

EPIDEMIOLOGY OF HOME INJURY IN MALAYSIA

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ABSTRACT

Home is second to road as a place for injury morbidity and mortality. There were 13,401 home injury cases and of which 44 case (0.3%) were fatal. Children below 10 years of age were the most to be affected (35.7%). Males had a higher incidence compared to females. Majority of cases seen were Malaysians (95.2%). Malays were the highest to be involved (54.8%) followed by Indians (17.3%) and Chinese (11.7%). Among the foreigners, Indonesians were commonly seen (2.2%). Compound followed by kitchen were the common location of injury. Home injuries were more frequent in the evenings between 4p.m. and 8p.m. Falls were the most common event leading to injuries (39.2%) followed by cutting and piercing (29.2%). Most falls were on the same level due to slipping, tripping or stumbling (60.2%). Kerosene poisoning was common among children especially toddlers (52.6%). Pesticide poisoning was common among adolescents and young adults (20-29 years of age). 61.5% of poisoning deaths were due to pesticide. Majority of burns (70.7%) were as a result of hot liquids and solids. The frequently occurring nature of injury was open wounds (34.5%) and superficial injuries (27.0%) especially to the extremities and to the head. Products such as floor and flooring surface, stairs, furniture, toys, baby walkers had been identified as factors that could contribute to injury. 91.5% of home injuries were accidental and majority (86.0%) were given out-patient treatment.

Home injury, fall, poisoning, burns,

INTRODUCTION

Injury is a major public health problem WHO (WHO 2002) estimated that 5 million people worldwide died from injuries in year 2000 with mortality rate of 83.7 per 100,000 populations. Home is place where many people spend most of their time especially the very young and the very old. Although it provides shelter and comfort to most people, it is also one of the common location for injury. It is second commonest cause for injury after road injuries. Home injuries occur in and around the house (building) and affect all age groups. In US home injury causes 20,000 deaths, 7 million disability injuries and 20 million hospital trips each year (Jennifer 2002).

In Hong Kong injury and poisoning were the leading cause of death among the populations aged 1 to 44 years of age (Chan & Luis 2003). In Malaysia the data on home injuries are very scarce. Study done by Lella in University Hospitals in 1975 (Lela 1985), showed that there were 1700 cases of injuries in children reported. Community study done by Ministry of Health in National Health Morbidity Survey 1996 shows that the prevalence of self reported home injury in Malaysia were 2.5%. The prevalence is higher among 0-4 years of age and in adult more than 80 years of age (Jamaiah 2000).

The objectives of this study is to describe the distribution of home injury in Malaysia by demographical factors, classify injury according to its types, mechanism of injury and body parts involved. It also will determine factors associated with the injury.

MATERIALS AND METHOD

This a descriptive cross sectional study conducted over a period of three months from 1 June to 31 August 1996 except for Sarawak which collected data from 1 August 1996 to 31 October 1996. Morbidity and Mortality data involving injuries occurring at home were collected from the patients who sought treatment at government hospitals and clinics in Malaysia with the exception of Perlis. Data were collected using questionnaires. This questionnaire was drafted with the state Epidemiologists. The final draft of the questionnaire was pre tested in Selangor and then circulated to all government hospitals and clinics in all the states. The completed questionnaires were compiled by state Epidemiologist and return to the Injury Prevention and Control Unit for analysis.

Data collected were analysed using Epi Info Program. Home Injuries are defined as injuries occurring at home inclusive outside and inside the house.

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RESULTS

Distribution By State

Johor reported the highest number of home injury cases that was 2,141 cases (16.0%) and of

which 15 cases (34.1%) were fatal followed by Perak. Federal Territory reported the lowest number of home injury cases. Sabah and Negeri Sembilan were the other two states that had high number of fatal injuries as shown in Table 1.

Table 1. Home Injuries by States In Malaysia

State	Number of Cases			Total (%)
	Non Fatal	Fatal		
Sabah	1713	7	1720	12.8
Sarawak	397	2	399	3.0
Selangor	1502	4	1506	11.2
N. Sembilan	1194	6	1200	9.0
Malacca	323	0	323	2.4
Perak	2072	3	2075	15.5
Kedah	1117	1	1118	8.3
Pulau Pinang	309	2	311	2.3
Kelantan	290	0	290	2.2
Terengganu	990	1	991	7.4
Pahang	1058	2	1060	7.9
Johore	2126	15	2141	16.0
Federal Territory (K.Lumpur)	266	1	267	2.0
Total	13357	44	13,401	100

DISTRIBUTION BY AGE

There were 4,786 cases of home injuries in children aged below 10 years. This represented 35.7% of the total home injury cases. Study done by Lella (Lela 1985) showed that 50% of home injury occurs among children less than 10 years old. Adolescents aged 10-19 years were the next most

commonly involved in home injuries accounting for 2,766 cases (20.6%) and it steadily declined until below 60 years of age. There was a slight increase in the number of cases among the elderly (60 years and above). Similarly the number of deaths due to home injuries were also highest among children below 10 years of age that is 12 cases (27.3%). The age distribution is shown as in Fig. 1.

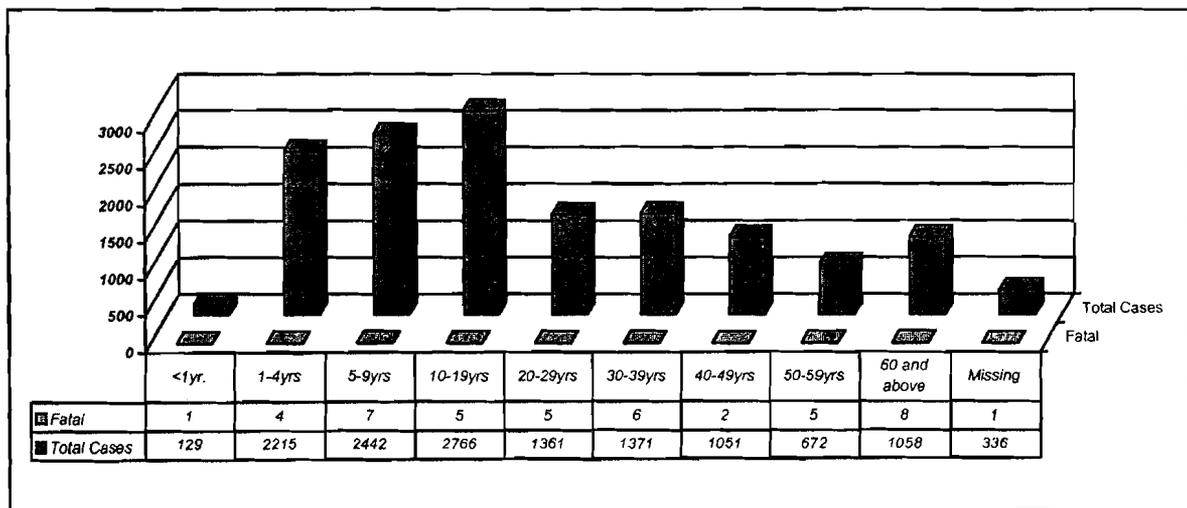


Fig. 1. Home Injuries by Age Group

DISTRIBUTION BY ETHNICITY

As can be seen below in Table 2, Malays were the highest to be involved in home injuries followed by Indians and Chinese. Malays and

Indians were also the highest to be involved in fatal injuries. Reported home injuries were relatively lower in other races. Malays has higher incidence probably because majority of the Malays seek treatment at government health facilities.

Table 2: Home Injuries by Ethnic Group

Ethnic Group	No of Cases			(%)
	Non Fatal	Fatal	Total	
Malays	7335	15	7350	54.8
Chinese	1565	8	1573	11.7
Indians	2304	12	2316	17.3
Kadazans	289	2	291	2.2
Bajaus	173	1	174	1.3
Muruts	77	2	79	0.6
Dusuns	139	0	139	1.0
Other Indigenous Groups in Sabah	475	2	477	3.6
Melanaus	84	0	84	0.6
Iban	179	0	179	1.3
Bidayuhs	51	0	51	0.4
Other Indigenous group in Sarawak	18	0	18	0.1
Other indigenous group in west Malaysia	48	1	49	0.4
Others	559	1	560	4.2
Missing	61	0	61	0.5
Total	13357	44	13401	100

DISTRIBUTION BY GENDER

Males had a higher incidence of home injuries when compared to females. Males made up 64.3% of total injury cases and females made up 33.8%. Information on gender was missing in 2.0% of cases. Similarly males constituted 61.4% of home injury deaths while females constituted 34.1% of the deaths. Information on gender was missing in 4.5% of death cases. The higher incidence of home injuries and death occurs among male in the ratio of 2:1 in this study. This is consistent with the findings by, Peter Cuning et al 1996 (Peter 1996) Hamidah Karim & Krishnan 1993 (Hamidah 1993) and Junainah 1996 (Junaidah 2002) the reason given is because males are more aggressive, adventurous, explore the environment more than girls and learn motor control more than girls. However Jamaiah in community based study NHMS 1996 (Jamaiah 2000) it is found that female has higher incidence of home injuries compare with males.

DISTRIBUTION BY NATIONALITY

Malaysians formed the majority (95.2%) of home injury cases seen. Among the foreigners Indonesians were the main nationality involved in home injuries (2.2%) followed by Filipinos (1.1%), other(0.6%) and 0.5% had missing data.

DISTRIBUTION BY LOCATION

Within the home, the compound (outside the house) followed by kitchen were common location of injury. Compound, living room and bedroom were also noted to be the common location of fatal home injuries as shown in Fig. 2. Compound were found to be the most common location of injuries followed by kitchen and living room. This finding is consistent with Jamaiah NHMS in 1996 (Jamaiah 2000). However study by Virginia Routley (Virginia 1993) reveal that the living/sleeping area were the most common place followed by garden or garage.

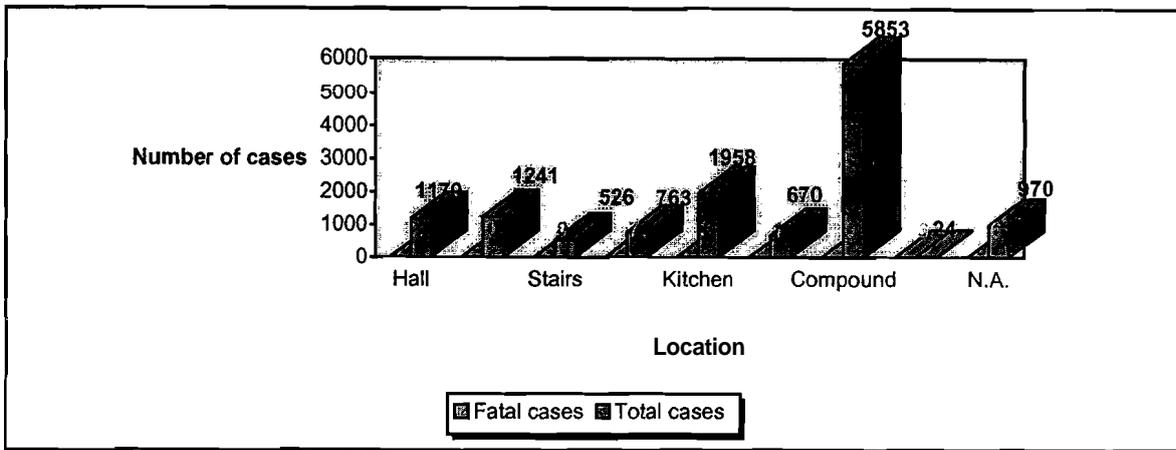


Fig. 2. Home Injuries by Location

DISTRIBUTION BY TIME OF OCCURRENCE

Fig.3 shows that home injuries were frequent in the evenings between 4p.m. and 8p.m. and in the mornings between 9a.m and 10a.m. The information regarding the time of occurrence of

injuries was missing in 1,319 cases (9.8%). As for fatal injuries the distribution is more spread out between 1p.m. and 10p.m. Home injuries frequently occurs in the evening is because parents are busy coming back from work and children are tired.

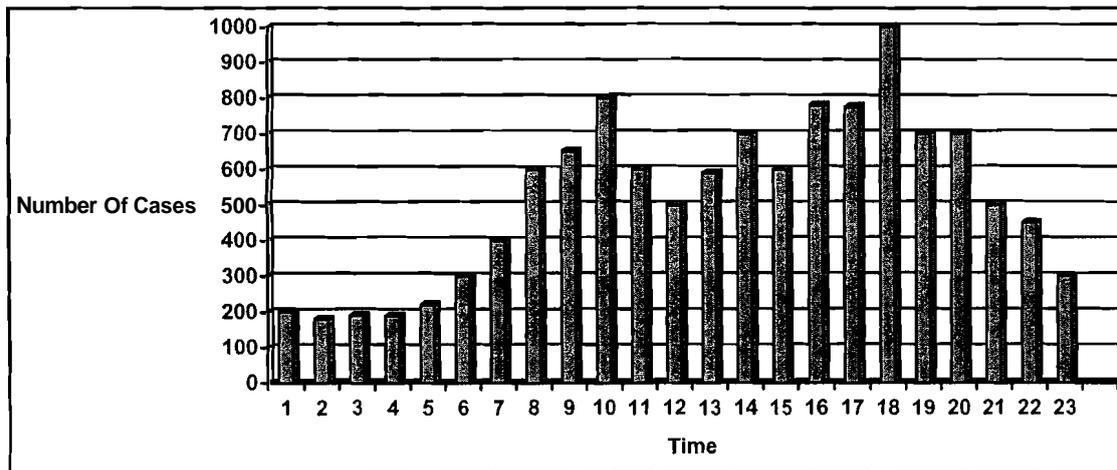


Fig. 3. Home Injuries by Time of Occurrence

DISTRIBUTION BY TYPES/ MECHANISM OF INJURY

Falls were the most common event leading to injury (39.2%) followed by cutting and piercing (29.2%), foreign bodies (6.0%), burns (5.6%) and

others (14.9%). Others include hit by blunt objects or hit by person, animal or insect bites and caught in or between objects as shown in Table 3.

Table 3. Home Injuries by Types/ Mechanism of Injury.

Types/mechanism of injury	Number of Cases		
	Non Fatal (%)	Fatal (%)	Total (%)
Falls	5239 (39.2)	12 (27.3)	5251(39.2)
Poisoning	431 (3.2)	13 (29.5)	444 (3.3)
Drowning and submersion	38 (0.3)	2 (4.5)	40 (0.3)
Burns	740 (5.5)	5 (11.3)	745 (5.6)
Foreign bodies			
• In the eyes	164	0	164
• Entering orifice such as mouth, nose and ear	356	0	356
• Other	208	1	209
• Missing	74	0	74
• Total	802 (6.0)	1 (2.3)	803 (6.0)
Suffocation/choking			
• Inhalation and ingestion of food suffocation/ choking	8	0	8
• Obstruction of the respiratory tract/suffocation.			
• Inhalation and ingestion of other objects causing obstruction of the respiratory tract or suffocation.	3		3
• Accidental mechanical suffocation and strangulation.	1	1	2
• Missing	3	0	3
Total	15 (0.1)	1 (2.3)	16 (0.1)
Electrocution	59 (0.5)	1 (2.3)	60 (0.4)
Cutting and piercing	3902 (29.2)	1 (2.3)	3903 (29.1)
Others	1991 (14.9)	7 (15.9)	1998 (14.9)
Missing	140 (1.1)	1 (2.3)	141 (1.1)
Total	13,357 (100)	44 (100)	13,401 (100)

Falls, poisoning, burns and foreign bodies commonly involved children between 1-4 years of age while drowning were more common in children between 5-9 years of age as can be seen in Table 4.

The other mechanism of home injuries such as electrocution, suffocation/choking, cutting and piercing were more common in adolescents.

Table 4. Types Mechanism of Injury by Age Group

Types/Mechanism Of Injury	Age Groups										
	1 No %	1-4 No %	5-9 No %	10-19 No %	20-29 No %	30-39 No %	40-49 No %	50-59 No %	<60 No %	Missing No %	Total No %
Falls	53	1120	1107	941	421	405	353	213	484	154	5251
	1.0	21.3	21.1	17.9	8.0	7.7	6.7	4.1	9.2	2.9	100
Poisoning	6	99	46	8	61	45	38	19	44	6	444
	1.4	22.3	10.4	18.0	13.7	10.1	8.6	4.3	9.9	1.4	100
Burns	34	207	92	125	83	66	46	31	47	14	754
	4.6	27.8	12.3	16.8	11.1	8.9	6.2	4.2	6.3	1.9	100
Drowning	0	12	14	5	2	5	2	0	0	0	40
	0	30.0	35.0	12.5	5.0	12.5	5.0	0	0	0	100
Foreign bodies	5	159	148	140	77	100	69	49	41	15	803
	0.6	19.8	18.4	17.4	9.6	12.5	8.6	6.1	5.1	1.9	100
Suffocation/ choking	3	1	2	4	0	2	0	2	2	0	16
	18.8	6.3	12.5	25.0	0	12.5	0	12.5	12.5	0	100
Electrocution	1	5	13	17	5	5	4	4	5	1	60
	1.7	8.3	21.7	28.3	8.3	8.3	6.7	6.7	8.3	1.7	100
Cutting and piercing	9	374	698	1019	424	465	330	224	274	86	3903
	0.2	9.6	17.9	26.1	10.9	11.9	8.5	5.7	7.0	2.2	100
Others	17	219	298	406	270	268	198	123	149	50	1998
	0.9	11.0	14.9	20.3	13.5	13.4	9.9	6.2	7.5	2.5	100
Missing	1	19	24	29	18	10	11	7	12	10	141
	0.7	13.5	17.0	20.6	12.8	7.1	7.8	5	8.5	7.1	100

Falls

Falls were the commonest mechanism for injury accounted for 39.2%. Fall are also commonest in children and adolescent 1-19 years of age. Study by Junainah (Junainah 2002) also showed that fall the commonest cause for indoor and outdoor injury in school. Study by Virginia (Virginia 1993) shows that 53% of injuries among children were due to fall. It is also common cause of injury among elderly. In US senior people aged 60 and above are very vulnerable every three people had a fall. Elderly who had a fall are more prone to sustain fractures of femur. Most falls were on the same level due to slipping, tripping or stumbling (60.2% of falls) followed by falls from greater height (15.4%) as can be seen in Fig. 4.

Falls on the same level due to slipping, tripping or stumbling most frequently involved children 5-9 years of age (20.9%), followed by adolescents 10-19 years of age (19.4%) and adult 20-29 years of age (16.5%). Falls on the same level due to collision, pushing or shoving by or with other person most frequently occurred among children 5-9 years of age (29.2%) and adolescents (29.2%). Falls on or from stairs also commonly involved children 5-9 years of age (26.2%) and adolescents (21.7%). Falls from greater heights commonly involved adolescents (23.9%) and young adults (23.6%). Falls into hole or open space most often occurred among young adults (21.0%).

Falls were generally most frequent among males compared to females. 63.5% of falls involved males while 34.2% involved females. Information on gender was missing in 2.3 % of falls. Specific areas where falls commonly occurred were

compound of the home accounting for 2,024 cases (38.5%), hall 688 cases (13.1%), living room 551 cases (10.5%) and bathroom 545 cases (10.4%). Falls were most frequent in the evenings between 4p.m to 8p.m.

The most frequently presented nature of injury was open wounds (29.6%), followed by superficial injuries (25.4%), contusions (13.4%) and fractures (13.4%). The head, the lower and upper extremities were the most frequently affected body parts 38.4%, 25.6% and 25.0% respectively. Factors identified that could contribute to the falls were floor and flooring surface (27.3%), stairs (14.6%) and furniture (6.4%). In about 30% of the cases, the factors were not identified because of non-availability of data.

Majority of falls (95.0%) of which eight ended up with death were accidental. In 2 % of falls the circumstances were unknown, 0.7% were due to homicide, 0.1% were due to suicide and information was missing in 2.3% of falls. Majority of injuries due to falls (84.5%) were given out-patient treatment only 15.5% of falls required in-patient treatment. Out of 5,251 injury cases (25.0%) were either brought in dead or died on arrival and 9 cases died in the ward within 7 days, 8 out of 12 deaths due to falls were as a result of falls on the same level due to slipping, tripping or stumbling. Majority of deaths due to falls (5 deaths) occurred in the living room, followed by the compound (2 deaths). The rest of the deaths occurred in the bathroom, bedroom and other places, which accounted for one death each. The information on the specific place of occurrence for the specific place of occurrence for the other two deaths was not available.

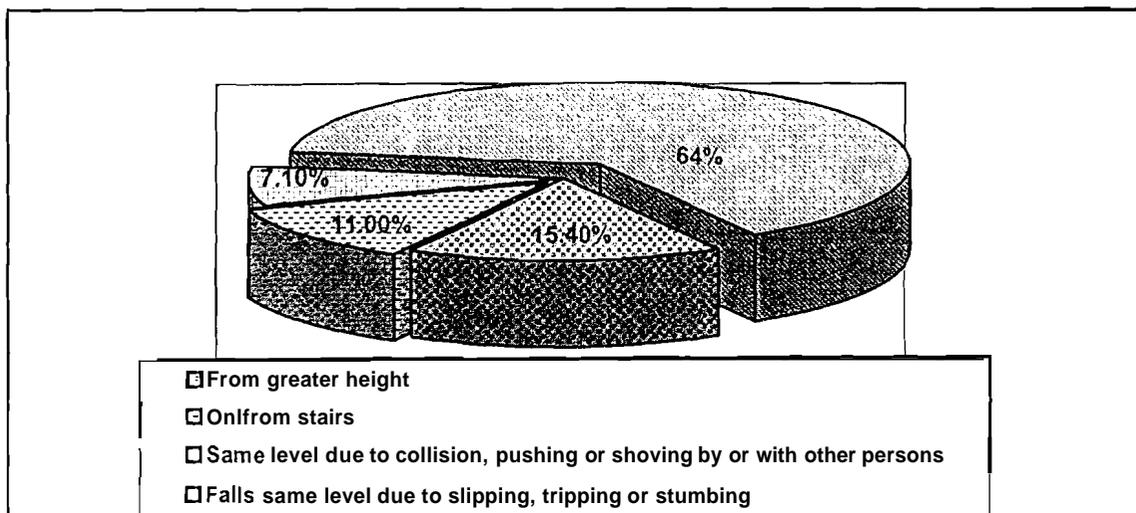


Fig.4. Home Injuries Cases due to Falls

Cutting and piercing (N=3,903)

It is the second most common mechanism of home injury after falls. It was responsible for 29.1% of total home injury cases. Males outnumbered females male: female = (2.4; 1.0). Majority (26.1%) involved adolescents (10-19 years of age) followed by children in the 5-9 years of age (17.9%). Most injuries occurred in the compound 2,240 cases (57.4%) followed by the kitchen 850 cases (21.8%) and the living room 246 cases (6.3%). Evening 4 p.m. to 6 p.m. were the most frequent time when injury occurred. Open wounds were the main nature of injury suffered (77.3%) followed by superficial injuries (76.7%) and foreign body in soft tissues (4.1%). Lower and upper extremities were the body parts most frequently affected 45.5% and 36.9% respectively. Majority (94.4%) of injuries due to cutting and piercing were given out - patient treatment only a small percentage (5.6%) required admission. One case was fatal.

Burns (N = 745)

Burns represent about 5.6% of all injury cases Out of 745 burns cases 70.7 % (527 cases) were as a result of hot liquids or solids, 21.9% (163 cases) due to fire and flames and only 2.6% (19 cases) were due to corrosives. Study done by Ilean et al in University Hospital KL⁽¹¹⁾ 69% of bum

cases admitted were due to scalding, 21% flame, 5% electrical and 5% fire crackers⁽¹⁰⁾. Males were over represented in all three bum categories male; female = (2.5:1.0), (12:1.0 and (1.4:1.0) respectively for burns due to fire and flames, children 1-9 years of age and adolescents were commonly involved. For burns due to hot liquids and solids children especially toddlers between 1-4 years of age were particularly at risk. Corrosive burns mainly involved adolescents (36.8%) as shown in Fig 5. Although the numbers were smaller, it is clear that corrosive burns with an admission rate of 36.8% were generally more severe than burns due to fire and flames (27.0%) or bums due to hot liquids or solids (21.3%). There were five fatal bums cases (0.7%). One was brought in dead or died on arrival and the other 4 cases died in the ward within 7 days.

Most bums occurred between 7a.m. to 11a.m. (28.2%) and 4p.m. to 11p.m. (34.6%) with a peak time in the morning at 8a.m and in the evening at 6p.m. Burns occurred most often in the kitchen (64.6%) followed by the compound (17.6%). Study by Jocelyn⁽¹²⁾ living or sleeping areas were the commonest area where bums occur (36%) followed by garden/garage (21%) kitchen (16%) and bathroom (14%). Fig. 6 shows the distribution of bums by body parts.

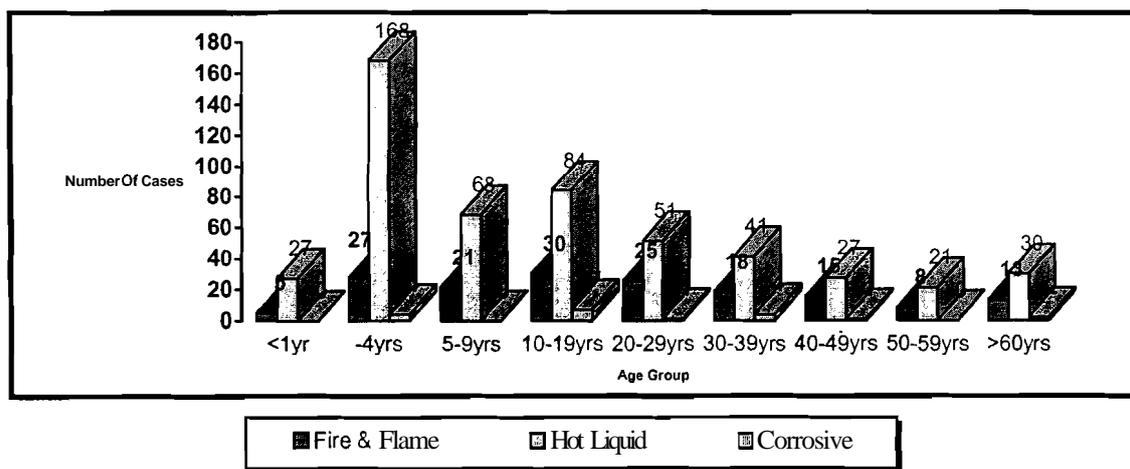


Fig.5. Types of Burns by Age Group

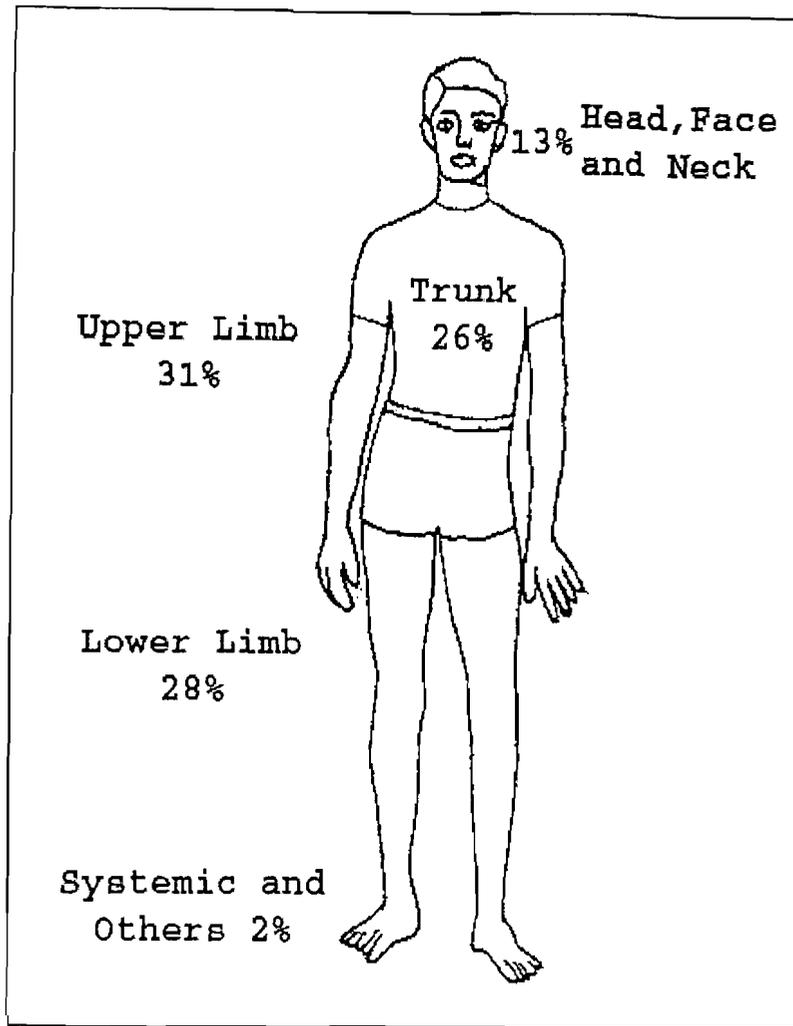


Fig.6. Distribution of burns by body parts

Poisoning (N=444)

Out of 444 poisoning cases, 99 cases (22.5%) were due to drugs and medications, 76 cases (17.1%) were due to kerosene, 70 cases (15.8%) were due to pesticide and 51 cases (11.5%) were due to household products as illustrated in Fig.7. 113 cases (25.5%) were due to others that include formic acid, petrol, gas, insect or snakebite etc. Agents that caused hospitalization for the patients were kerosene (90%), caustic cleaning agent (76%) automatic disc washer detergent (57%) and insecticides/repellants (56%) A breakdown by age showed that a majority (20.2%) of poisoning due to drugs and medications occurred among those in the 20-29 years of age followed by those in the 20-29 years of age followed by those in the 1-4 years of age (19.2%). Kerosene poisoning was common among children especially those in the 1-4 years of age (52.6%) followed by children in the 5-9 years of age (14.5%). Poisoning due to household products more commonly involved

adolescents (21.6%) and young adults (19.6%). Pesticide poisoning was also common among the adolescents (30.0%) and adults in the 20-39 years of age. Other causes of poisoning were generally distributed throughout all age group. Males were involved in 50.9% of poisoning cases while females were involved in 48.0% of cases. The information on gender was missing in 1.1% of cases. Male outnumbered females in poisoning due to kerosene, pesticide and others that is 57.9%, 52.9% and 61.9% compared to 40.8%, 44.3% and 38.1% in females respectively. Malays were involved in 52.3% of the poisoning cases followed by Indians 23.6% and Chinese 9.9%. Poisoning due to drugs and medications and due to pesticide were more common among Indians accounting for 37.4% and 32.9% respectively, while poisoning due to kerosene, household products and other were more common among Malays accounting for 59.2%, 39.2% and 78.8% respectively. The specific place where poisoning commonly occurred were in the compound (25.5%), in the kitchen (20.7%) and bedroom (16.0%). Poisoning was more frequent

between 8a.m to 10a.m. and 1p.m. to 8p.m. The maximum number of poisoning occurred at 10a.m. (8.3%) and 8p.m. (6.8). Approximately three-quarters of poisoning cases (72.5%) were accidental, 16.2% were due to suicide, 0.9% due to homicide and 7.4% unknown. Information on the circumstances was missing in 2.9% of cases. 33.6% of cases required hospital admission while the rest (66.4%) were given out - patient treatment.

Of 444 poisoning cases, 13 were fatal. Majority (69.2%) of poisoning deaths were due to suicide, only 15.4% were accidental. In another 15.4% of cases the circumstances were unknown. Three cases (23.1%) were either brought in dead or died on arrival and 10 cases (76.9%) died in the ward within 7 days. 61.5% of deaths due to poisoning are pesticide related.

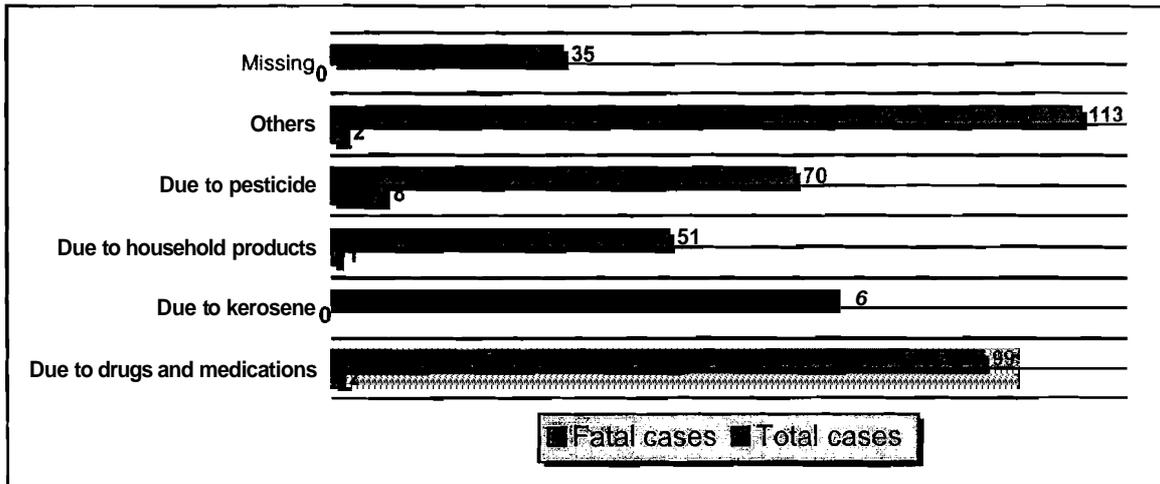


Fig.7. Home Injuries and Death due to Poisoning

DISTRIBUTION BY NATURE OF INJURY

Open wounds including cuts or lacerations (34.5%), superficial injuries (27.0%), contusions including haematoma or bruise (8.7%), fractures (6.1%), foreign bodies either entering through orifice or in soft tissue and sprains and strains of joints and adjacent muscles (5.3%) were the nature of injury that frequently occurred. Other includes injury to the nerves and spines, internal injury to the chest, abdomen and pelvis and asphyxiation. (See Fig.8.).

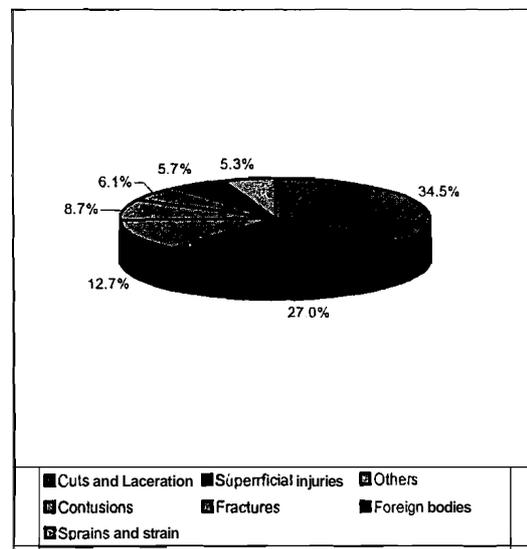


Fig.8. Nature Of Injury

Distribution By Body Parts

Proportions of injuries by body parts are shown in Fig.9. The body parts most frequently injured were the lower extremities (27.4%) and the head (27%). Others (3.2%) include pelvis, perineum and genital organs. The head was the main body part involved in home injury deaths (27.0%).

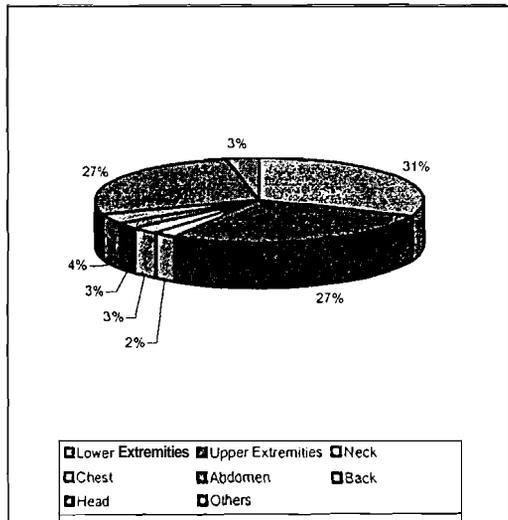


Fig.9. Body Part Involved In Injury

Distribution By Factors Associated

Fig. 10. illustrates factors identified that could contribute to home injuries. Sharp objects or cutting instruments were the most frequent factors identified, followed by other factors which include persons/animals/insect/blunt and hard objects/vehicle/trees/ladders/doors/drains and windows. Jarnaiyah reported that among the objects involved in community injuries are Knife/scissors/cutlery 23.9%, vehicles 12.7%, cooking utensil 8.4%, hardware tools 4.4%, toys 7.7% and gardening tools 2.8%. Floor and flooring surface was the product or agent involved in 1,524 home injury cases and of which there were four deaths. Stairs and outside homes were responsible for 888 home injury cases but there were no deaths. Furniture was involved in 474 home injury cases with two deaths and food items in 413 home injury cases with one death. Household items, electrical appliances, toys, medicinal products and baby walkers were responsible for 521 cases with 8 deaths. However, 28.0% of factors could not be identified due to non-availability of data.

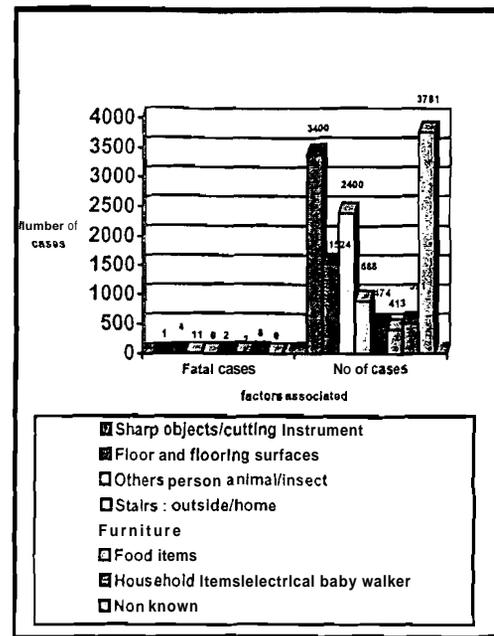


Fig.10. Home Injuries By Factors Associated

Floor and Flooring Surface

Floor and flooring surface related injury mainly involved males (57.7%) compared to females (40.4%). Information on gender was missing in 1.9% of cases. Majority (94.0%) of injuries were due to falls. Bathroom (23.9%), compound (23.4%), hall (17.9%) and living room (13.4%) were the main places where injury occurred. Injury associated with floor and flooring surface mostly involved toddlers (18.5%) followed by children 5-9 years of age (17.3%). Nature of injury that usually occurred was open wounds (29.4%) superficial injuries (25.3%), contusions (13.6%), sprains and strains of joints and adjacent muscles (13.3%) and fractures (11.1%). The head (40.0%), the upper extremities (26.0%) and lower extremities (22.8%) were the most commonly involved body parts. The majority of floor and flooring surface related injuries were given out-patient treatment injuries were given out-patient treatment only 16.0% of cases required admission. Out of 1,524 cases four were fatal. One was brought in dead and the other three cases died in the ward within seven days of admission.

Furniture

Injuries associated with **furniture** mainly involved toddlers (36.5%) and children 5-9 years of age (20.7%). Males tend to predominate. 65.2% of cases involved males and 33.3% involved females. **Information** on gender was missing in 1.5% of cases. Falls were the most frequent mechanism leading to injury (70.5%) followed by cutting and piercing (15.4%). Living room (26.2%), hall (24.3%) and bedroom (23.6%) were the specific places where injuries occurred. Open wounds (38.5%), superficial injuries (24.2%), contusions (14.8%) and fractures (9.4%) were the main nature of injury and they occurred especially to the head (50.1%), upper extremities (23.3%) and lower extremities (17.8%). Majority (83.0%) of cases were given out - patient treatment. 17.0% of **furniture** injury cases required admission. Two cases died. The types of furniture involve in the injury are beds chairs, sofa, tables. Study by Virginia Routley⁽⁹⁾ shows **that** 39% of injury in children results from falling from chairs, floors (26%) and table (4%)

Toys

Seventy two percent of injuries associated with toys occurred in children below 10 years with toddler 1-4 years of age having the highest occurrence (38.1%). Virginia Routley⁽⁹⁾ reported 75% injuries due to toys for children under 5 years of age. Males were more affected than females, 66.7% of cases involved males and 26.7% involved females. **Information** on gender was missing in 6.6% of cases. Specific areas where injuries commonly occurred were the compound (33.3%), the hall (24.8%) and living room (20.0%). Falls (45.7%), cutting and piercing (18.0%) and foreign bodies (17.1%) were the main mechanism leading to injury. Superficial injuries (31.6%), open wounds (26.5%), contusions (11.1%) and foreign bodies entering through orifice (10.2%) were the common nature of injury sustained. The head was the main body part injured (46.2%) followed by the upper and lower extremities (20.7% and 19.8% respectively). Majority that is 85.0% of cases were given out - patient treatment only 15.0% of patients required admission. None of the toy related injury was fatal.

Baby walkers

There were eighty cases of baby walker related injuries. The events leading to injury were falls (62.5%), cutting and piercing (20.0%), burns (5.0%). others (5.0%), poisoning (2.5%), foreign bodies (2.5%). Joan Ozonne Smith in her study shows which 77% baby walker injuries due to fall, 12% burns.

Half of the injury was to the head. 25.0% to the lower extremities and 18.7% to the upper extremities. Superficial injuries (42.3%), open wounds (27.8%), contusions (12.4%) and fractures (5.1%) were the main nature of injury sustained. Males were over represented. 77.5% were males while 21.3% were females. **Information** on gender was missing in 1.3% of cases.

The compound (36.3%), kitchen (16.3%), hall (15.0%), stairs (10.0%) and living room (10.0%) were the common places of occurrence of injuries. Majority of baby walkers related injuries were given out - patient treatment and 13.0% were given in-patient treatment. None of the baby walker related injury was fatal.

DISTRIBUTION BY CIRCUMSTANCES OF INJURY

Majority that is 91.3% of home injuries were accidental, 0.9% were as a result of suicide and 1.6% were due to homicide. The circumstances of injuries were unknown in 3.2% while in 3.0% of injuries the information on the circumstance was missing. As for fatal cases the majority (52.3%) were accidental followed by suicide (27.3%) and homicide 6.8%. The circumstances of injury were **unknown** in 11.4% of fatal cases and the information was missing in 2.3% of cases.

DISTRIBUTION BY OUTCOME

Out of 13,401 home injuries 44 (0.3%) were fatal. Majority (86.0%) of home injuries were given out - patient treatment, 14.0% were given in-patient treatment, out of the 44 fatal cases, 20 cases (45.5%) were either brought in dead or died on arrival while the rest 24 cases (54.5%) died in the ward within seven days.

DISCUSSION AND RECOMMENDATIONS

There were 13,401 cases of home injuries reported in Malaysia over 3 months period in 1996. The incidence of home injury in Malaysia is expected to be higher because this study only covers patients who seek treatment from the government hospitals and clinic It is also found that 4786 cases of injury (35.7%) occurs among children 0-10 years of age and increase about 35% from the study done by Lella 1975 (Lella 1985).

Since the study showed that majority of home injuries were among children aged 1-10 years old and accidental therefore prevention programme should be targeted to this groups of children. The causes of injury were mainly due to fall, followed by cutting and piercing, poisoning and bums.

Among the strategies for prevention as suggested by Robert et al (1984) is by active method that is safety counseling. This method is necessary because many items and activities in the environment cannot be replaced or removed, for examples the needs to keep medication. The active counseling would be to store the medicine properly. The passive method is by legislation for example product ban for baby walker.

Since fall has been recognized as one of the commonest mechanism for injury therefore prevention toward injury at home should be focused. Prevention strategies should be targeted towards prevention of falls especially falls on the same level due to slipping, tripping or stumbling, cutting and piercing. Among the strategies are proper lighting in all traffic area, Install non skid surface on bathroom, kitchen living room and bedroom Install gates on stair ways examining design and location of furniture particularly its stability and height.

The commonest cause for burn injury is scalding by hot and liquids and solid especially among toddlers. Among the causes identified by Jocelyn (Jocelyn 2000) were 48% were due to pulled over by the toddlers reaching for and actively pulled a cup or tea port from various height. Another reason were due to knocking hot drinks (24%) In lap of parents (2%) and others. Further study should be done in Malaysia to establish real cause. The prevention strategies should be towards changing the attitude of parents and awareness towards the potential injuries.

To reduce the incidence of poisoning among children and adolescents, the drugs and medication should be labeled properly and keep in safe place as in the locker (Robert 1984). Kerosene which is colourless should be kept in poisoning bottles so that the children can recognized and differentiate kerosene with plain water. The high incidence of suicidal act (16.2%) in this study should alarmed for further study to determine the cause.

Sarah (Sarah 1988) study shows that among the factors which predispose for injury and suicidal act were among those who suffer from multiple stressors such as family separation, mothers working more than 15 hours a day etc.

Some factors that could contribute to home injuries such as furnitures, toys, baby walker had been identified and therefore prevention should also be targeted towards product safety. Injury may be prevented by having rounded corners on tables, whereas glass topped tables should have safety glass. Coffee tables should be moved from the center of a room to the side to prevent young children who fall hitting the table and to make hazardous objects on them less accessible. It is also important to educate parents to buy toys which are age appropriate.

Among the preventive strategies to reduce injury using baby walker are redesign of the baby walker or product ban.

Further research should be undertaken to determine the risk ratio, to describe the factors in more detail and to identify other factors that might be associated with injury causation and thus improving consumer safety. Research is also needed for evaluation of any intervention programmes.

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REFERENCES

- Chan CC Luis, Chow 2003. Unintentional residential Injury surveillance in Hong Kong *Journal of Paediatrics and Child Health Australian College of Physian.* Vol. 39 (6) (420-426)
- Hamidah Karim & R. Krishnan 1993 Child Injury Prevention *Journal of Paediatrics Obstetrics and Gynaecology* May/June 19-22.
- Iean, R.Krishnan, K.Tan, Thein Tun Ohn. Hospitalized Paediatric Bum Injuries at University Hospitals, 1989.
- Jennifer Warner, Brunilda Nazario MD MSN 2002 Health-Home Injuries are major causes of accidental Deaths.
- Jamaiyah Haniff Tahir Aris, Fauziah Hairi 2000. Home Injury in Malaysia from *NHMS Malaysian Public Health Journal.*
- Junainah Sabirin 2002 - Epidemiology of School Injuries in Malaysia, *Jurnal Kesehatan Masyarakat.*
- Jocelyn Bell Scalds, Victorian injury Surveillance System Edition 3 Royal Children's Hospital Parkville Victoria.
- Karen Asby, Virginia Routley. Domestic Chemical and Plants Poisoning Victorian Injury Surveillance System. Edition 28 Sept.
- Lella Nathan, MJ Robinson 1985. Domestic Accidents in Malaysian Children The family Practioner Vol. 8 No 3 Dec.
- Peter Cuning Frederick P. Rivara, Janice Boase Jean K Mac Donald 1996 -injuries to their relation potential hazards in Child Day Centre. *Injury Prevention* 2: 105-108.

- Suzanne Mc Coy Barr 2002.** The Most common Home Injury in America, *National Centre for injury Prevention*.
- Joan Ozonne-Smith **Irene Brumen 1993.** Safety Of Baby Walker Hazards Editions No **16** Sept Victorian Injury Surveillance System *Monash University Accident Research Centre*.
- Robert **A Dershewitz M Edward and R Christophersen 1984,** Childhood household Safety **PHD AJDC Vol 138** Jan **14.**
- Sarah Mc Cue Horwitz Loretta Di Pietro and Carol L Morrison 1988.** Determinant Of Pediatric injuries *AJDC* Vol **142** June.
- Virginia **Routley Julie Valuri 1993.** Victorian Injury Surveillance System *Monash University Research Centre Hazard* March Edition **14.**
- WHO –**2002.** Graphical overviews of the the global burden of injuries. *WHO*.