$, $p < .01$ based on two observers ratings of the same households.

Parental Protectiveness was measured by the 9-item Parental Protectiveness Subscale from the Parental Supervision Attributes Profile Questionnaire (PSAPQ).[19,25] This subscale measures a mother's feelings, thoughts, and actions that prevent injury or make sure their children are safe from all dangers both inside and around their home. Mothers were asked to rate items on a 5-point scale, ranging from 1 (not true) to 5 (strongly true) (e.g. "I feel a strong sense of responsibility"). The total sum of the scores ranged from 9 to 45. Higher scores indicate that mothers had greater ability to protect their children from injury and lower scores indicated that mothers had low ability to protect their children from injury. Cronbach's alpha on this scale in our sample was .79.

Parental Supervision was measured by the subscale measuring supervision on the PSAPQ.[19,25] This subscale identifies the mother's watching, hearing, observing, or controlling their children's whereabouts or appropriateness of play inside and around their home. For this study, mothers rated all 9 items on a 5-point rating scale ranging from 1 (not true) to 5 (strongly true) (e.g. "I keep a close watch on my child"). Items # 4 and # 6 had a negative meaning and were reverse scored. The summed scores potentially ranged from 9 to 45, with higher scores indicating that more close supervision of their children and lower scores indicating that mothers provided less or inadequate supervision of their children. Cronbach's alpha obtained for this subscale in this study was .67.

Parental Tolerance for Child's Risk Taking was measured by the subscale of the same name in the PSAPQ [19,25] to assess mothers' allowing, or not preventing, their child's having risky experiences or activities inside and around their home. Mothers were asked to rate the 8 items on a 5-point rating scale ranging from 1 (not true) to 5 (strongly true) which produced a subscale score from the summed items ranging from a possible 8 to 40 (e.g. "I let my child do things for him/herself"). Higher scores indicated that mothers allow or encourage their children to play

with objects or the environment around them, and lower scores indicated that mothers do not allow or encourage their children to play with objects or the environment around them. This subscale achieved a Cronbach's alpha of .84.

Parental Fate Beliefs were measured by the Fate Beliefs subscale of the PSAPQ.[19,25] This assesses a mother's beliefs that children's risk of injury is a matter of good or bad luck. The Parental Fate Beliefs subscale contained 3 items (e.g. "When my child gets injured it is due to bad luck"). Mothers rated the 3 items on a 5-point rating scale ranging from 1 (not true) to 5 (strongly true) yielding total scores from 3 to 15, with higher scores (>12 scores), indicating the belief that their child getting injured was due to bad luck. Lower scores (<12 scores) indicate that that they did not believe that their children getting hurt was due to fate. Cronbach's alpha for this subscale was .75.

Unintentional Home Injury in Toddlers (UHI) was measured by a modified form of the Perception of Risk of Injury scale.[26] It measures whether or not children aged 1 – 3 years old experience an incident of unintentional injury in the past six months inside or around their home. Mothers were asked to rate all 14 items on a 5-point rating scale ranging from 0 (least likely) to 4 (most likely) (e.g. "falls", "burn"), yielding a total sum of 0 to 56, with higher scores indicating children have a great unintentional injury and lower scores pointing to children having a minimal home unintentional injury. Cronbach's alpha for this measure was .82.

Data collection: After receiving IRB approval, 3 research assistants were trained by the researcher to complete all study procedures. The researcher or the research assistants contacted community leaders and explained the criteria for participation. Then community leaders took the research team to meet with each potential family to make an appointment with the mother. At that appointment, written informed consent for completing the interview and the home observation was obtained. Data collection in a given home took approximately 1 hour.

Data Analysis: The demographic characteristics of the sample were described using descriptive statistics and relationships between each continuous predictor and UHI were calculated using Pearson's Correlation Coefficients. The magnitudes of both direct and indirect effects of the important characteristics on UHI were analyzed with SEM.

Results

Participants included 250 mothers with a single 12–36 month-old child. Approximately 50% of mothers were between 21 to 30 years old. Most were married, had graduated from the higher elementary school level, and were housewives and laborers, and had an adequate family income but no savings. Slightly more than half of the children were boys. First-born children comprised 45.6% of the sample. Most sampled households had one (36%) or two (36%) children younger than 15 years living in them. Most of the homes were single story/studio (55.6%) and consisted of a bedroom, a bathroom, and a kitchen. More than 90% of the homes were used for dwelling only, and located near/next to a small street in front of a house (64%). Nearly 30% of mothers' phones included recorded emergency numbers for the hospital (14.4%), police station (8.8%), or ambulance station (3.2%). One third of homes (30.4%) had baby walkers

and most of these (26.8%) had not had the wheels removed. The majority of the families' vehicles were parked nearby their homes (50.8%).

The data for the 250 recruited families were tested for univariate outliers and these cases were deleted. Consequently, the final sample contained 247 participants. The correlation matrixes of variables are presented in **Table 1**. **Table 2** presents each criterion, the acceptable score for the model-fit index, and the achieved statistics for the original hypothesized model and the modified models. The findings do not support the original hypothesized model. Consequently, the hypothesized model was modified by deleting each of 14 non-significant parameters, one by one, until the set of remaining estimated parameters achieve the criteria for model fit. The final modified model was identified by reaching goodness of fit. The modified model partially supported the research hypotheses. Child temperament had the greatest statistically significant positive direct effect on UHI (b = .53, p < .001). Parental supervision and protectiveness each had a statistically significant negative direct effect on UHI (b = −.17, p < .01 and (b = −.11, p < .05). Additionally, parental supervision mediated the link between child temperament and maternal protectiveness and UHI. Finally, the variables in the modified model accounted for 37% (R^2 = .37) of the variance prediction for UHI (**Figure 3**).

Table 1 Correlation matrix of study variables (*n* = 247)

Variable	CG	CT	HPH	PP	PS	PR	PF	UHI
Child gender	1.00							
Child temperament	−.12	1.00						
Home physical hazards	.00	−.04	1.00					
Parental protectiveness	−.04	.00	.07	1.00				
Parental supervision	−.09	−.17**	.07	.45**	1.00			
Parental risk tolerance	.05	.24**	.07	.12	−.12	1.00		
Parental fate beliefs	.06	.12	−.10	−.17**	−.14*	.19**	1.00	
UHI	−.05	.56**	−.03	−.19**	−.31**	.14*	.14*	1.00

* p < .05, ** p < .01

<u>Note</u> CG = Child gender, CT = Child temperament, HPH = Home physical hazards,

PP = Parental protectiveness, PS = Parental supervision,

PR = Parental risk tolerance, PF = Parental fate beliefs, UHI = Unintentional home injury in Thai toddlers

Table 2 Statistics of model fit index between the hypothesize and modified model ($n = 247$)

Model fit criterion	Acceptable Score	Hypothesized model	Modified model
CMIN	p > .05	$\chi^2 = 7.76$ p = .051 (df = 3)	$\chi^2 = 4.98$ p = .29 (df = 4)
CMIN/*df*	< 2	2.59	1.25
RMR	< .05	.69	.97
GFI	.90 − 1.00	.99	.91
AGFI	.90 − 1.00	.99	.97
RMSEA	< .05	.08	.03

<u>Note</u>   CMIN = minimum Chi−square, RMR = root−mean square residual,
       GFI = good−of−fit index, AGFI = adjusted goodness−of−fit index,
       RMSEA = root−mean−square error of approximation
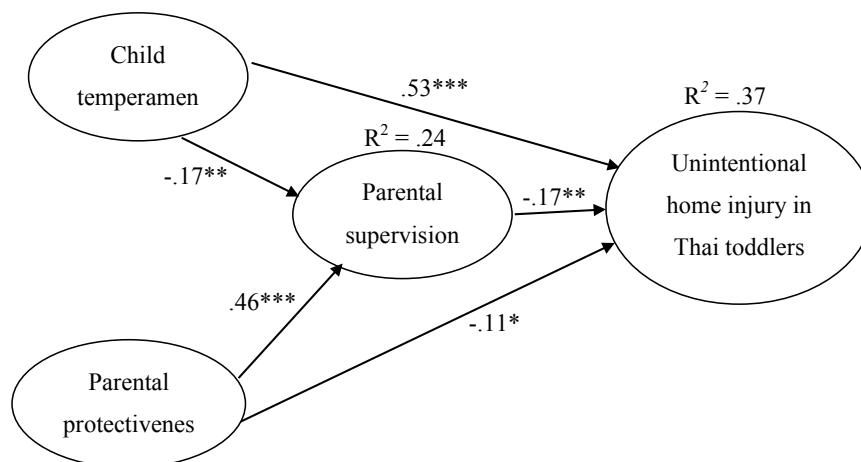
Figure 3 The modified Klommek Model of Unintentional Home Injury in Thai Toddlers
Note * = p < .05, ** = p < .01, *** = p < .001

Discussion

These findings support a modified version of the Klommek Model of Unintentional Home Injury in Thai Toddlers. The strongest to the weakest significant direct predictors of UHI were child temperament, parental supervision, and parental protectiveness, respectively.

Child temperament had a direct positive effect on UHI. It indicated that a child with difficult temperament or a high level of risk taking behavior was more exposed to UHI. Consistent with this finding, numerous prior studies demonstrated that children's hyperactivity, aggressiveness, intensity, and negative moods were highly, positively, correlated with unintentional injuries.[10, 27]

Child temperament also had a direct negative effect on parental supervision. It could be implied that children with difficult temperaments are less closely supervised. This finding seems inconsistent with prior studies, which found that parents of young children with difficult temperaments provided closer supervision than did parents of easier temperament children.[15]

There was a statistically significant direct negative effect between parental supervision and UHI. Parental supervision of toddlers acted as direct reaffirmation of their children's current activity and parents exhibited continuity of supervision so that supervision continually preceded their children's behaviors.[18] Inversely, parents who reported inadequate supervision had children who were exposed to more injury risk and UHI.[27] Practically, most parents cannot provide close to their children at all times, but if they frequently check on their child, they will have less UHI.

Parental protectiveness showed a significant direct negative effect on UHI. This indicates that mothers with high protectiveness had toddlers who experienced less UHI. This characteristic was consistent with prior research.[27] Mothers provided more attention to their children's activities when their children were in locations in their homes with greater risk such as the kitchen, dining room, or bathroom. In addition, the study by Morrongiello and colleagues[20] reported that mothers who had high scores for being protective were more likely to successfully protect their child and had child who experienced fewer unintentional injuries at home.

Parental protectiveness also showed a direct positive effect on parental supervision. The evidence indicated that mothers who were protective of their children or who thought about their children's injury risks, demonstrated closer supervision than did less protective mothers. This suggests that parental protectiveness might be the cause of increased parental supervision. However, there was little literature supporting the idea that parental protectiveness had a direct positive effect on parental supervision. There is a finding of Morrongiello and Corbett[19], which demonstrated a relationship between parental protectiveness and supervision among children aged 2 to 5. They found that parental protectiveness was the characteristic most positively associated with parental supervision. Therefore, the next study should

test whether there is a causal association between these two variables.

As for indirect effects, there were two predictors that had a significant indirect effect on UHI, child temperament and parental protectiveness. These characteristics operated through parental supervision. The estimated parameter from child temperament to UHI had a significant positive indirect effect on UHI through parental supervision ($b = .03$, $p < .001$). The total effect of child temperament was positive ($b = .56$, $p < .001$). It indicates that difficult temperament children accounted for more UHI when their mother provided low levels of supervision, a finding consistent with previous studies.[15] Practically, hyperactive children are rarely left unsupervised and their mothers supervised them more closely than mothers of children with normal activity levels.[10] Interestingly, the estimated parameter for child temperament did not show an indirect effect on UHI through parental protectiveness, parental tolerance for children's risk taking, or parental fate beliefs. Hence, the findings only partially supported this hypothesis because child temperament proved to be the only significant predictor of UHI through parental supervision.

Parental protectiveness proved to have an indirect negative effect on UHI through parental supervision ($b = -.08$, $p < .05$) and the total effect was a negative relationship ($b = -.19$, $p < .05$) which had not been hypothesized. This finding indicates that parents who had more ability to closely supervise their children, had children who experienced less UHI.

The predictors that did not have the hypothesized direct effects on UHI were child gender (higher risk for boys), home physical hazards, parental tolerance for child's risk taking, and parental fate beliefs. Additionally, child gender and home physical hazards had no indirect effects on UHI through parental protectiveness, parental supervision, parental tolerance for children's risk taking, and parental fate beliefs. One potential explanation could be that parents

provide very good child rearing and protect boys and girls equally while their homes exposed children to high numbers of physical hazards their children seldom experienced severe unintentional injuries, especially from poisoning, sharp object injury, and motorcycle accidents. A previous study found a similar effect in that Thai parents' were more overprotective, reasoned in their action than controlling or neglectful in their parenting style.[28] Additionally, it has been consistently demonstrated in previous studies that parents who were more protective when their toddlers were engaging in risky behaviors such as using a slide, riding a bike, or sliding a chair, had children with lower rates of UHI among than those of less protective parents.[10]

Limitations

There are three limitations to this study. First, generalizability of findings to other populations is limited. While sampling procedures provided a representative sample of communities in the region from which the families were drawn, which is a significant strength of the design, the findings can only be generalized to similar urban areas. The characteristics of home physical hazards and parental supervisory attributes may be different in rural areas. In addition, the research instruments were originally developed in English and translated into Thai for the first time for use in this study. Even though back translation was performed and the back-translated version was carefully examined for conceptual consistency, translation can never be absolutely perfect and not all concepts have counter parts in another culture and language. Another important limitation is that the study's cross-sectional design precludes proving causal relationships. This study provides data that provides strong support for the modified causal model but it cannot provide proof of causal relationships. A prospective design where data on the risk factors are collected first, and the outcome, Unintentional Home Injury, is measured at a later time would provide the next level of evidence for cause.

Conclusions and Implications for Nursing Practice

This study tested and modified the proposed Klommek Three Dimensional Model of Unintentional Home Injury in Thai Toddlers and provides an understanding of the causal pathways linking predictors and UHI. Child temperament, parental supervision, and parental protectiveness are significant contributing factors to risk of UHI. This modified Model met the model-fit criteria for the data collected from a final sample of 247 mothers with a target child aged from 1 to 3 years. The findings suggest a new direction for nurses in pediatrics, community education, and public health as they gain understanding of the associations between child temperament, parental protectiveness, parental supervision, and UHI in Thai Toddlers. Particularly, a child with a difficult temperament is at greater risk for UHI and professional nurses should assist parents to recognize the characteristics of their children that represent difficult temperament and to understand their children's behavior well to decrease injury risk behaviors. Furthermore, nurses should identify the supervisory attributes of parents such as parental tolerance for children's risk taking and parental fate beliefs. In addition, nurses should be in tune with parental supervisory behaviors and provide support and guidance to give appropriate protection and close supervision.

There are several recommendations for future research suggested by this study. First, the instruments used in this study were derived from English measures developed in Euro-American cultures. Although a back-translation process yielded measures with acceptable content validity, and internal reliability, it would be more valuable to develop measures that can ensure accuracy and completeness of concepts related to unintentional injury in Thai toddlers.

The findings from testing the hypothesized causal model of unintentional home injury in Thai

toddlers provide new information about Thai mothers of toddlers residing in urban communities. It would be useful to replicate this cross-sectional design in rural communities and to include children and their parents from higher economic circumstances. Additionally, longitudinal and qualitative designs should be implemented for stronger evidence of cause and for deeper understanding of complex interactions between parental supervisory attributes and unintentional home injury.

Furthermore, it would be beneficial to design, conduct and evaluate interventions to prevent UHI based on the three predictors of unintentional home injury identified in this study as well as information from the literature. Experimental interventions should target patterns of parental supervision in combination with children's risk taking behaviors in order to reduce unintentional home injuries.

Acknowledgements

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ปัจจัยทำนายการบาดเจ็บแบบไม่ตั้งใจที่บ้านในเด็กวัยหัดเดิน:การทดสอบเชิงประจักษ์ของแบบจำลองเชิงสาเหตุ

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บทคัดย่อ: การศึกษานี้มีวัตถุประสงค์เพื่อทดสอบกล่อมเมฆโมเดลของการบาดเจ็บแบบไม่ตั้งใจที่บ้าน ในเด็กไทยวัยหัดเดิน โดยขยายองค์ความรู้จากงานวิจัยที่ผ่านมา ซึ่งพบว่าสาเหตุการบาดเจ็บแบบไม่ ตั้งใจที่บ้านในเด็กวัยหัดเดินส่วนใหญ่มีความสัมพันธ์ซึ่งกันและกันอย่างซับซ้อนระหว่างปัจจัยด้านตัว เด็ก รูปแบบการดูแลของบิดามารดา และสิ่งแวดล้อมอันตรายที่บ้าน แต่อย่างไรก็ตามยังไม่มีความ ชัดเจนในการตรวจสอบกลุ่มปัจจัยพยากรณ์เชิงประจักษ์เกี่ยวกับการบาดเจ็บแบบไม่ได้ตั้งใจที่บ้าน กลุ่มตัวอย่างในการศึกษานี้ คือ มารดาที่มีบุตรอายุ 1 ถึง 3 ปีและอาศัยในกรุงเทพมหานครจำนวน 247 คน การสัมภาษณ์มารดาใช้แบบสอบถามจำนวน 7 ชุด ประกอบด้วยข้อมูลส่วนบุคคล พื้นฐาน อารมณ์เด็กที่เสี่ยงต่อการบาดเจ็บ การปกป้องของมารดา การดูแลของมารดา ความอดทนของมารดา ต่อพฤติกรรมเสี่ยงของบุตร ความเชื่อเรื่องโชคชะตาต่อการบาดเจ็บของมารดา และการบาดเจ็บแบบ ไม่ตั้งใจที่บ้านสำหรับเด็กวัยหัดเดิน รวมทั้งใช้แบบตรวจสอบสิ่งก่อให้เกิดอันตรายที่บ้านโดยการ สังเกตตามธรรมชาติที่บ้านของมารดา การวิเคราะห์ข้อมูลใช้สถิติเชิงบรรยายและโมเดลสมการ โครงสร้างเพื่อค้นหาปัจจัยที่มีอิทธิพลทั้งทางตรงและทางอ้อมต่อการบาดเจ็บแบบไม่ตั้งใจที่บ้านในเด็ก วัยหัดเดิน ผลการวิจัยพบว่า พื้นฐานอารมณ์เด็กมีอิทธิพลโดยตรงทางบวกต่อการบาดเจ็บแบบไม่ ตั้งใจที่บ้านอย่างมีนัยสำคัญทางสถิติสูงสุด ขณะที่การดูแลของมารดาและการปกป้องของมารดามี อิทธิพลโดยตรงทางลบ การดูแลของมารดาเป็นตัวแปรคั่นกลางระหว่างพื้นฐานอารมณ์เด็กและการ ปกป้องของมารดาต่อการบาดเจ็บแบบไม่ตั้งใจที่บ้าน สุดท้ายผลรวมของความแปรปรวนของตัวแปร ทั้งหมดต่อการพยากรณ์การบาดเจ็บแบบไม่ตั้งใจที่บ้านในเด็กไทยวัยหัดเดินเท่ากับร้อยละ 37 ผลการ ศึกษาครั้งนี้เสนอแนะว่า ผู้ดูแลเด็กวัยหัดเดินคือกลุ่มเป้าหมายที่พยาบาลวิชาชีพและผู้กำหนด นโยบายสุขภาพ ควรให้ความรู้เรื่องการป้องกันการบาดเจ็บที่บ้าน

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