Turkish Journal of Pediatrics, 2005; 47(2): 141-9.

Original Article / Orijinal Makale

Infant and adolescent deaths due to home accidents in Istanbul

[İstanbul' da ev kazalarına bağlı çocuk ve ergin ölümleri]

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Abstract

Adolescent and infant deaths due to home accidents pose an important social problem and can be prevented significantly by appropriate measures. The aims of this study about adolescent and infant deaths under the age of 18 due to home accidents are assessment of risk factors and proposals for protective measures. Four hundred and fourteen autopsy reports (Applied by Mortuary Section, Council of Forensic Medicine, Istanbul- Turkey, 1996-2000) were reviewed as well as scene investigation data and information from eyewitnesses for those aims. Determination of risk factors, appropriate education, as well as legal regalements for manufacturers of household articles may reduce the number of infant and adolescent deaths due to home accidents significantly.

Keywords:

Home accidents, infant deaths, adolescent deaths, forensic medicine.

Özet

Ev kazalarına bağlı çocuk ölümleri önemli bir halk sağlığı problemi olup, yeterli önlemler alındığında, sayısal azalma sağlanması mümkündür. Bu çalışmanın amacı, 18 yaş altında meydana gelen ev kazalarına bağlı çocuk ölümlerinin nedenlerini belirlemek, risk faktörlerini ve alınacak önlemleri ortaya koymaktır. Çalışmamızda, Adli Tıp Kurumu Morg İhtisas Dairesi' (İstanbul,Türkiye) nde 1996-2000 yılları arasında otopsileri yapılmış, 0-18 yaş grubunda bulunan ve ölüm sebepleri ev kazaları olduğu tespit edilen 414 kişiye ait otopsi raporları retrospektif olarak incelenmiş, olay yeri inceleme tutanaklarındaki bilgiler ve tanık ifadeleri değerlendirilmiştir. Kesin risk faktörlerinin belirlenmesi, eğitimin risk gruplarına göre yönlendirilmesi ve daha önceki makalelerde belirtilen önlemler çerçevesinde kanun yapıcıların ve gerek yapı gerekse ev aletleri ve malzemeleri üreten firmaların uyarılması, çocukların ev kazaları nedeniyle meydana gelen ölümlerini önemli derecede azaltacaktır.

Anahtar Kelimeler:

Ev kazaları, çocuk ölümleri, ergin ölümleri, adli tıp.

1. Introduction

Home accidents happen inside or around a house [1,2]. The importance of home accidents is rising [3]. According to Kaz'ar G et al [4], home accidents constitute approximately the half of all accidents and show an increasing tendency. Home accidents make up 23.5% of all accidents in Sweden and therapeutic measures for a home accident victim costs approximately 1,300 USD annually in Norway [5,6] and, in France, 10 % of all public health costs is caused by home accidents [2].

Home accidents among children pose a serious problem for public health in developed and developing countries. According to the studies, children and individuals beyond the age of 65 years are mostly affected [1,2]. In several studies, it has been announced that 55% of the victims are pre-school children, the incidence of home accidents among children under 6 years is in 51 / 1,000 and 279 / 10,000 among children under 15 years of age, respectively, 26 % of all accidents in the age group 0-19 years occur inside the domicile, victimization during

household activities being 1.5 – 4.88 per 100,000 infant hours [2,6,8-12].

Home accidents are in 10% of the cases serious enough to require hospitalization and a major cause of infant death. 5% of the victims succumb before hospitalization. In the United States only, home accidents among children and adolescents are the second leading cause of death after traffic accidents [2,9,13,14].

According to Thomsen et al. [15], the role of forensic medicine in the society is not only limited to the investigation of criminal cases but forensic scientists have also to work out appropriate measures for preventable deaths.

The aim of this study is to investigate domestic accident-related cases of death in Istanbul (Turkey) for infants and adolescents in the age group 0-18 years, to assess risk factors and to develop appropriate preventive measures.

2. Material and methods

Autopsy reports of 414 home accident victims (0-18 year-old) in the years 1996-2000 were reviewed as well as scene investigation data and information obtained from eyewitnesses.

Home accidents under the age of 18 were classified based upon the "Home Accident Prevention Inventory" that has been proposed by Tertinger et al. [16], and it was modified by the authors.

1) Deaths due to poisoning by solid/liquid and gaseous compounds
2) Deaths due to falling and blunt trauma
3) Deaths due to burning, scalding, and electrocution
4) Deaths due to drowning and other asphyxias
5) Deaths due to firearms wounding
6) Deaths due to stabbing

We investigated in a further step, the cause of accidents, and types of fatalities in age groups and gender, high-risk areas at home as well as household articles and activities leading to accidents.

Deaths at home of homicidal or suicidal origin as well as fatalities not identified beyond dept as accidental were investigated in the group: other deaths under the age 18 were not included in the study. Deaths by drug overdose identified as non-homicidal, however, were included in the home accident group.

In statistical evaluation, the arithmetical mean of the data was accessed and x^2-*test* was applied. (In an additional evaluation, *Fisher's probability test* was carried out.)

3. Results

A total of 13,801 autopsies were carried out in the Mortuary Section of Council of Forensic Medicine in the years 1996-2000. One thousand and five hundred ninety-one victims were infants and adolescents under the age of 18 and 414 of those were caused by home accidents.

Deaths due to home accidents of infants and adolescents make up 3 % of all deaths, and 26 % of all fatalities in this age group.

Additionally, infant and adolescent victims consist of 34 % of all deaths due to home accidents.

Female/ male ratio was 1: 2.02 for all deaths; the ratio was 1: 1.26 for 414 victims.

Deaths by home accidents reached a peak in the age group of 0-3 years in both sexes, declining in elder ages. Beyond the age of 12, there was again an increase, returning in a U-shaped parabolic manner to the figures of the age group 0-3 years.

In 154 cases, no information was available about the place in which accident occurred. Among the remaining 260 cases with sufficient scene information, most of the fatalities (n=103, 39%) occurred in bedrooms (Table 1).

Table 1. *Age groups, sex and parts of home for deaths caused by home accidents among infants and adolescents*

Distribution of victims	**Number**			**%**	
A- Distribution by age groups and sex	***Male***	***Female***	***Total***	***Male***	***Female***
0-3 years	83	74	157	52.9	47.1
4-6 years	30	31	61	49.2	50.8
7-9 years	17	8	25	68	32
10-12 years	14	5	19	73.7	26.3
13-15 years	36	25	61	59	41
16-18 years	51	40	91	56	44
Total	231	183	414	55.8	44.2
B-Distribution by location in homes (n=260)		***Number***		**%**	
Bedrooms		103		39.6	
Bathrooms		65		25	
Living rooms		37		14.2	
Balconies		26		10	
Kitchens		14		5.5	
Roofs		7		2.7	
Stairs		4		1.5	
Elevators and its shafts		4		1.5	

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The relationship between the type of home accident and age/sex of the victim is shown in Table 2. In all age groups except 10-12 years, intoxications occupied the first rank, followed by falling and blunt trauma, burning-scalding and electrocution and other causes of death. In the age group of 10-12 years, burning- scalding and electrocution were the leading cause of death, followed by intoxications and other causes. And, in all groups, there was a clear male preponderance.

In our series, fatalities due to perforating and/or stab wounds were not included.

Table 2. *Cause of deaths for individuals less than 18 ages*

Cause of death	*Number*	*%*
Poisoning with solid, liquid or gaseous compounds (n=178)		
0-3 years	51	28.7
4-6 years	23	12.9
7-9 years	11	6.2
10-12 years	8	4.5
13-15 years	36	20.2
16-18 years	49	27.5
Male	95	53.4
Female	83	46.6
Fall or blunt trauma (n=101)		
0-3 years	37	36.6
4-6 years	18	17.8
7-9 years	9	8.9
10-12 years	1	1
13-15 years	14	13.9
16-18 years	22	21.8
Male	59	58.4
Female	42	41.6
Burn, scalding or electrocutions (n=81)		
0-3 years	26	32.1
4-6 years	16	19.8
7-9 years	5	6.2
10-12 years	9	11
13-15 years	8	9.9
16-18 years	17	21
Male	48	59.3
Female	33	40.7
Drowning and other asphyxiants (n=39)		
0-3 years	36	92.3
4-6 years	1	2.6
7-9 years	0	0
10-12 years	0	0
13-15 years	0	0
16-18 years	2	5.1
Male	21	53.8
Female	18	46.2
Firearm wounds (n=15)		
0-3 years	7	46.6
4-6 years	3	20
7-9 years	0	0
10-12 years	1	6.7
13-15 years	3	20
16-18 years	1	6.7
Male	8	53.4
Female	7	46.6

3.1. Deaths due to intoxication by solid-liquid and gaseous compound:

Among 178 cases of intoxication, carbon monoxide was involved in 139 (78%). It is the leading cause of all home accidents, constituting 34% of the cases.

There were 71 cases of carbon monoxide poisoning due to the inhalation of fumes from coal ovens. The sources of carbon monoxide were gas heaters in bathrooms in 50 cases (36%).

Other source of carbon monoxide was catalytic gas ovens (n=7) and gas stoves (n=3), all due to improper usage of the devices or inattention. In 8 cases (6%) hospitalized because of carbon monoxide poisoning at home and having died latter, no information was available about source of carbon monoxide.

Carbon monoxide poisoning by inhalation of fumes from coal ovens had lead to the deaths of seven children and adolescents in only one house; furthermore, there were more than one infant and/or adolescent victim in 15 houses. In other houses, parents or brothers and sisters over the age of 18 had also died or been treated because of carbon monoxide poisoning.

Eighteen of deaths caused by drug intoxication occurred in the age group of 0-3 years old (n=12) and 4-6 years old (n=6), respectively. In these cases the victims ingested drugs located with in the reach of children.

All cases of mushroom poisoning (15 cases) were caused by wild mushrooms collected for cooking, and in each case, all family members were affected. Again all victims had died in the hospital. No scene information was available in either case.

Narcotic drug (heroin) over dosage was the cause of death in 4 cases (all 15-18 years).

A 4-year-old boy died due to potassium chlorate poisoning after swallowing the firework bodies left on the table.

3.2. Deaths due to falling and blunt trauma:

For 68 children under the age of 18 years had died due to falling from balconies, terraces, or elevator pits. The accidents under their group occurred while looking through from windows (n=25) or from balconies (n=17), during cleaning the windows (n=9, all victims were girls aged 13-18 years-old), during placing laundry for drying on balconies (n=7, all victims were girls aged 13-18 years-old), during adjusting TV antennas into correct position (n=4, all victims male adolescents older than 12 year-old) and whilst playing on the terrace (n=3).

Two children had fallen into the elevator pit without the elevator being at the floor.

A sixteen-year-old boy having forgotten the home key had fallen down and died while trying to climb the balcony from the neighbor's balcony.

Eleven children had died by falling from beds and cribs (all victims were aged 0-6 years-old) and 5 children (between 1 and 14 months of age) had fallen from the lap.

All four children falling down from stairs were boys under the age of 12 years.

A fourteen-year-old girl had lost her balance on the wet floor of the bathroom and hit the closet with her head.

Seven children, who died of blunt trauma by being entrapped between or under furniture pieces, were under the age of 3 year.

One child had been entrapped with his neck between window shutters, one child had been entrapped under television, and 3 children had been entrapped between elevator and the wall, between bed and the wall, and between a crib and a trunk, respectively.

3.3. Deaths due to burning, scalding, and electrocution:

In two cases, death occurred from flashing out of the oven by pouring gas and cologne into oven and in one case, short circuit in an electric-heated bed-sheet was the cause of death.

As scene investigation reports contained no information case and location of the fire call not be identifies.

Three cases of death due to scalding burns occurred in children aged 0-3 years. In all cases, hot fluids from the cooking stove had scalded the victim. In addition, 2 boys (2 and 3 years-old, respectively.) had died in the kitchen by the explosion of a liquid gas bottle.

Twenty children had died due to electrocution. Four victims aged 0-6 years had introduced some material into unprotected wall-sockets. Four children aged 7 years and more had died whilst handling with washing machines, hair dryers, and electrical water-boilers, 4 by surge of current from the refrigerator. Two children had touched free lying electrical wires in the living room. A 16 years-old boy had died whilst repairing the defective electrical oven. The details of the accident for the five cases of accidental electrocution although positive autopsy findings.

3.4 Deaths due to drowning and other asphyxias:

In this group, 11 cases of death due to drowning (10 cases in buckets of water in the bathroom, 1 case in the bucket on the balcony) had occurred, the eldest victims being 4 year-old of age.

Seven infants had died during nursing by choking with the nipple (The eldest victim being 14 mouths of age), 1 by placing a plastic bag on the head, 1 by coverage with the bed-sheet, 1 by strangulation with the crib-cordon and 1 by strangulation with long TV-cable during playing.

Fifteen of 17 children died of by foreign body (food) aspiration were in the age group of 0-3 years. Fourteen

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had died due to aspiration of food like beans, mandarins, or pieces of apples (found on the floor or while eating). In one case, a piece of toy had been aspired into the airways. A 16-year-old girl had died by aspiration after having fallen asleep with the chewing gum in her mouth.

A 17-year-old old boy, while drinking alcohol with his friends at home, had died by the impact of the piece of meat in the airways.

3.5 Deaths due to firearm injuring:

This group contains 15 fatalities (13 by pistols and 2 by riffles). Death occurred by during cleaning of the weapons by parents or relatives (n=9) or whilst playing with firearms placed in the home with easy access for children (n=5) or after wounding with weapon out of home (n=1). 10 of the victims were younger than 6 years, the remaining older than 10.

The relationship between the origins of home accidents and age/sex percentage of victims is given in Table 3.

Table 3. *Causes of death for origins*

Cause of death	n	%	Male/Female	Range of age
Deaths due to poisoning with solid, liquid or gaseous compounds (n=178)				
Carbon monoxide poisoning	139		75/64 (1.2 / 1)	9.6 ± 0.2 years
Drug intoxication	19		9/10 (1 / 1.1)	3.4 ± 0.6 years
Mushroom poisoning	15		8/ 7 (1.1/ 1)	9.6 ± 0.1 years
Narcotic drug overdose	4		2/ 2 (1/ 1)	17.3 ± 0.1 years
Potassium chlorate poisoning	1		1/ 0 (1/ 0)	4 years
Deaths due to fall or blunt trauma (n=101)				
Falling from windows, balconies or roofs	68		42/26 (1.6/ 1)	9.4 ± 0.3 years
Falling down staircases	4		4/ 0 (4/0)	6.5 ± 0.1 years
Falling from beds or cribs	11		3/ 8 (1/ 2.7)	1.5 ± 0.6 years
Falling from parent's lap	5		4/ 1 (4/ 1)	5 ± 0.1 months
Fall down underground by slipping	1		1/ 0 (1/ 0)	14 years
Trapping between or under piece of furniture	12		6/ 6 (1/ 1)	4.7 ± 0.8 years
Deaths due to burning, scalding or electrocution (n=81)				
Burning	56		27/29 (1/ 1.1)	7 ± 0.1 years
Scalding	3		2/ 1 (2/ 1)	2 ± 0.3 years
Liquid gas bottle explosion	2		2/ 0 (2/0)	2.5 years
Electrocution	20		17/ 3 (5.7/ 1)	12.9 ± 0.3 years
Deaths due to drowning or other asphyxiants (n=39)				
Drowning	11		7/ 4 (1.8/ 1)	1.9 ± 0.3 years
Obstruction by mother's nipple	7		3/ 4 (1/ 1.3)	1.2 ± 0.1 years
Obstruction by a plastic bag on head	1		0/ 1 (0/1)	2 years
Obstruction by covering with the bed-sheet	1		0/ 1 (0/1)	9 months
Strangulation with the crib cording	1		0/ 1 (0/1)	3 years
Strangulation with the long TV cable	1		1/ 0 (1/ 0)	2 years
Foreign body aspiration	17		10/ 7 (1.4/ 1)	3 ± 0.7 years
Deaths due to firearm wounds (n=15)				
Wounding by pistol and rifle	15		8/ 7 (1.1/ 1)	6.2 ± 0.4 years

4. Discussion

In our study, fatalities of infants and adolescents who died due to home accidents constituted 3% of all deaths and 26% of those were under the age of 18. Among a total of 1211 deaths due to home accidents, 34% occurred in individuals under the age of 18. Those rates are severe for infant and adolescent health and should be evaluate carefully.

According to Laffoy [13], 59.2% of 74 children injured in home accidents were males. Lindblad et al.[17] reported a female/male ratio of 1/1.6 for home accident-victims in the age group of 0-15 years-old. According a paper of H'izar-Medina et al.[14], on home accidents in children under 10 year-old of age, there is a male preponderance of 62 %. In contrast, Zannetti et al.[18], in a study on home accidents involving all age groups, report that 64.7 % of all affected victims are females. In our study male/

female ratio was 2.02/1 for all deaths and 1.26/ 1 (male: 55.8 per 100) for deaths due to home accidents under the age of 18. These results approximate to the data reported in literature except of Zannetti's findings and compared with all deaths and all fatalities under the age of 18, there is a statistically non significant increase in the number of female victims home accidents and of those occurring under the age of 18 ($p>0.05$) ($x^2=3.474 < x^2 (3 – 0.05)= 7.82$). Sex distribution based on age groups was not significant ($p>0.05$)($x^2=5.39 < x^2 (5 – 0.05)= 11.07$).

As for the age distribution in home-accidents, Laffoy[13] reported that 66% of the victims in his study group were under the age of 5. According to Lindblad et al.[17], home accidents most frequently occured in infants younger than 1 year-old. Gaillard et al.[2] reported that infants younger than 5 year-old were most frequently involved in home accidents. According to H'izar-Medina et al.[14], 37% of home accident-victims under 15 years were in the age group of 1-2 years. Laflamme et al.[19] reported that the incidences of injuries due to home-accidents were higher in the age group of 1-2 years-old. In our study, fatalities due to home accidents show a parallel course in the both sexes, culminating in the age group of 0-3 years-old and decreasing in elder age groups. The fatality rate, however, increases again beyond the age of 12 and approximate to the rates of the age group of 0-3 year, in the age group of 16-18 year. There was an accumulation of the cases (38%) in the age group of 0-3 years-old, followed by the age group of 16-18 years-old (22%). These results contrasted the data in the literature. Infants under 6 years constituted 53% of the cases. This age distribution was formal to be statistically lightly significant ($p<0.001$) ($x^2=185.39 > x^2 (5 – 0.001)= 20.52$). The increase beyond age of 12 can be explained by the high number of cases of electrocution, carbon monoxide and mushroom poisoning, falling and firearm wounding with their high mortalities and high age averages. Furthermore, series in other studies covered victims younger than 15 year-old and cases with non-fatal outcome or fatalities and cases with minor injuries both.

In literatures, they have been reported that the most dangerous areas of homes were kitchens but in our study, 5% of 260 cases, which obtained information on the scene of the home accident, occurred in kitchens while mostly occurred bedrooms (39%) and bathrooms (25%), respectively. ($p<0.001$) ($x^2=98.72 > x^2 (7 – 0.001)= 24.32$). This can be explained by high rates of carbon monoxide poisoning among our cases [1,2].

According to Schelp et al.[5], the most frequent type of home accident was falling for females and blunt-incisive trauma and collisions for males. Laffoy et al.[13] reported that 50.8% of home accidents were caused by falling, 22.6% by blunt and incisive trauma, 13% by burns, 7.9% by poisonings and 5.7% by foreign body aspiration. According to Zannetti et al.[18], home accidents with fatal and non-fatal outcome were most frequently caused by falling, followed by burn. H'izar-Medina et al.[14] reported that home accidents were caused mainly by falling (either on the same or from different levels) and intoxications. According to Hu et al.[20], falling was the leading cause of home accidents among children and adolescents (51%), followed by traumatization with different object in 18% and by incisive wounds in 9%. In our study, among total of 414 fatalities were caused by intoxications (43%), falling and blunt trauma (24%), burns scalding and electrocution (20%), drowning or other asphyxia (9%), and by firearm wounding (4%).

As for the relationship between type of the accident and age of the victim, drowning and asphyxia were not represented significantly beyond the age of 6 year-old. These were most frequent between 0-3 years-old of age, diminishing in elder victims and reappearing in the age group 16-18 years-old. No fatalities due to firearm wounding were present between 7-9 years-old. In all age groups except for 10-12 years-old, intoxication occupied the first rank, followed by falling, entrapment, and burns and by electrocution. In the age group 10-12 years-old fatalities were must frequently caused by burns, scalding and electrocution, followed by intoxications. The relationship between type of home accident and age distribution was statistically most significant (Fisher-probability test; $p<0.05$). The relationship between type of home accident and sex was not statistically most significant ($p>0.05$)($x^2=1.4984 < x^2 (5 – 0.05)= 11.07$).

Deaths due to perforating and/or stab wounds represented in a high number in the general groups of fatalities were not included in our series containing fatal home accidents under the age of 18.

Seventy-eight percent of 178 cases of intoxication involved carbon monoxide poisoning, constituting of all home accidents. Carbon monoxide- poisoning shows a decreasing tendency in developed countries owing to appropriate measures and technological facilities. It, however, still a major cause of home accidents in developing or under developed countries. According to a study in Spain, among 10 cases of carbon monoxide poisoning with 17 victims, fumes caused 9 from water-heaters and gas-ovens and 1 by fumes from a conventional coal-oven. All family members were involved in the accident except in one case [21]. A Danish Study emphasized the role of gas boilers in carbon monoxide- poisoning if not properly installed by authorized personnel [15]. In contrast to this, our study showed that poisoning originating from conventional coal ovens was more frequent (n=71). Poisoning from gas boilers also accounted for a considerable number of home accidents (n=50). All gas boilers were installed in a nonprofessional manner in bathrooms without sufficient air access. In seven cases carbon monoxide poisoning were resulted from gas ovens in rooms without airing, and in 3 from ovens without proper maintenance service.

A paper presented by Lindblad et al.[22] shows that home accidents by poisoning were mostly caused by drugs (34%) and organic solvents (25%). According to Casey

et al.[23] and Thompson et al.[24], pesticide poisoning accounts for 3.4% and 3.9% respectively in children younger than 10 year-old and constitutes 0.2% of home accidents. H'izar-Medina et al.[14] emphasized that cleaners and make-up utensils were easily accessible for children, and they caused home accidents in children in the ratio of 38% and 34% respectively. Nielsen et al. [26] reported that cleaners were kept in only 2.5% of households properly locked and 8% for poison and drugs. Our study contained no poisoning by organic solvents, pesticides, cleaners and make-up articles. The only chemical poisoning was that by potassium chlorate. Drug poisoning was present in 19 cases and constituted a major cause of death in children younger than 6 year-old (n=18). The drugs in these cases had been again kept easily accessible for children. Poisoning by wild mushroom occupied the third rank among intoxications, involving all family members heaving eaten the meal prepared with mushrooms, especially in suburban districts (n=15). Although not regarded as home-accident in the literature on the subject, our paper contains four fatalities due to overdose-intake of narcotic drugs (heroine).

Various studies reported that falling forms a major cause of home accidents [5,13,14,18,20,25,26]. This study emphasizes that there were dangerous windows in 30%, without banister cradles in 30%, without banister staircases in 44%-59%, free entrance to roofs in 44% of the houses. Our study also showed that except for carbon monoxide poisoning, falling was the leading cause for home accidents (n=89, 21%) emphasizing the importance of this type of trauma.

Blunt trauma by entrapment between or under furniture was also frequent (n=12). The main cause of entrapment was that there was a space between the furniture and the wall so that little children can be easily entrapped.

Fifty-six infants and adolescents had died due to burns. In Turkey, the majority of households lack smoke detectors and fire extinguishers. In contrast, only 27% of families in the United States do not have smoke detectors in their homes [26]. In all three fatalities due to scalding, hot water from containers on the oven had been poured onto the victims. The accidents were exclusively caused by negligence. The explosion of the LPG bottle causing the death of two children in the kitchen was due to production defects and lack of control measures.

As for electrocutions, 4 among 20 victims had died after introduction diverse objects into wall-sockets, and eight because of short circuits in washing machines, hair dryers, refrigerators and water boilers, and two by contact with uninsulated cables and one by repairing an electrical heater. In various papers, unprotected wall-sockets were reported in 40-42% and free-lying cables in 30% of the their cases as risk factors [14,25].

Eleven children had drowned by water containers used for storage. Similar cases were reported only in paper from Mexico [27].

There were 7 fatalities (The oldest being 14 mouths) during nursing, one by a plastic bag placed over the head, one by covering with a bed sheet, one by a rope wrapped around the neck in the crib and one by strangulation with a TV-cable. In addition, 17 victims (most cases were between 0-3 years-old) died of foreign body aspiration like beans, fruits, toys, gum, and meat. According to H'izar-Medina et al.[11], 30% of young children were at increased risk by easily accessible plastic bags and small toys.

Thirteen adolescents and infants had died of pistol and two adolescents by rifle wounding. Ten of the victims were under, and the remaining beyond the age of 6. Nine had died accidentally by bullets from firearms while being cleaned or handled by parents or relatives, five while playing with firearms not kept safety. One victim was killed accidentally by a bullet while looking out of the window. Farah et al.[28] and Patterson et al.[29] emphasized the risk of being injured by weapons if not kept inaccessibly for children and families possessing firearms frequently reported that they were not aware of this risk.

The sources of risk mentioned in papers, constructive characteristics of the houses like unprotected windows and staircases, and roofs with easy access; not professionally installed or not maintained gaseous water boilers and heaters; water containers; furniture; play equipments (swings etc.) and small playthings may be easily ingested; plastic bags accessible for children; sport articles; transport tools for babies and young children; unguarded cradles, hot objects (steam radiators etc.); chemical agents like medicines, cleaning materials and poisonings easily accessible for children; kitchen equipments, easily accessible firearms; free electric-wires and unprotected wall sockets; deficiency of fire-detectors [5, 13-32].

In our opinion, there are further risk factors, mainly: coal ovens without properly cleaned channels and ovens kept burning over night in windy times, eating of wild mushrooms, leaving narrow spaces between pieces of furniture, failing to immobilize furniture, failing maintaining services for elevators and protection doors, lack of fire extinguishers at home, electrical devices without maintenance, heavy bed-sheets and pillows in cribs, unattended TV- cables, cordons attaches to cribs, food especially beans and alike left unattended in households with children under the age of three.

The literature on the prevention of home accidents mention various measures, mainly defining sources of potential danger according to the psychological and motor development of children appreciating that all children, regardless of the age, are at enhanced risk for home accidents, education of parents and attending personal, home-safety measures on the basis of legal regulations, home-designing and production of safe household articles, special safety regulations fore household equipments and environmental conditions, labeling of chemical agent containers, supervision of

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home-safety measures by inspectors and financial support for families to safety-improving measures [7,13,14,18-20,25,26,33-39].

Infant and adolescent deaths due to home accidents are a major public health problem throughout the world. We can conclude: Especially in developing countries like Turkey, as well as in under developed countries, children protection from home accidents is insufficient with resulting fatalities at home. Defining risk factors and risk groups, appropriate education, regulations for house-building professions and manufactories of household articles would help to reduce significantly the number of fatalities among infants and adolescents due to home accidents.

Acknowledgments: The present study was realized with consent of the President of Council of Forensic Medicine.

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