

Assessment of Parents' Knowledge about the Provision of First Aid to Their Children after Thermal Burn Injuries

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Key Words: thermal injuries, burns, child safety, first aid, trauma, knowledge.

Summary. In Lithuania, approximately 9.5 thousand inhabitants experience burn traumas each year, of which one-fourth are children. It is important to investigate knowledge that parents have about the causes of burn injuries and appropriate preventive measures, including the ability to provide first aid in a proper and timely manner. Qualified first aid provided by parents would enable saving children with burns or minimizing complications and long-term negative outcomes.

Aim. The aim of this study was to assess parents' knowledge of first aid in case of child burn injury in relation to their previous experience of burns.

Methods. Quantitative cross-sectional study design was applied. Two groups of parents/guardians were included in the study: (1) those whose child experienced thermal injury under 3 years of age and (2) families that had no experience of child thermal injury until they were 3 years of age or younger. In total, 243 parents were invited to take part in the study and 232 filled in the forms with the response rate of 95.5%. The data were collected between February and May, 2017. An anonymous questionnaire was developed by the researchers. Ethical permission to conduct the study was issued by the Bioethics Centre of the Lithuanian University of Health Sciences.

Results. The results are presented on 105 boys (45.3%) and 127 girls (54.7%) whose parents provided information for this study; 68 children (29.3%) had experience of burns. Boys suffered from burns significantly more often than girls (53.3% and 9.4%, respectively, $P < 0.001$). In 85% of the cases, hot beverages were the main cause of burns in children. The results revealed that 55 children (80.9%) were provided with first aid within the first 5 minutes after a burn and parents were those who most often (85.3%) administered first aid to their children. The experience of thermal burns in children was linked with the socio-demographic characteristics of their parents. Parents whose children did not have burns knew better how to behave in provided sample cases than those whose children had experience of burns. The results revealed that the average point of parents' self-assessed knowledge was 5.1 ± 1.98 (min – 1, max – 9, median – 5.0).

Conclusions. Parents who were younger, lived in the city, had higher education and were married had better first aid knowledge related to child burns. Self-assessment of knowledge about first aid in burns was higher in parents whose children never experienced burns. It is necessary to teach parents/guardians how to provide timely and proper first aid in case of a child thermal burn.

Introduction

Burns are a global public health problem, accounting for an estimated 180,000 deaths annually [1]. In Lithuania, approximately 9.5 thousand inhabitants experience burn traumas each year, of which one-fourth are children. Burns remain one of the main trauma causes in children [2]. Most often burns are experienced by children under the age of 2. Burns are extremely traumatizing and disabling injuries for children [3].

Timely, proper and qualified first aid would enable saving children with burns or providing them with help in serious burn cases, minimizing complications and long-term negative outcomes [2]. If

first aid is appropriate, pain is lessened, and tissue-injuring effects of high temperature are stopped, the skin's deep tissue is protected and the burn remains epidermal. Unfortunately, often used folk remedies or incorrect first aid usually do not ease the burn, but impair healing [3].

In Lithuania, an action plan for improvement of injury and accident prevention and reduction disability and mortality from external causes is in force. It is projected, by complex measures, to strengthen the prevention of traumas and accidents, as well as accidents, mortality and disability caused by external factors by improving the effectiveness of timely aid to injured persons minimizing negative side ef-

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fects and returning patients to active everyday life in the shortest term [4].

In a study of Shai (2009), the relationship between income, housing and fire injuries was assessed, and poor knowledge was related to the risk of burn injuries (Shai, 2009). The World Health Organization recognizes education of parents as crucial for child injury prevention (Peden, 2009). Lithuanian health care legislation regulates the duty and responsibility of primary health care specialists to inform and educate parents about traumas of child age, including burns [4]. Besides the standard education of families on the prevention of child burn injuries, it is important to investigate knowledge that parents have about the causes of burn injuries and appropriate preventive measures, including the ability to provide first aid in a proper and timely manner.

The aim of this study was to assess parents' knowledge of first aid in case of child burn injury, in relation to their previous experience of burns in children.

Methods

Quantitative cross-sectional study design was applied. The study sample consisted of parents/guardians of hospitalized children at the Pediatric Surgery Department of the University Hospital. In total, 243 parents were invited to take part in the study and 232 filled in the forms with the response rate of 95.5%. The data were collected between February and May, 2017.

Two groups of parents/guardians were included in the study: (1) those whose child experienced a thermal injury under 3 years of age and (2) families that had no experience of child thermal injury until their child was 3 years of age. The second group of parents/guardians were hospitalized with their children because of other pediatric reasons (appendicitis, fractures, abscesses, etc.).

An anonymous questionnaire was developed by the researchers after making a literature review and taking into consideration the personal experience of working in children's department. Multiple choice questions about the cause of burn injury, starting time of first aid provision and the first aid provider were included along with sociodemographic characteristics of a family and a child. To assess the level of parents'/guardians' knowledge about burn injuries and their prevention, the respondents were asked about safe behaviour skills at home, main causes and aggravating factors of burns in children, first steps in providing aid to a child after a burn and how to act if a blister appears. Three case studies were also described in a questionnaire and the respondents were requested to tick the right action for particular situation.

Ethical permission to conduct the study was issued by the Bioethics Centre of the Lithuanian University of Health Sciences (no. BEC-KS(M)-181).

Statistical data analysis was performed using Statistical Package for the Social Sciences for Windows 22.0. The study employed descriptive statistics (numerical characteristics: mean, standard deviation, frequency distribution expressed as percentage), correlation analysis (Pearson compatibility χ^2 test), dispersion analysis (nonparametric Mann-Whitney U test for comparison of 2 samples and Kruskal-Wallis H test for comparison of 3 and more samples). In order to compare the mean scores of the scales, parametric statistical criteria – Student t test for comparison of 2 samples and ANOVA F for comparison of 3 and more samples – were employed in the study. The statistical significance level used was $P < 0.05$.

Results

In relation to gender and age, 3 respondents (1.3%) were men and 55.2% of the study sample were younger than 30 years old. The respondents were distributed into three groups according to the education level. Besides, 80.2% of the respondents were married and 67.2% were on parental leave at the moment of the study (officially available up to 3 years). The socio-demographic characteristics of the respondents are presented in Table 1.

The results are presented on 105 boys (45.3%) and 127 girls (54.7%) whose parents provided information for this study; 68 children (29.3%) experienced burns. Boys suffered from burns significantly

Table 1. Socio-demographic Characteristics of Respondents (n=232)

Characteristic	n (%)
Age (in years):	
up to 29	128 (55.2)
≥ 30	104 (44.8)
Place of residence	
urban	167 (72.0)
rural	65 (28.0)
Education level	
primary	82 (35.3)
secondary	65 (28.1)
higher	85 (36.6)
Marital status	
married/partnership	186 (80.2)
divorced or single	46 (19.8)
Occupation	
parental leave	156 (67.3)
employed	61 (26.3)
unemployed	14 (6.0)
student	1 (0.4)

more often than girls (82.4% and 17.6%, respectively, $P < 0.001$).

The average age of children who experienced burns was 13.7 ± 4.8 months (min – 7, max – 36, median – 12) and there was no significant difference in relation to gender. More than half of toddlers (60.3%) had burns before the age of 12 months and 39.7% had burns after the age of 12 months.

In 85% of cases, hot beverages were the main cause of burns in children. The results revealed that 55 children (80.9%) were provided with first aid within the first 5 minutes after a burn. Parents alone most often (85.3%) administered first aid to their child or had family members helping them; in 4.4% of cases, care was provided by neighbors or friends and only in 10.3% of burn cases, first aid was provided by paramedics.

The experience of thermal burns in children was linked with the socio-demographic characteristics of their parents. Table 2 shows that occurrence of burns in children is significantly higher if parents are under the age of 30, live in a rural area, have primary or secondary education and are divorced, unemployed or are students (Table 2).

The assessment of parents' knowledge about immediate actions after the child experienced a burn revealed that 196 parents (84.5%) knew that the burned area had to be immediately cooled with water. Thus, the perception about what to do if a blister formed after a burn was significantly different between the two groups of parents. The parents whose child was burned provided the incorrect answer that if blistering occurred it had to be punctured, covered in cream and wrapped in a sterile bandage more frequently ($P < 0.01$). On the contrary, the parents whose child had no burns knew better that blisters should not be touched until medical care was given and that clothing and jewellery should be removed from around the affected area ($P < 0.01$) (Table 3).

During the survey, the parents were given three different cases to assess their first aid knowledge. The summary of the responses received from the situations presented demonstrated that parents'

Table 2. Distribution of Children with Burns according to the Socio-Demographic Characteristics of Their Parents (n=68)

Characteristic	n (%)	P
Age (years): up to 29 ≥30	54 (79.4) 14 (20.6)	<0.001
Place of residence: urban rural	17 (25.0) 51 (75.0)	<0.001
Education: primary secondary higher	60 (88.2) 7 (10.3) 1 (1.5)	<0.001
Family status: married divorced/single	36 (52.9) 32 (47.1)	<0.001
Occupation: parental leave working unemployed/student	44 (64.7) 10 (14.7) 14 (20.6)	<0.001

knowledge about first aid in burn cases was not good. Only one-third of the interviewed parents would do the right thing in all three situations. In these situations, the parents whose children did not have burns knew better how to behave than those whose children experienced burns.

The most appropriate duration for cooling the burned area is 10 to 20 minutes. In our study, 60 parents (25.9%) selected this answer correctly with no significant difference in relation to social-demographic characteristic of the parents.

The parents were asked to self-evaluate their knowledge of first aid in case of a child burn on a 10-point scale where 1–4 points reflect very weak knowledge, 5 points refer to weak knowledge, 6 points refer to satisfactory knowledge, 7 points refer to sufficient knowledge, 8 points refer to good knowledge, 9 points refer to very good knowledge, and 10 points evidence perfect knowledge of par-

Table 3. Knowledge of Parents about the Actions if a Blister Appears after a Burn in Relation to Their Experience of Burns in a Child

Action if a blister appeared after a burn	Burn experience in a child, n (%)		P
	No n=164	Yes n=68	
Puncture the blister, cover it in cream and wrap in a sterile bandage (incorrect)	8 (4.9)	16 (23.5)	<0.001
Not to touch the blister until medical care is given (correct)	128 (78.0)	37 (54.4)	<0.001
Remove clothing around the affected area (correct)	66 (40.2)	12 (17.6)	0.001
Monitor swelling (correct)	11 (6.7)	11 (16.2)	0.025

Table 4. Distribution of Parents according to Their Knowledge about the Right Action if Their Child is Burned

Situation 1. A 2-year-old boy that is wearing a shirt and a diaper has scalded himself with a kettle of boiling water. How would you react in this situation?	Total n=232	Burn experience in a child, n (%)		P
		No n=164	Yes n=68	
Leave the clothing untouched, wrap the child in a towel and look for help (incorrect)	26 (11.2)	18 (11.0)	8 (11.8)	>0.05
Leave the clothing untouched, but cool with water (incorrect)	105 (45.3)	72 (43.9)	33 (48.5)	>0.05
Remove clothing, cool with ice (incorrect)	16 (6.9)	9 (5.5)	7 (10.3)	>0.05
Remove clothing, diaper, cool under running water for 20 minutes (correct)	54 (23.3)	48 (29.3)	6 (8.8)	<0.05
Do not know	31 (13.4)	17 (10.4)	14 (20.6)	<0.05
Situation 2. A 4-year-old girl has stepped barefoot into smouldering campfire embers. How would you react in this situation?				
Would immediately put out the camp fire, wrap the affected area in a bandage and look for help (incorrect)	25 (10.8)	17 (10.4)	8 (11.8)	>0.05
Would leave the camp fire and cool the feet with water (incorrect)	91 (39.2)	57 (34.8)	34 (50.0)	<0.05
Would put ice on the feet and drive to the nearest hospital (incorrect)	31 (13.4)	24 (14.8)	7 (10.3)	>0.05
Would immediately find a running source of water and cool the feet using it for 20 minutes (correct)	53 (22.8)	47 (28.7)	6 (8.8)	<0.05
Do not know	32 (13.8)	19 (11.6)	13 (19.1)	>0.05
Situation 3. A 3-year-old boy has spilled hydrochloric acid on his chest and clothes. How would you react in this situation?				
Would not touch the clothing, and would wrap in a clean towel and search for help (incorrect)	48 (20.7)	31 (18.9)	17 (25.0)	>0.05
Would not touch the clothing and would tell the child to sit in a bath with water (incorrect)	43 (18.5)	19 (11.6)	24 (35.3)	<0.05
Would remove clothing and apply ice (incorrect)	22 (9.5)	15 (9.1)	7 (10.3)	>0.05
Would remove clothing and cool in the shower for 20 minutes (correct)	57 (24.6)	51 (31.1)	6 (8.8)	<0.05
Do not know	62 (26.7)	48 (29.3)	14 (20.6)	>0.05

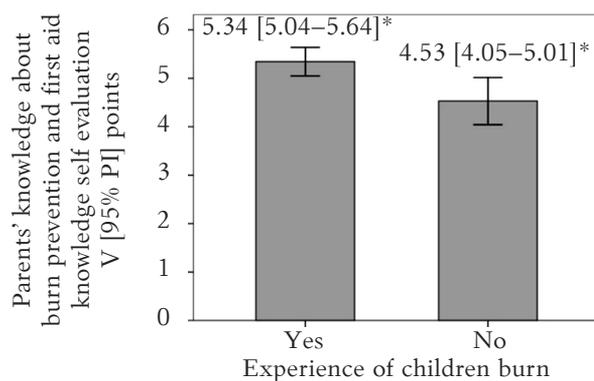


Fig. Distribution of respondents according to self-assessed knowledge of burn prevention and first aid, taking into consideration previous experience of child burn.

V – average, PI – confidence interval,

* $P = 0.003$ with Mann-Whitney test.

ents about first aid after a thermal burn of a child. The results revealed that the average point of parents' self-assessed knowledge was 5.1 ± 1.98 (min – 1, max – 9, median – 5.0). Almost half of the respondents assessed their knowledge as very weak (32.8%) or weak (12.1%), 22.0% as satisfactory, 15.9% as sufficient or good (6.9%), and 2.2% as very good. The level of knowledge was higher in parents without experience of a child thermal burn (5.34 ± 1.94 points and 4.53 ± 2.0 points, respectively, Fig.).

Discussion

In Lithuania, burns are experienced more often by boys, and these findings comply with the studies completed by other authors [3].

The results of our study confirmed that in most cases burns in children were caused by hot liquids.

According to Gružasuskas (2013), scalding with hot liquids is recognized as the main etiological factor of children burns (87% of the cases); in children under the age of 3 years, it causes 95.6% of all burns. Scalding usually happens under exposure of hot water (57.6% of all scald cases) and water or tea (19.6% and 14.1%, respectively). Other hot food items (soups, porridges, fats, others) cause 8.7% of all burn cases [3]. Scalding with hot liquids is identified as the most common reason for burns in children by other authors as well [9]. Children scald themselves because their supervising adults do not evaluate the actual risks of liquids scalding the children [8].

In many countries, there are studies being conducted to find out if there is a connection between the characteristics of parents and the risk of burn injuries in children. It was determined that the risk of burns is higher if the mother has less than 6 years of work experience or has lost her job recently, or one or both of the parents are unemployed. Almost 60% of the parents whose children burned their hands with a hot iron were unemployed as found by a study in the United States of America [5]. Nevertheless, the statistical analysis could not confirm unemployment as a decisive factor for the frequency of burns [6]. Edelman (2009) concludes that the lack of education of parents, poverty, large families, and inappropriate living conditions raise the risks of burn injuries in children significantly [8].

In the case of thermal burn injury, proper first aid is the most effective remedy. In a study of Davis, Maquire and others (2013), 43% of parents had insufficient knowledge of first aid in case of burn injury. Training of burn injury first aid is important, but even after it only 74% of parents had appropriate knowledge how to act in case of a child burn. Correlations between parents age, gender, education and

knowledge were not found [10].

The parents' knowledge assessment revealed that two-thirds of parents in our study would immediately cool the burned skin of their child with water by providing first aid and this is a correct action that parents know well. Similar results were confirmed in a study of Graham, Bache and others (2012) [7]. However, our study revealed that parents lacked theoretical knowledge how to act in various situations after a child is burned. Only one-third of the respondents demonstrated sufficient knowledge on how to act properly in three cases provided.

It is necessary to inform and teach individuals, especially those with children how to provide timely and proper first aid in case of burns. This professional duty belongs to community care doctors and nurses who are primarily responsible for family health promotion and prevention. Right actions of those who help first would assure faster healing of children's injuries and prevent undesirable consequences and complications.

Conclusions

The occurrence of burns in children is significantly higher if parents are under the age of 30, live in a rural area, have primary or secondary education and are divorced, unemployed or are students.

Parents whose children had no experience of burns knew better how to act in thermal burn cases where first aid was required and knew how to act after a blister formed. Self-assessment of knowledge about first aid in burns was higher in parents whose children never experienced burns.

Therefore, parents should be informed and taught systematically by community care staff how to prevent thermal injuries and how to provide first aid to their children after thermal burn injury.

Tėvų žinių vertinimas apie pirmosios pagalbos suteikimą vaikams, patyrusiems terminius nudegimus

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Raktažodžiai: terminiai nudegimai, vaiko sauga, pirmoji pagalba, trauma, žinios.

Santrauka. Lietuvoje apie 9,5 tūkst. gyventojų patiria nudegimų traumas ir ketvirtadalis iš jų yra vaikai. Svarbu įvertinti tėvų žinias apie nudegimų priežastis ir apie tinkamas tokių traumų profilaktikos priemones. Viena iš šių priemonių – laiku ir teisingai tėvų suteikta pirmoji pagalba. Tėvų pagalba padėtų išgelbėti nudegusį vaiką arba sumažinti komplikacijas ir ilgalaikes neigiamas traumas pasekmes.

Tyrimo tikslas – įvertinti tėvų žinias apie pirmosios pagalbos teikimą vaikui, patyrusiam terminį nudegimą.

Metodai. Kiekybiniame tyrime dalyvavo dvi grupės respondentų: tėvai / globėjai, kurių jaunesnis nei 3 m. vaikas buvo nudegęs ir tėvai, neturintys vaikų iki 3 m. nudegimų traumų patirties. Tyrime dalyvavo 243 tėvai, iš kurių 232 atsakė į anketos klausimus (atsako dažnis – 95,5 proc.). Duomenys rinkti 2017 m. vasario – gegužės mėn. pagal autorių sudarytą anketą. Tyrimui atlikti išduotas Lietuvos sveikatos mokslų universiteto Bioetikos centro leidimas.

Rezultatai. Tyrime dalyvavę tėvai atsakė į anketos klausimus, perteikdami savo patirtį augindami sūnus – 105 (45,3 proc.) ir dukras – 127 (54,7 proc.). 68 (29,3 proc.) iš šių vaikų buvo patyrę nudegimus. Berniukams nudegimų pasitaikė reikšmingai dažniau nei mergaitėms (atitinkamai 53,3 proc. ir 9,4 proc., $p < 0,001$). Dažniausia (85 proc.) nudegimų priežastis buvo karšti gėrimai. Remiantis rezultatais, 55 (80,9 proc.) vaikams pirmoji pagalba buvo suteikta per 5 min. ir ją daugeliu atvejų suteikė tėvai (85,3 proc.). Tėvų sociodemografinės charakteristikos buvo susijusios su nudegimų traumos patirtimi. Tėvai, kurių vaikai nepatyrė nudegimų traumos, taip pat geriau žinojo, kaip elgtis patyrus vaikų nudegimų traumą. Patys tėvai savo žinias įsivertino vidutiniškai $5,1 \pm 1,98$ balais (min. – 1, maks. – 9, mediana – 5,0).

Išvados. Jaunesni tėvai, gyvenantys mieste, labiau išsilavinę, susituokę daugiau žinojo apie vaikų nudegimų traumas. Savo žinias apie vaikų nudegimus ir pirmąją pagalbą geriau įvertino tėvai, neturėję šių traumų patirties. Svarbu šviesti tėvus ir globėjus apie laiku ir teisingai suteiktą pirmąją pagalbą vaikams, patyrusiems terminius nudegimus.

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Received 1 June 2017, accepted 30 June 2017

Straipsnis gautas 2017 birželio 1, priimtas 2017 birželio 30