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Self-efficacy of First Aid for Home Accidents among Parents with 0- to 4-Year-old Children at a Metropolitan Community Health Center in Taiwan

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Abstract: This study demonstrates that parents obtained first aid information primarily from mass media and occasionally from health and medical personnel. The findings also indicate that first aid information provided by health personnel positively affects parents' self-efficacy of first aid. Parents' knowledge and self-efficacy of first aid regarding choking management and CPR are of paramount importance.

Introduction

Accidents are a leading cause of death among young children. Every day in the member countries of the Organization for Economic Co-operation and Development (OECD), over 2,000 children die from accidental injuries, approximately 5,000 children require emergency treatment, 4 million children are hospitalized for injuries, and numerous children endure physical and mental injuries, impairment, or even severe brain damage from accidents (Lai et al., 2006; WHO, 2008). Statistics shows that children aged 0 to 4 are the group with the highest risk of accidental injury (Hardeman et al., 2011; Lai et al., 2006). According to a report by the Taiwan National Health Department, the death rate in Taiwan due to accidents for children between the ages of 0 and 4 years is twice that of children aged 5 to 14 (Department of Health, 2006).

Children aged 0 to 4 years normally stay at home. Therefore, most young children's accidental injuries occur at home (Hardeman et al., 2011; Hyder et al., 2009; Alptekin et al., 2008). Related statistics indicate that after an accidental injury to a child, prompt and appropriate first aid procedures can reduce the risk of death by 25% to 35% (Chiu, 2008; Wen and Zhou, 2008). However, when parents encounter accidental injury, they usually panic and send their child to a hospital without appropriately applying the first aid process (Shen, Tsai, Yeh, & Chen, 2007). The consequences may be disastrous for the individual and for society when the accident results in permanent disability.

First aid can be described as action provided by trained (or untrained) persons using no or minimal medical apparatus. The study results indicate that correct pre-hospitalization management of trauma has a significant influence on injury prognosis (Ye, 2008; Burford et al., 2005; Scolnik et al., 2011). If emergency cardiopulmonary resuscitation (CPR) is administered within 4 to 6 min to a child whose heart has suddenly stopped, the likelihood of survival increases by 8% to 40% (Burford et al., 2005). Appropriate first aid to reduce the consequences of injury is also a form of tertiary prevention (Conrad and Beattie, 1995).

Researchers have found that self-efficacy can be used to predict behavior during emergency situations (Suzuki et al., 2009; Chen et al., 2010). Self-efficacy is defined as an

individual's confidence in his or her ability and competence to complete tasks in certain situations (Lee et al., 2007; Chiang et al., 2004). People with high self-efficacy continue resolutely until a task is complete, whereas people with low self-efficacy tend to give up prematurely (Cheng and Lee, 2009). Related studies have discovered that parenting self-efficacy is an important variable that affects parenting skills and satisfaction and is a determinant of parenting competence (Jones and Prinz, 2005; Sevigny and Loutzenhiser, 2009; Hess et al., 2004). Therefore, self-efficacy can be used to assess related behaviors when the actual behaviors cannot be measured.

Based on the studies above, children are at high risk of experiencing accidental injuries, and parents must know how to handle children's home injuries. Most studies on accident injuries and first aid knowledge have examined students, educators, and professional child caregivers (Singer et al., 2004; Lee and Chen, 2009) and have focused on the first aid knowledge of parents (Erkal, 2010; Singer et al., 2004; Altunda and Ozturk, 2007) and injury prevention or home safety (Altunda, and Ozturk, 2007; Singer et al., 2004). However, self-efficacy to predict first aid behavior has not been investigated among parents of young children. Therefore, the purpose of this study is to investigate parental self-efficacy about first aid for children between the ages of 0 and 4 years and the factors that affect parental self-efficacy.

Methodology

Design: This was a descriptive, exploratory study using survey methods.

Subject and setting

Subjects were recruited by purposive sampling of parents with 0- to 4-year-old children in eight metropolitan community health centers in the central district of Taiwan. A total of 475 surveys were distributed; 470 were returned (98.9%) and 30 incomplete surveys were excluded for a 97.3% (n=445) completion rate.

Instruments

The survey instrument was developed from a synthesized literature review of first aid. The instrument consisted of 37 items divided into three subscales. The first subscale consisted of knowledge of first aid, including trauma, scalds and burns, choking, poisoning, and cardiopulmonary resuscitation (CPR). This subscale contained 25 questions scored true or false, with a higher score indicating a better level of first aid knowledge. The second subscale focused on parents' self-efficacy regarding first aid (the degree of confidence in managing first aid). A 12-item, five-point Likert scale was constructed, with 4 indicating 'very sure (100% certainty)' and 0 indicating 'not sure (0% certainty)'. Higher scores indicated better confidence regarding first aid. The third subscale consisted of demographic data, including age, education, participation in a previous first aid program, and experience of first aid. The questionnaire required approximately 15 minutes to complete.

The instrument's readability, accuracy, and adaptability were adequate as determined by

an expert panel and pilot test. The members of the expert panel included one scholar in pediatric nursing, one scholar in preschool education, one senior nurse in community service, one pediatric emergency physician, and one statistician. The face validity of the instrument was determined by the expert panel and had a CVI value of 0.97. The reliability of the instrument was determined through a pilot study with a sample of 34 patients. The reliability of internal consistency of 25 items on knowledge of first aid by KR20 was 0.70 at pilot and 0.69 at final study. Internal consistency of 12 items on self-efficacy of first aid by Cronbach's alpha was 0.91 at pilot and 0.89 at final study. Thus, the instrument had sufficient reliability and validity for use in this study.

Data collection and analysis

The study was approved by the Institutional Review Board of the university. Based on the study's criteria, parents of children aged 0-4 years old were invited to participate in the study at the community center. After informed consent was obtained, participants completed the questionnaires anonymously. To improve and correct the participants' knowledge of first aid, a leaflet on first aid for accidental home injuries was provided when participants completed the questionnaire. Data were collected from July 1 to August 30, 2010. Frequency distributions, ANOVAs, and correlations were used to analyze the relationships between the demographic data and parents' self-efficacy for first aid at home.

To assess the participants' knowledge of first aid as a mediator, regression analyses were applied to assess the association between variables. Given an association between the independent and outcome variables, a variable is considered to function as a mediator if the following conditions are met: 1) a significant association is found between the independent and the mediator variables, 2) a significant association exists between the mediator and outcome variables, and 3) when 1 and 2 are controlled, the direct association between the independent and outcome variables is reduced (Baron and Kenny, 1986). Statistical significance was designated at an alpha level of 0.05.

Results

Demographic data

This study included 445 subjects, of which 322 (72.4%) were females and 123 (27.6%) were males. The mean age was 33.6 (SD=5.2), with ages ranging from 19 to 50 years old. The most common education levels of the participants was a bachelor's degree (45.8%; n=204). In the study, 39.1% (n=174) of the participants reported that their children had experienced unintentional accidents at home. Among the types of home accidents, the frequent types of unintentional home injuries were falling (87.7%), scalds (14.4%), choking (8%), poisoning (0.6%), and drowning (0.6%). Thirty-five percent of the participants had attended a first aid program. Parents' first aid resources and information were obtained most frequently from mass media (52.8%), books, newspapers and magazines (44.3%), and health

care personnel (33%). Eighty-four percent of the participants were willing to participate in a child first aid program. CPR and management of choking were listed at the most urgent and important topics.

Knowledge of first aid

Scores for the knowledge of first aid ranged from 4-25, with a mean score of 18.01 (SD=3.28). The participants' total rate of correct knowledge of first aid was 72%. By the type of accident, the participants had 91.2% correct knowledge of scalds, 64.8% correct knowledge of choking, 43.6% correct knowledge of nose bleeding, and 47.5% correct knowledge of CPR.

Self-efficacy of first aid

Participants were asked about their confidence in dealing with unintentional injuries at home. The mean score for self-efficacy of first aid was 30.3 (SD=9.2), with a range of 6 to 48 (Table 1).

The mean percentage of participants who were very sure (100% certainty) about their self-efficacy for first aid was 26.6%. The highest self-efficacy for first aid was found for the following item 1, "I know how to call 119 for help when facing an accident" (76.4%). The items for which the participants had the least confidence in their ability to perform first aid were item 5, "I can perform cardio rescue (CPR) when a child has no heartbeat" (30.8%); item 4, "I can perform artificial respiration when a child is not breathing" (28.1%); item 3, "I can perform first aid (Heimlich method) when a child is choking" (23.4%); and item 10, "I can perform first aid when a young child is drowning" (22.9%).

Factors in self-efficacy of first aid

Table 2 shows that there was no relationship between self-efficacy for first aid and the level of parental education, age, income, or number of children ($p > 0.05$). Parents' gender, sources of first aid information obtained from health personnel, participation in a previous first aid programs, and parent's knowledge of first aid were associated with parental self-efficacy for first aid ($p < 0.05$).

When assessing the mediator variable, participants who had participated in a first aid program and whose source of first aid information obtained from health personnel were directly associated with better knowledge of first aid ($p < 0.01$, $R^2 = 0.46$) (Model 1, not show). Table 3 shows the association of mediator in parent's self-efficacy for first aid. Participants who attended first aid programs and who obtained resources of first aid information from health personnel were associated with greater parental self-efficacy ($p < 0.01$, $R^2 = 0.17$). As shown, parents' knowledge of first aid was found to be associated with first-aid self-efficacy ($p < 0.01$, $\beta = 0.21$) (Model 2). Introducing knowledge of first aid into Model 3 resulted in a decreased β , from 5.97 to 3.29 for parents who had attended a first aid program and from 3.29 to 2.69 for parents' whose resource of first aid information was from health personnel. The association with parental self-efficacy of first aid remained significant ($p < 0.01$, $R^2 = 0.26$).

This result indicated that parents’ knowledge of first aid was partly mediated by the association between participants’ attendance at a previous first aid program, first aid information obtained from health personnel and self-efficacy of first aid.

Table 1. Percentage of self-efficacy for first aid in unintentional injury at home (N=445)

items	100% certainty (%)	70% certainty (%)	50% certainty (%)	30% certainty (%)	0% certainty (%)	Mean (SD)	Rank
1. I know how to call 119* for help when facing an accident.	340(76.4)	84(18.9)	18(4.0)	1(0.2)	2(0.4)	3.71(0.60)	1
2. I can perform “flush, remove, soak, cover, send” when a child is scalded.	245(55.1)	143(32.1)	42(9.4)	9(2.0)	6(1.3)	3.38(0.84)	3
3. I can perform first aid (Heimlich method) when a child is choking.	64(14.4)	101(22.7)	131(29.4)	45(10.1)	104(23.4)	1.95(1.36)	9
4. I can perform artificial respiration when a child is not breathing.	49(11.0)	80(18.0)	120(27.0)	71(16.0)	125(28.1)	1.68(1.34)	11
5. I can perform cardio rescue (CPR) when a child has no heartbeat.	43(9.7)	82(18.4)	93(20.9)	90(20.2)	137(30.8)	1.56(1.35)	12
6. I can fix the injured area when a child has a bone fracture.	79(17.8)	128(28.8)	106(23.8)	77(17.3)	55(12.4)	2.22(1.27)	7
7. I can address the wounds when a child has abrasions.	265(59.6)	138(31.0)	35(7.9)	5(1.1)	2(0.4)	3.48(0.73)	2
8. I can stop the bleeding when a child has a nosebleed.	202(45.4)	155(34.8)	59(13.3)	24(5.4)	5(1.1)	3.18(0.93)	4
9. I can address the injured area when a child has a muscle strain.	106(23.8)	123(27.6)	120(27.0)	50(11.2)	46(10.3)	2.43(1.25)	5
10. I can perform first aid when a young child is drowning.	51(11.5)	105(23.6)	102(22.9)	85(19.1)	102(22.9)	1.82(1.33)	10
11. I can perform the correct methods when a child eats something by mistake.	76(17.1)	142(31.9)	139(31.2)	62(13.9)	26(5.8)	2.4(1.10)	8
12. I can judge a child's injury status when an accident happens.	80(18.0)	159(35.7)	142(31.9)	42(9.4)	22(4.9)	2.52(1.05)	6
Total (mean of self-efficacy)	26.6	25.2	22.1	11.4	14.7	30.33(9.2)	

* 119 is emergency telephone number in Taiwan.

Table 2. Distribution of the parents by self-efficacy for first aid (N=445)				
Variable	N	Mean	SD	p-value
Gender				.035*
male	123	31.81	8.83	
female	322	29.76	9.29	
Age				.0561
under 20	3	35.67	1.16	
21-30	125	30.07	8.83	
31-40	277	30.18	9.21	
over 41	40	31.70	10.55	
Marriage				.241
(1) married	443	30.25	9.23	
(2) not married, divorced	10	33.70	7.51	
Education				.592
(1) junior	25	28.84	9.77	
(2) high school	158	29.83	8.76	
(3) university	204	30.64	9.41	
(4) above graduate degree	58	31.24	9.50	
Number of children				.479
(1) one	186	30.39	9.34	
(2) two	201	29.91	9.04	
(3) three	58	31.57	9.35	
Family income (monthly)				.531
(1) under 40,000 NT	149	29.70	8.45	
(2) 40,001-70,000 NT	179	30.17	9.32	
(3) 70,001-100,000 NT	55	31.29	10.18	
(4) over 100,001 NT	62	31.42	9.69	
Attended first aid program				.000**
yes	157	35.01	8.56	
no	288	27.77	8.52	
Source of first aid information: health personnel				.000**

yes	147	34.01	8.28	
no	298	28.51	9.10	
*p<.05, **p<.01,				

Table 3. Logistic regression models with association of mediator in parent’s self-efficacy of first aid (N=445)

					Model 2				Model 3			
	B	SD	p	R ²	B	SD	p	R ²	B	SD	p	R ²
Self-efficacy				0.17				0.21				0.26
Constant	26.68	.58	.00		7.31	2.17	.00		10.66	2.22	.00	
Gender (Ref: female)												
male	1.63	.89	.07		1.27	0.87	.15		1.21	.84	.15	
Had first aid program (Ref: No)												
Yes	5.97	.90	.00**						3.29	.92	.00**	
Source of first aid information: health personnel (Ref: No)												
Yes	3.29	.91	.00**						2.69	.86	.00**	
Knowledge of first aid					1.26	.12	.00**		.96	.13	.00**	

**p<.01

Discussion

Injuries to young children are generally believed to occur at home, and the findings from this study lend supporting evidence to this claim, although in a numerically restricted population. In this study, more than one-third of the participants reported that children under the age of 4 years had suffered accidental injuries at home in the previous year. In a similar study by Erkal (2010), 37% of children aged 0–6 years were found to have experienced accidental injuries at home.

Home pediatric injuries observed in this study were mostly falls, accounting for 87.7%, while other common causes included scalds and burns, poisoning, choking, and drowning (Department of Health, 2006; Tsai et al., 2011; Gulliver et al., 2005). Statistics show that 40% of pediatric falls require hospitalization (Alptekin et al., 2008; Durbin et al., 2000; Erkal, 2010). In one study, contact with hot objects/substances or hot liquids/gases was the leading cause of injury in children aged 4 years, with falls ranking second (Alptekin et al., 2008).

Information on first aid

In this study, the most common resource for information on first aid was found to be mass media dissemination. Mass media provides a significant amount of information on child safety for caregivers (Thein et al., 2005) and represents the most convenient source of information. Thus, appropriate media-derived information would be effective in increasing parents' awareness of first aid at home. The *Children's Health Booklet*, which is provided for those involved in childcare by the National Department of Health in Taiwan, mainly provides information on injury prevention and very little information is provided on first aid management. Thus, we suggest that information about techniques and procedures for handling accidental home injuries should be appended to this publication to provide information on practical first aid and better childcare.

Since it was noted that only one-third of participants in this study obtained first aid information from health personnel, it would appear that healthcare professionals provide insufficient first aid information (Joanna et al., 2004). Thein et al. (2005) found that only 38% of participants in their study obtained information on emergency first aid from doctors and other health personnel, while a figure of 30% was quoted by Lee and Chen (2009). In addition, most child safety-related health education and information focuses on injury prevention (Chan et al., 2003; Gulliver et al., 2005). The first line of defense for accidents is injury prevention and safety education, but post-accident first aid is the second line of defense for reducing the severity of injuries (Department of Health, 2006; Conrad and Beattie, 1996). Health services should provide information on both injury prevention and first aid as part of a parents' health education program.

Approximately one-third of the participants in the present study had enrolled for a first aid program, but very few had attended first aid-related courses. Similar results were found in other studies: only 28% of respondents (Conrad and Beattie, 1996) and 20% of parents of children under the age of 15 years (Thein et al., 2005) had attended first aid classes. The present study also found that participants' first aid courses had primarily been conducted through their place of employment or the military, and most of these were based on adult resuscitation and first aid. Although the principles are often the same, the management of first aid in children differs from that in adults. Consequently, additional resources or courses for parents should focus on pediatric first aid. According to parents' responses, the ideal places for such training are schools, kindergartens, pediatric and obstetric clinics (Joanna et al., 2004), and community health centers.

Knowledge of first aid

Early and appropriate management of emergency injuries can reduce morbidity and mortality. Our study findings show that the rate of first aid knowledge of home injuries was 72.1%, consistent with the results from studies in the UK (75%; Kendrick and Marsh, 1999) and the US (60%; Singer et al., 2004). However, fewer than half of participants in the present

study had correct first aid knowledge on CPR and nasal bleeding, and scored badly on other items. Our findings indicate a lack of parental knowledge with regard to specific emergencies in the pediatric population, as evidenced by the frequency of incorrect responses to questions about common injuries. Parental knowledge of home injuries and their first aid management in the community needs to be addressed.

Self-efficacy of first aid

The low incidence of parental self-confidence with regard to first aid is not surprising. Only one-quarter of participants were fully confident of their ability to deal with accidental injury. With regard to the items of self-efficacy of first aid, CPR skills illustrated a lack of confidence, with scores lower than those for all other items. A similar study by Kendrick and Marsh (1999) on 2125 parents with infants found that self-efficacy in first aid was 16.4%, and the confidence in their ability to deal with CPR and choking was only 15.7%. These data indicate that parental confidence in first aid management of young children is absent and needs to be addressed, in particular for CPR and choking.

Factors in self-efficacy of first aid

To our knowledge, this is the first study to investigate the effect factors of self-efficacy in home first aid among parents with young children. We found that males had a higher rating for self-efficacy than females with regard to this. Other studies have found that factors such as mother's educational status, age, family type, and number of children were related to parents' knowledge of childhood injuries and their prevention (Erkal, 2010; Thein et al., 2005), although those studies did not investigate participants' gender. In a study by Lee and Chen (2009), male students displayed more confidence in first aid than females.

Participants who had obtained information on first aid from health personnel scored better on self-efficacy in managing accidental injuries compared with those who had received information from other sources. Obtaining relevant information from medical health personnel is thus one of the predictors of parental self-efficacy of first aid. Similar findings indicate that acquiring healthcare information from medical personnel not only increases the self-care knowledge of patients with asthma, but also boosts their confidence and ability to care for themselves (Chen et al., 2010). People feel more confident and believe in their abilities when their knowledge of health comes from medical personnel. Therefore, we suggest that the medical industry should provide first aid information on managing accidental pediatric home injuries. Doctors and nurses should provide information related to first aid when parents or caregivers bring their children for health checks or immunization at community health centers and clinics.

This study also found that people who had attended a first aid program had higher scores for self-efficacy than those who had never attended training courses. Various studies found that participants who had attended first aid training scored higher on knowledge and confidence than those who had not (Jones and Prinz, 2005; Lee and Chen, 2009). However,

other studies have shown that parents' educational attainment is not associated with the provision of first aid (Kendrick and Marsh, 1999; Conrad and Beattie, 1995). To improve parents' level of self-efficacy, the positive reinforcement of appropriate first aid knowledge and responses could be carried out with health consultation in primary health care (Kendrick and Marsh, 1999; Chen et al., 2010). Such programs allow parents to discuss their feelings, and the acknowledgment that parents already undertake many procedures to keep their children safe may increase their self-efficacy.

The results of this study show that parents' knowledge of first aid is positively associated with their self-efficacy in that field, and are consistent with previously published Taiwanese and international evidence on the relationship between knowledge of and self-efficacy in performing first aid (Lee and Chen, 2009, Hess et al., 2004; Suzuki et al., 2009; Sevigny and Loutzenhiser, 2009). In other words, higher levels of knowledge lead to greater self-efficacy, and results in enhanced confidence when encountering accident injuries. Therefore, increasing parents' first aid knowledge boosts their confidence in facing emergencies.

Knowledge of first aid is not only a key predictive factor in parents' self-efficacy of first aid. In this study, knowledge of first aid was also found to be partly associated with the correlation between parents who had participated in first aid programs and their self-efficacy of first aid; and partly mediate the association between parents who received first aid information from health personnel and their self-efficacy of first aid. This suggests that knowledge of first aid explains a significant proportion of self-efficacy of first aid. Through the provision of first aid programs and offering first aid information by health personnel, parents' knowledge of first aid would hopefully be progressed to enhance their level of self-efficacy.

Conclusions

This study demonstrates that parents obtained first aid information primarily from mass media and occasionally from health and medical personnel. The findings also indicate that first aid information provided by health personnel positively affects parents' self-efficacy of first aid. Parents' knowledge and self-efficacy of first aid regarding choking management and CPR are of paramount importance. Thus, we suggest that additional pediatric first aid information and resources should be included in the *Children's Health Booklet* or similar literature, particularly with regard to choking and CPR, and this will increase parents' awareness of and confidence in first aid. This study can be seen as a starting point for local policy makers to recognize first aid for injuries as a major health concern rather than only injury prevention.

Moreover, parents' knowledge of first aid, attendance at first aid programs, and acquisition of first aid information from health personnel positively influences their level of self-efficacy in first aid. In addition, first aid knowledge partly explains the association

between attendance at first aid programs, receiving first aid information from health personnel, and first aid self-efficacy, highlighting the importance of improving knowledge of first aid to address self-efficacy in pediatric first aid at home. We recommend that first aid programs or classes be made more widely available, particularly by medical services on the management of pediatric accidental injuries, which will increase parents' confidence in managing accidental injuries at home.

Limitations

First, the use of self-reported data led potentially to a reporting bias in social desirability. Second, since the study participants were parents from metropolitan community centers in a central district of Taiwan, the findings may not be generalized to all parents in Taiwan. Furthermore, this study focused on parents of children who visited community centers, and data from parents or caregivers not attending these health institutes may differ. Finally, a large regional or national survey would help to further assess parents' self-sufficiency in first aid for young children.

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