



## Patterns of burns and scalds in Mongolian children: a hospital-based prospective study

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1 **Title**

2 Patterns of burns and scalds in Mongolian children: a hospital-based prospective study

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15

16 **Abstract**

17 **Objective:** To describe the circumstances of burn injury occurrence among Mongolian  
18 children and the products involved.

19 **Methods:** Study participants were children aged 15 years and younger who were admitted to  
20 the Burn Unit of the National Trauma Orthopedic Research Center from August 2015 to July  
21 2016. We collected data on participant demographics and the etiology and clinical features of  
22 their burn injuries, and we analyzed the data based on the NOMESCO Classification model.

23 **Findings:** Of 906 children, 83% were aged 0 to 3 years, 66% were injured around the  
24 cooking area in the traditional tent-like dwelling called a *ger* or a detached house where no  
25 specified kitchen exists, and 28% were injured in a kitchen. Burn injuries resulted mostly  
26 from exposure to overflowing hot liquids (93%). Electric pots and electric kettles were the  
27 products most frequently involved in causing burn injuries (41% and 14%, respectively). Of  
28 601 major burn injuries, 52% were due to electric pots. Moreover, burn injuries inflicted by  
29 electric pots were most likely to be major burn injuries (83%). Children typically fell into  
30 electric pots, while electric kettles were often pulled down by children.

31 **Conclusion:** Burn injuries among Mongolian children mainly occurred in cooking area of a  
32 *ger* involving electric pots. The current practice of cooking on the floor should be  
33 reconsidered for child burn prevention.

## 34 **Patterns of burns and scalds in Mongolian children: a hospital-based prospective study**

### 35 **Introduction**

36 Globally, burns and scalds are a leading cause of unintentional, life-threatening injuries  
37 among young children(1). The World report on child injury prevention reported that over  
38 95,000 children die from burns annually worldwide, with many more experiencing non-fatal  
39 burn injuries and resultant lifelong disabilities(2). The risk of child burn injuries is  
40 disproportionately higher in low- and middle-income countries (LMICs) than in high-income  
41 countries. According to the recent estimates from the Global Burden of Disease study 2013,  
42 burn mortality among children aged 1 to 14 years was 2.5 per 100,000 among 103 countries;  
43 the rate varies by country up to 8.1 in Mongolia, 9.0 in Malawi and 9.5 in Rwanda(3).

44 The risk of burn injuries among children largely depends on their physical environment and  
45 exposures to heat sources which also varies by country (4–7). Globally, contact with hot  
46 liquids is the most common mode of burn injuries among children, with the majority  
47 occurring at home, but children in developed countries typically contact with hot liquids by  
48 pulling at kettle cords or using the hot water tap in formal housing, while children in  
49 developing countries by knocking over a pot of boiling liquid over a fire or kerosene stove on  
50 the floor in overcrowded domestic settings (1). In developing countries, burn injuries  
51 associated with electric appliances as seen in developed countries will emerge, as the  
52 countries' economies advance. In any case, environmental modifications such as enclosing

53 open fires for cooking, and product redesign such as shortening the electric cord of kettles

54 have been proposed for burn injury prevention as they have proved effective (8).

55 In Mongolia, injuries are the third leading cause of morbidity and mortality among children,

56 and burns and scalds are the second leading cause of injuries (9,10). Mongolia has a long,

57 cold season lasting for 7 months from September to May while people use domestic heating

58 and spend more time in indoor settings. The majority of Mongolian households live in a *ger*,

59 which is a traditional tent-like dwelling, or in a simple detached house with furnaces for

60 heating and cooking in the center. Safety measures such as fences are not applied. Therefore,

61 the risk of burn injuries in Mongolia is potentially high, especially for children, due to

62 prolonged exposures to sources of domestic bare heat.

63 In the last decade, the number of child burn injuries has dramatically increased in urban areas

64 of Mongolia(11). In Ulaanbaatar, the capital of Mongolia, burn deaths among children aged

65 under 5 years rose from 2.9 per 100,000 in 2004 to 26.3 in 2013(11). It is also notable that the

66 seasonal pattern of child burn injuries diminished and the cause of burn deaths shifted from

67 flame to scalds after 2008(12). Anecdotal reports suggest that large electric pots started to

68 appear in Mongolian markets after 2000. Widespread use of electric pots throughout the year

69 may have contributed to the changing pattern and increase of burn injuries(13).

70 Burn injuries among Mongolian children were characterized in a recent community survey

71 among 900 caregivers of children aged < 5 years (14,15). The survey revealed that 27% of

72 the children had a history of burn injuries, and 70% of those with the history were living in a  
73 *ger*. The survey suggested that younger age, male gender, living in a *ger* and lower income  
74 household were the primary risk factors for burn injuries. In this survey, the circumstances of  
75 how burn injuries occurred were not described .

76 It is important to understand the circumstances of burn injury occurrence in order to propose  
77 sound methods of burn injury prevention. We therefore prospectively investigated the  
78 circumstances of burn injury occurrence, including products involved, among Mongolian  
79 children who were admitted to the national trauma center for severe burn injuries.

## 80 **Methods**

### 81 *Study setting*

82 Mongolia is a landlocked country located in northeast Asia. It is sandwiched between Russia  
83 to the north and China to the south, east and west and has a territory of 1,566,460 square  
84 kilometers. Mongolia is sparsely populated with about 3 million people, but about 1.4 million  
85 live in Ulaanbaatar, the capital of Mongolia. The proportion of children aged 16 and under is  
86 approximately 30% in both the capital city and the country as a whole(16).

87 Currently, a Mongolian traditional dwelling called a *ger* is widely used across the country. A  
88 *ger* is a tent-like round-shaped dwelling with five walls. The diameter of a *ger* is about 6  
89 meters and the height from the wall to the center is about 1.5 to 2.5 meters. A furnace sits in

90 the center of the *ger* for both heating and cooking. A *ger* has no separate rooms but consists  
91 of one space for living including cooking, dining, sleeping and children's play.

92 In the capital, about 58% of the households are living in residential areas called *ger* districts  
93 where many people live in a *ger*, while others live in simple detached houses (16). In *ger*  
94 districts, detached houses are made of brick and wood with one or two rooms and are often  
95 built by the inhabitants. Similar to a *ger*, a furnace is commonly used in the detached houses.

96 In their daily life, Mongolians customarily produce homemade dairy products by boiling milk  
97 in traditional pots on the furnace, or more recently in electric pots. The traditional pots are  
98 made of metal. They can be as high as 40 to 50 cm with a diameter of 20 to 50 cm and a  
99 volume of 10 to 30 liters. Electric pots are made of steel and as high as 30 to 50 cm with a  
100 diameter of 20 to 40 cm and a volume of over 10 liters. Electric pots as well as electric kettles  
101 were brought to the Mongolian market around 2000 and soon became popular due to their  
102 convenience. Electricity is supplied to *ger* districts. Among nomads, solar energy is  
103 increasingly used to generate electricity, so electric appliances can be used even in nomadic  
104 lifestyle. Electric pots and kettles are often placed on the floor because proper kitchen tables  
105 or shelves are not readily available.

106 *Participants*

107 Study participants were children 15 years and younger who were admitted to the Burn Unit of  
108 the National Trauma Orthopedic Research Center from 1<sup>st</sup> August 2015 to 31<sup>st</sup> July 2016. The  
109 Center is the only hospital providing tertiary care for burns and scalds across the country. The  
110 Center's Burn Unit consists of 80 beds including an Intensive Care Unit. The Center admits  
111 burn patients based on the following criteria: the percentage of the total body surface area  
112 (TBSA) burned >10% for all ages, >5% for children under 3, >1% for full thickness injury,  
113 >0.5% on the face, head, feet, hand and genitalia or perineum; chemical, electrical or  
114 inhalation burns; elderly patients; burns associated with major trauma; patients with  
115 pre-existing disorders; and prolonged recovery or complexity of wound(17).

116 The number of children under the age of 16 years admitted for burn injuries to the Center in  
117 2015 and 2016 was 1,066 and 964, respectively(18). All were considered eligible participants  
118 in the study, but approximately 10% were eventually dropped due to staying in the Intensive  
119 Care Unit or their subsequent death.

#### 120 *Data collection*

121 The Center's medical staff conducted face-to-face interviews with the participants' guardians  
122 using structured questionnaires after obtaining written informed consent. The staff  
123 approached the guardians when the participants' condition became stable, considering their  
124 psychological shock. The interview took place at the head nurse room in the inpatient  
125 department, lasting for about 10 minutes. The staff also extracted information about burn



126 injuries from medical records. We did not directly ask older children about the circumstances  
127 of their injury, considering their psychological shock after injury. This study was approved  
128 by the research ethics committees of the Ministry of Health, Mongolia and the Faculty of  
129 Medicine at the University of Tsukuba, Japan.

### 130 *Measures*

131 Data collected about the study participants included age and sex; residential area (urban,  
132 suburban, province center, soum center, rural); cohabitants; time, month, and place of burn  
133 injury occurrence; and etiology of burn injury (the mode of injury, the injury event, the  
134 precipitating event/activity, and the product involved). The etiology classification is based on  
135 a simple model proposed in the NOMESCO Classification of External Causes of Injuries(19).  
136 Details can be found in the reference of Nordic Medico-Statistical Committee (2007). Briefly,  
137 the model describes the sequence of events precipitating the moment of injury and the  
138 product involved in the events: the mode of injury, such as contact with hot liquids; the injury  
139 event (the event immediately preceding the injury), such as overflowing of hot liquids from a  
140 cooking pot; and the precipitating event/activity, such as pulling down a cooking pot.  
141 Products involved were categorized into electric pot, electric kettle, flask, traditional pot,  
142 kettle/pot, mug/bowl, pan, furnace, and others. The traditional pot, kettle/pot and pan are  
143 products typically used on the furnace or open flames.

144 Residential areas were classified as: urban, representing the three major cities (Ulaanbaatar,  
145 Erdenet, and Darkhan); suburban, representing the districts surrounding the capital of  
146 Mongolia; province centers, representing towns; soum, or district centers, representing  
147 villages; and rural, representing nomad settlement areas.

148 Clinical features of burn injuries extracted from medical charts included: type of burn injuries,  
149 e.g. thermal (scalds, contact and flame) or non-thermal (chemical, electrical and radiation);  
150 the degree of burn injuries including depth; affected body regions; and the proportion of  
151 affected body surface areas. The Trauma Center's Burn Unit systematically collects these  
152 data, using the registration form. However, prior to the data collection, we found that affected  
153 body regions were not necessarily recorded in the form. So, we filled the missing information  
154 using the body map during the interview with the guardians. According to the Trauma  
155 Center's Clinical Guideline for Burn Injury Diagnosis and Treatment (based on the Practice  
156 Guidelines for Burn Care of the American Burn Association), we defined burn injuries as  
157 "major" if the wounds affected 10% or more of TBSA, over 5% of TBSA with full thickness  
158 burns, electric burns, burns to eye, face, hand, feet, joints, genitalia, or circumference  
159 burns(20,21).

## 160 *Analysis*

161 After summarizing descriptive characteristics of the study participants and their burn injuries,  
162 we examined the distribution of age and sex by the mode of burn injury, and we categorized

163 the etiology of the participants' burn injuries based on the NOMESCO Classification model.  
164 We calculated the proportion of major burn injuries by the type of injury events and the  
165 products involved in order to identify which events and products caused the most severe  
166 injuries. Finally, we analyzed the proportion of precipitating events and activities by the  
167 products involved in order to understand how children were exposed to the injury event.  
168 These analyses were also stratified by sex to see any differences between the sexes.

169

## 170 **Results**

### 171 *Participants*

172 Table 1 shows demographic information of the study participants and the circumstance of  
173 their burn injury. Of 906 children, 83% were aged 0 to 3 years, 59% were males, 64% were  
174 living in urban areas, and about 80% had two or three family members to live with who were  
175 mostly their parents and siblings. Burn injuries mainly occurred inside a residence (99%),  
176 with 64% in a *ger*. Of those inside a residence, 66% occurred around the cooking area in a  
177 *ger* or detached houses where no specified kitchen exist, while 28% happened in the kitchen.  
178 No clear trends were observed in the time and month of injury. Contact with hot liquids was  
179 the most frequent mode of burn injuries (94%) followed by contact with hot objects (3%),  
180 contact with fire or flames (2%) and contact with electric current (1%).

181 Table 2 shows the distribution of age and sex by the mode of burn injury. More males than  
182 females experienced burn injuries by all the modes, while the distribution of age was similar  
183 between the sexes. Over 80% of those injured through contact with hot liquids or hot objects  
184 were aged 0 to 3 years in both sexes. Burns through contact with open fire or flame occurred  
185 to older children: 12 out of 17 (71%) were aged 5 to 15 years.

186 *Burn injury by the type of injury event and the product involved*

187 Table 3 shows the distribution of burn injuries by the type of injury event and the product  
188 involved in the injury event, and also the proportion of major burn injuries for each type  
189 event and product involved. The most frequently occurring injury event was overflowing of  
190 hot liquids (93%). Electric pots and kettles are the most frequently involved products (41%  
191 and 14%, respectively), followed by flasks (12%) and traditional pots (8%). Moreover, 310  
192 out of 601 major burn injuries (52%) were due to electric pots, and burn injuries inflicted by  
193 electric pots were most likely to be major burn injuries (83%). The distribution appeared  
194 quite similar between the sexes (Appendix, Tables 3.1 and 3.2).

195 *Precipitating events/activities by the products involved*

196 Table 4 shows the proportions of precipitating events/activities prior to the injury event of  
197 overflowing hot liquids by the products involved in the events/activities. Children typically  
198 fell into electric pots, traditional pots, and pans. Electric kettles, flasks, kettle/pots, and

199 mug/bowls were most often pulled down by children. The similar trend was observed in both  
200 sexes (Appendix, Tables 4.1 and 4.2).

201

## 202 **Discussion**

203 This hospital-based survey of burns and scalds in Mongolian children revealed that many  
204 infants and toddlers experienced burn injuries in the traditional Mongolian dwelling *ger*,  
205 where there is one open space for living including cooking and dining. Electric pots inflicted  
206 a large number of major burn injuries. In Mongolia, electric pots have gained popularity in  
207 the last decade, replacing traditional pots that are used on the furnace. Electric pots, on the  
208 other hand, are often used on the floor and unprotected. The electric pots commonly used in  
209 Mongolia are large, with a diameter of 30-40 cm and a volume of over 10 liters. Children can  
210 literally fall into them, resulting in deep and extensive scalds. With only prospective data  
211 collected over 1 year in this study, we cannot attribute the increasing trend of child burn  
212 injuries in Mongolia to the electric pot; yet, in this study, the largest proportion of burn  
213 injuries was associated with electric pots.

214 In recent years, the Government of Mongolia implemented the National Program on Injury  
215 Prevention and Violence between 2009-2016 that included burn prevention activities (22).

216 The activities were mainly educational interventions raising public awareness of injury risks

217 through national television and websites, where home hazards were highlighted such as  
218 electric appliances, plugs and other heat sources that are accessible to children. No practical  
219 advice of removing the hazards was provided. The effectiveness of such activities has not  
220 been formally evaluated, but we did not observe any decline in the incidence of child burn  
221 injuries during this period.

222 The incidence of child burn injuries is largely dependent on environmental hazards  
223 (4,7,23–25). We know that children, especially infants and toddlers, have no control over the  
224 environment, and their guardians are unable to supervise them all the time. In fact, the  
225 previous community survey in Mongolia reported that 79% of child burn injuries occurred  
226 while their guardians were present, elucidating the limitation of child supervision (12). This  
227 is the same elsewhere too (8). It is therefore essential to modify environmental hazards  
228 whenever possible, and such environmental approaches are reportedly effective in reducing  
229 burn injuries (26,27). In some instances, environmental modification is quite simple. For  
230 example, in Inner Mongolia, where traditional beds are commonly connected to stoves,  
231 placing a barrier between the stove and bed appeared to be effective in reducing severe burns  
232 among children (28). In Guatemala, where people use open fire for cooking at a floor level,  
233 the incidence of child burns reduced by almost half after introducing closed stoves that are  
234 raised from the floor level (8,29). In Mongolia, falling into the heat source is a distinct pattern  
235 of burn injuries, reflecting the current practice of cooking on the floor. Therefore, one

236 possible intervention would be to introduce kitchen tables where cooking appliances can be  
237 safely used, with their electric cords inaccessible to children. Kitchen tables also help make  
238 other heat sources such as flask and kettle inaccessible to children.

239 We acknowledge several limitations of this study. First, our study included only admitted  
240 patients at the tertiary hospital, so we are unsure how minor burn injuries occurred and how  
241 they differed from major burn injuries in terms of the circumstances and the products  
242 involved. Moreover, we reported that the proportion of major burn injuries due to electric  
243 pots was the largest among the products involved. It is noted that our data do not establish  
244 electric pots as a risk factor for burn injuries because we did not compare the incidence of  
245 burn injuries between households with and without electric pots. Having said that, since over  
246 half of major burn injuries were inflicted by electric pots, an intervention as described above  
247 would be appropriate.

248 Second, while we determined how children were exposed to the injury events (e.g., a child  
249 fell into a cooking pot and contacted hot liquids overflowing from the pot), we did not  
250 precisely determine who was doing what when burn injuries happened (e.g., a mother was  
251 cooking but did not watch the pot while a child played). Such behavioral information might  
252 be useful, but more important and effective in burn injury prevention is to identify what  
253 environments and products are involved in burn injuries and to modify them as proposed  
254 above. In injury prevention, human errors cannot be fully eliminated.

255 Third, information in the medical records are not necessarily complete regarding affected  
256 body regions. To compensate, in the interviews we asked study participants about affected  
257 body regions using a body map. Eventually, we were able to determine the severity of burn  
258 injuries of all the participants but we cannot be sure whether their report in the interviews  
259 was as good as the medical records.

260 Forth, we did not identify whether the burn injury was intentional or unintentional. According  
261 to the Trauma Center's statistics in 2016, there were 17 intentional burn injuries with hot  
262 liquids but age of the victims was unreported (30). We assume that almost all burn injuries  
263 reported in the present study were unintentional.

264 Finally, we could not interview the guardians of all eligible patients during the study period.  
265 We missed approximately 10% of the patients, particularly those who stayed in the intensive  
266 care units or subsequently died. We cannot be sure whether this missing data distorted our  
267 findings.

268 In conclusion, burn injuries among Mongolian children mainly occurred in cooking area of a  
269 *ger* involving electric pots. The current practice of cooking on the floor should be  
270 reconsidered for child burn prevention.



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**Table 1** Participant demographics and circumstance of burn injury

	<b>n</b>	<b>%</b>
<b>Age (year)</b>		
<1	87	9.6
1	407	44.9
2	162	17.9
3	94	10.4
4	50	5.5
5	26	2.9
6 to 10	63	7.0
11 to 15	17	1.9
<b>Sex</b>		
Male	532	58.7
Female	374	41.3
<b>Residential area</b>		
Urban	577	63.7
Suburban	99	10.9
Province center	104	11.5
Soum center	74	8.2
Rural	50	5.5
Missing	2	0.2
<b>Number of cohabitants</b>		
One	33	3.6
Two	317	35.0
Three	412	45.5
Four	122	13.5
Five	19	2.1
Six	3	0.3
<b>Type of cohabitants</b>		
Mother	884	97.5
Father	825	91.0
Grandmother	105	11.5
Grandfather	67	7.3
Elder siblings	505	55.7
Younger siblings	115	12.6
Relative	3	0.3
<b>Place of injury occurrence</b>		
Ger	577	63.7
Detached house	159	17.5
Apartment	130	14.3
Outdoor	11	1.2

<b>Place of injury occurrence inside a residence</b>		
Cooking area*	592	66.1
Kitchen	254	28.3
Living room/bedroom	28	3.2
Unspecified	19	2.1
Bathroom	1	0.1
Corridor	1	0.1
<b>Month of injury occurrence</b>		
January	68	7.5
February	89	9.8
March	66	7.3
April	63	7.0
May	79	8.7
June	69	7.6
July	75	8.3
August	78	8.6
September	103	11.4
October	90	9.9
November	66	7.3
December	60	6.6
<b>Time of injury occurrence</b>		
06:00-08:59	8	0.9
09:00-11:59	158	17.4
12:00-14:59	234	25.8
15:00-17:59	160	17.7
18:00-20:59	217	24.0
21:00-23:59	121	13.4
00:00-2:59	7	0.8
02:00-5:59	1	0.1
<b>Mode of injury</b>		
Contact with how liquids	855	94.4
Contact with hot objects	25	2.8
Contact with open fire or flame	17	1.9
Contact with electric current	9	1.0

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\*Cooking area in a ger or detached houses where no specified kitchen exists

**Table 2** Distribution of age and sex by the mode of burn injury

Age, years	Contact with hot liquids				Contact with hot objects				Contact with open fire or flame				Contact with electric current			
	Male		Female		Male		Female		Male		Female		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<1	46	9.2	36	10.1	1	7.7	2	16.8	2	14.3						
1	237	47.4	149	42.0	9	69.2	7	58.3	2	14.3			2	40.0	1	25.0
2	90	18.0	70	19.7			1	8.3							1	25.0
3	56	11.2	35	9.9	1	7.7	1	8.3							1	25.0
4	24	4.8	25	7.0							1	33.3				
5	11	2.2	11	3.1	1	7.7			2	14.3					1	25.0
6 to 10	27	5.4	27	7.6	1	7.7	1	8.3	4	28.6			3	60.0		
11 to 15	9	1.8	2	0.6					4	28.6	2	66.7				
<b>Total</b>	<b>500</b>	<b>100</b>	<b>355</b>	<b>100</b>	<b>13</b>	<b>100</b>	<b>12</b>	<b>100</b>	<b>14</b>	<b>100</b>	<b>3</b>	<b>100</b>	<b>5</b>	<b>100</b>	<b>4</b>	<b>100</b>

**Table 3** Distribution of burn injuries by injury event and the product involved, and proportion of major burn injuries

Injury events*	Product involved in injury event	All burn injuries		Major burn injuries	
		n	%	n	% †
A20: Overflowing (liquids)	Electric pot	373	41.2	310	83.1
	Electric kettle	127	14.0	62	48.8
	Flask	104	11.5	48	46.2
	Traditional pot	72	7.9	53	73.6
	Kettle/pot	60	6.6	50	83.3
	Mug/bowl	59	6.5	5	8.5
	Pan	51	5.6	31	60.8
A11: Release of energy as extreme heat	Furnace	22	2.4	12	54.5
A10: Release of electric energy	Electric cord	9	1.1	6	66.7
A28: Release of liquid and gaseous substances/chemicals, other specified	Gas stove	5	0.6	4	80.0
	Benzene	4	0.4	3	75.0
Z99 Accidental event, other specified	Bath	5	0.6	4	80.0
A02: Release of energy as fire, flames	Open fire, ash	3	0.3	3	100.0
Z98 Accidental event, unspecified		12	1.2	10	83.3
<b>Total</b>		<b>906</b>	<b>100</b>	<b>601</b>	<b>66.3</b>

\* Based on NOMESCO Classification of External Causes of Injuries.

† % indicates the proportion of major burn injuries for each injury event and product.

**Table 4** Precipitating events/activities prior to the injury event of overflowing hot liquids, by the products involved

	<b>Electric pot</b>		<b>Electric kettle</b>		<b>Flask</b>		<b>Traditional pot</b>		<b>Kettle/pot</b>		<b>Mug/bowl</b>		<b>Pan</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Fell into the products	261	70.0	11	8.7	8	7.7	40	55.6	13	21.7	5	8.5	29	56.9
Pulled the products down over themselves	88	23.6	95	74.8	77	74.0	25	34.7	44	73.3	45	76.3	19	37.3
Climbed up and reached the products	8	2.1	15	11.8	10	9.6	4	5.6	2	3.3	6	10.2	1	2.0
Pulled dangled cords	3	0.8	3	2.4										
Spilled by others	12	3.2	2	1.6	8	7.7	3	4.2	1	1.7	3	5.1	2	3.9
Others	1	0.3			1	1.1								
Missing			1	0.8										
<b>Total</b>	<b>373</b>	<b>100</b>	<b>127</b>	<b>100</b>	<b>104</b>	<b>100</b>	<b>72</b>	<b>100</b>	<b>60</b>	<b>100</b>	<b>59</b>	<b>100</b>	<b>51</b>	<b>100</b>



**Table 3-1** Distribution of burn injuries by injury event and the product involved, and proportion of major burn injuries (males)

Injury event*	Product involved in injury event	All burn injuries		Major burn injuries	
		n	%	N	%†
A20: Overflowing (liquids)	Electric pot	210	39.5	178	84.8
	Electric kettle	70	13.2	27	38.6
	Flask	61	11.5	29	47.5
	Traditional pot	42	7.9	34	81.8
	Kettle/pot	40	7.5	34	85.0
	Mug/bowl	41	7.7	3	7.3
	Pan	30	5.6	21	70.0
A11: Release of energy as extreme heat	Furnace	12	2.3	6	50.0
A10: Release of electric energy	Electric cord	5	0.9	3	60.0
A28: Release of liquid and gaseous substances/chemicals, other specified	Gas stove	4	0.8	3	75.0
	Benzene	3	0.6	2	66.7
Z99 Accidental event, other specified	Bath	3	0.6	2	66.7
A02: Release of energy as fire, flames	Open fire, ash	2	0.6	2	100.0
Z98 Accidental event, unspecified		8	1.5	8	100.0
<b>Total</b>		<b>532</b>	<b>2.6</b>	<b>353</b>	<b>66.4</b>

\* Based on NOMESCO Classification of External Causes of Injuries

† % indicates the proportion of major burn injuries for each injury event and product

**Table 3-2** Distribution of burn injuries by injury event and the product involved, and proportion of major burn injuries (females)

Injury event*	Product involved in injury event	All burn injuries		Major burn injuries	
		n	%	n	%†
	Electric pot	163	43.6	132	81
	Electric kettle	57	15.2	35	61.4
	Flask	43	11.5	19	44.2
A20: Overflowing (liquids)	Traditional pot	30	8.0	19	63.3
	Kettle/pot	20	5.3	16	80.0
	Mug/bowl	18	4.8	2	11.1
	Pan	21	5.6	10	47.6
A11: Release of energy as extreme heat	Furnace	10	2.7	6	60.0
A10: Release of electric energy	Electric cord	4	1.1	3	75.0
A28: Release of liquid and gaseous substances/chemicals, other specified	Gas stove	1	0.3	1	100.0
	Benzene	1	0.3	1	100.0
Z99 Accidental event, other specified	Bath	2	0.6	2	100.0
Z98 Accidental event, unspecified		4	1.1	2	50.0
	<b>Total</b>	<b>374</b>	<b>100</b>	<b>248</b>	<b>66.3</b>

\* Based on NOMESCO Classification of External Causes of Injuries

† % indicates the proportion of major burn injuries for each injury event and product

**Table 4-1** Precipitating events/activities prior to the injury event of overflowing hot liquids, by the products involved (males)

	<b>Electric pot</b>		<b>Electric kettle</b>		<b>Flask</b>		<b>Traditional pot</b>		<b>Kettle/pot</b>		<b>Mug/bowl</b>		<b>Pan</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Fell into the products	139	66.8	7	9.9	3	4.9	24	57.1	9	22.5	4	9.8	20	66.7
Pulled the products down over themselves	55	26.4	51	71.8	45	73.8	15	35.7	28	70.0	28	68.3	9	30.0
Climbed up and reached the products	7	3.4	7	9.9	7	11.5	2	4.8	2	5.0	6	14.6		
Pulled dangled cords	1	0.5	3	4.2										
Spilled by others	5	2.4	2	2.8	5	8.2	1	2.4	1	2.5	3	7.3	1	3.3
Others	1	0.5			1	1.6								
Missing			1	1.4										
<b>Total</b>	<b>210</b>	<b>100</b>	<b>71</b>	<b>100</b>	<b>61</b>	<b>100</b>	<b>42</b>	<b>100</b>	<b>40</b>	<b>100</b>	<b>41</b>	<b>100</b>	<b>30</b>	<b>100</b>

**Table 4-2** Precipitating events/activities prior to the injury event of overflowing hot liquids, by the products involved (females)

	<b>Electric pot</b>		<b>Electric kettle</b>		<b>Flask</b>		<b>Traditional pot</b>		<b>Kettle/pot</b>		<b>Mug/bowl</b>		<b>Pan</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Fell into the products	122	79.9	4	7.1	5	11.6	16	53.3	4	20.0	1	5.6	9	42.9
Pulled the products down over themselves	33	16.2	44	78.6	32	74.4	10	33.3	16	80.0	17	94.4	10	47.6
Climbed up and reached the products	1	0.5	8	14.3	3	7.0	2	6.7					1	4.8
Pulled dangled cords	2	1.0												
Spilled by others	5	2.5			3	7.0	2	6.7					1	4.8
<b>Total</b>	<b>163</b>	<b>100</b>	<b>56</b>	<b>100</b>	<b>43</b>	<b>100</b>	<b>30</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>18</b>	<b>100</b>	<b>21</b>	<b>100</b>