

Unintentional fatal domestic injuries among female in Iraq from 2010- 2015

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ABSTRACT

INTRODUCTION: Globally, each year more than 11,000 people are estimated to die within homes from preventable unintentional injuries. The majority (73%) of family victims was female.

OBJECTIVE: To describe the epidemiological characteristics, estimate incidence and identify mechanism of female unintentional fatal domestic injuries (FUFDI) in Iraq, 2010-2015.

METHODS: A descriptive cross sectional study through desk review of the records of all female fatalities due to unintentional injuries that occurred at home and reported from all the coroner offices in Iraq for the period 2010-2015 as part of Iraqi Injury Surveillance System (IISS). The population data obtained from Ministry of Planning.

RESULTS: Total number of FUFDI was 6,613 with an average annual incidence of 8.4/100,000 female population (FP). FUFDI represented 72% of total fatal domestic injury among females. The incidence of FUFDI decreased from 8.8/100,000 FP in 2010 to 7.9/100,000 FP in 2015. One thousand, nine hundred and seventeen 1917 of cases (29%) occurred at the age group 20-29 years. The highest average annual incidence (14.9/100,000 FP) was recorded at the age group 20-29 years. Six thousand, three hundred and three 6303 (95.3 %) were unintentional inflect by self with average annual incidence 8.1 /100,000 FP and the remaining were unintentional by others with average annual incidence 0.3/100,000 FP. About 73% occurred during 6 am-5pm. Main causes of FUFDI were: Burn 4702 (71.2%) and electric injury 1000 (15.2%) with average annual incidence 6.1, and 1.2/100,000 FP respectively.

CONCLUSION: FUFDI still represents a big health problem in Iraq with more involvement of young women. Burn followed by electric injury are the major cause of fatal unintentional domestic injury in women. Awareness about the seriousness of the problem and system of transportation are still immature.

Key words: Fatal unintentional injury, Female, Epidemiology, Domestic, Iraq.

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INTRODUCTION

Injuries are among the most prominent public health problems in the world,¹ they affect everyone, regardless of age, race, or economic status. However, they are preventable and their consequences are reducible.² Death may occur immediately after injury or months or years thereafter.³ Globally, Home injuries are major cause of death and permanent disabilities and they have a significant financial burden.⁴

Injuries may result when 'humans are exposed to energy forces, which are larger than

the body's normal tolerance levels for energy absorption',⁵ like mechanical, heat, electric, chemical or radiation. Some injuries like drowning and frostbite are caused by the sudden absence of essential agents such as oxygen or heat.⁶ Home injuries are events occurring within the confines of home.⁷ Fatal domestic injuries will definitely include all people killed because of an injury at the home environment.⁸

World Health Organization (WHO) stated that injuries cause the death of about 5.8 million people annually all over the world.⁹ In the Eastern Mediterranean Region (EMR), each

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year almost half a million people are killed by injuries.⁸ Dozens of millions of people suffer from injuries.¹⁰

According to the presence of an intention to produce harm to the self or to others, injuries can be grouped into intentional and unintentional.¹¹

The magnitude of the critical issue of injuries varies greatly by many factors like age, gender, economic status and other health problems. Although all age groups can be inflicted by injuries, young people are mostly affected. Among the elderly, falls represent the most common cause of fatal injury.¹² Twice number of Men is dying every year from all types of injuries than women, except in fires where the rate of death in women is higher.¹³ Smoking, diabetes, circulatory problems, and stress are known to increase the risk of injuries. Also, it has been reported that activities requiring heavy gripping and pinching increase the risk.¹⁴ Fatal injuries are more in poorer countries in all regions of the world than in higher income countries. More than 90% of fatalities produced by injury are located in low- and middle-income countries.⁹ In the EMR, rates of injury death represent nearly three times higher in low- and middle income countries than in high income countries.¹³

In Iraq, data are scarce on fatal unintentional domestic injuries among women. This study is conducted to estimate the incidence rate of fatal unintentional domestic injuries FUDI among women in Iraq for the period from 2010 to 2015, and to describe its distribution according to some epidemiological characteristics.

METHODS

Setting and Study Design: A descriptive cross sectional study was conducted to measure death of women due to unintentional injuries that occurred at home and reported to the Coroner Offices (CO) as a part of Iraqi Injury Surveillance System (IISS) in all provinces of Iraq from 2010-2015

Ethical Consideration: A written permission for accessing the data was obtained from Operations Centre Department (OCD) at Ministry of Health (MoH). We comply with the code of ethics in research of MoH in Iraq during all the steps of this research.

Definition of the cases: Data of all women died as a result of unintentional injuries (harmful events that take place with the lack of any intention for producing harm to the self or to others) at home in all provinces in Iraq from 2010-2015 were included in the calculations of this study. Data were extracted from Iraqi Injury Surveillance System.

Data Collection: Data obtained from the records and registries of the IISS, OCD at MoH for the period from 2010 to 2015. The IISS is a central registry system established MoH in Baghdad in December 2008 as a pilot included only 4 Health Directorates; Baghdad/Rusafa, Basra, Erbil and Karbala. From 2010 to 2012 IISS expanded to involved eight governorates; Baghdad (Rusafa and Karhk), Basra, Karbala, Erbil, Misan, Anbar, Mosel, and Sulaimaniya. In 2013, all provinces in Iraq have been involved. For reasons of security instability that some provinces in Iraq has witnessed in 2014 and 2015, the data of Mosel and Selah-Al-Dean in 2014 and 2015 and of Anbar in 2015 were unavailable so they have not been included in this study.

Each Iraqi province has a single CO that records the bio data of the fatalities using a standardized surveillance form; a form that was prepared by MoH in English, Arabic and Kurdish languages with support of experts from the WHO and the Centre for Disease Control and Prevention (CDC). All reports would be transferred to the Operation Centre Department at MoH in Baghdad on monthly bases by Epi-info software.

Procedure: We took the row data of IISS from the OCD\MOH for the period from 2010 to 2015. The data were examined carefully to remove any duplication. For the sake of our study, data of the fatal unintentional injuries affecting women at home were only extracted and subjected for analysis.

Female population (FP) which is the number of women in Iraqi distributed according to age from 2010 to 2015 were taken from Ministry of Planning (MoP).¹⁵ due to lack of exact figures of 2014, the number of women in each age group (five-year interval) was estimated by calculating the average number of women in 2013 and 2015. The number, percentage, trend, and the incidence of FUDI were calculated. The incidence of FUDI for the period from 2010 to 2012

Table 1: Number and incidence per 100,000 FP of unintentional fatal domestic injuries among females in Iraq from 2010-2015.

Year	2010	2011	2012	2013	2014	2015
Number of fatal domestic injuries	888	851	956	1,574	1,152	1,192
Number of female population	9,982,768	9,931,760	10,229,417	17,231,514	15,062,074	14,908,954
Incidence of fatal domestic injuries	8.8	8.5	9.3	9	7.6	7.9

Table 2: Distribution of unintentional fatal domestic injuries among females in Iraq from 2010-2015 by type of intention

Type of intention	2010 N (%)	2011 N (%)	2012 N (%)	2013 N (%)	2014 N (%)	2015 N (%)	Total N (%)
Unintentional inflicted by self	848 (95.4)	814 (95.6)	934 (97.7)	1,508 (95.8)	1,070 (92.9)	1,129 (94.7)	6,303 (95.3)
Unintentional inflicted by others	40 (4.6)	37 (4.4)	22 (2.3)	66 (4.2)	82 (7.1)	63 (5.3)	310 (4.7)
Total	888 (100)	851 (100)	956 (100)	1,574 (100)	1,152 (100)	1,192 (100)	6,613 (100)

Table 3: Incidence of unintentional fatal domestic injuries per 100,000 FP among females in Iraq from 2010-2015 by type of intention

Type of intention	2010	2011	2012	2013	2014	2015	Total	Average
Unintentional inflicted by self	8.4	8.2	9.1	8.7	7.1	7.5	49	8.1
Unintentional inflicted by others	0.4	0.3	0.2	0.3	0.5	0.4	2.1	0.3

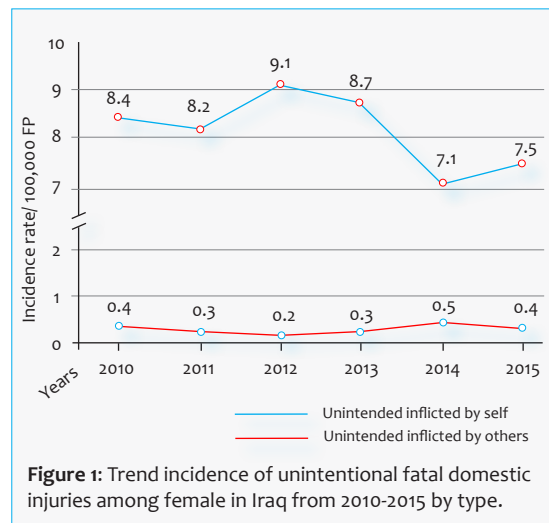
was calculated by using the population of eight governorates only; Baghdad (Rusafa & Karhk), Basra, Karbala, Erbil, Misan, Anbar, Mosel, and Sulaimaniya, while the incidence of FUFDI in 2013 calculated by using the population of all governorates. The incidence in 2014 were calculated without the data of Mosel and Selah-Al-Dean, while the incidence in 2015 were calculated without the data from Mosel, Selah-Al-Dean and Anbar.

Statistic: Analysis of data done by using Epi-info and Excel software, and represented in suitable tables and figures.

RESULTS

The total number of FUFDI in Iraq during the period from 2010 to 2015 was 6,613. They represented 72% of the total, intentional and unintentional, female fatal domestic injuries (9,181) recorded by IISS. **Table 1** shows the incidence of UFDI among females from 2010 to 2015. It decreased from 8.8/100,000 of FP in 2010 to 7.9/100,000 in 2015, with an average annual incidence of 8.4/100,000 FP.

About 95 % of the victims the unintentional injury was caused by the victim herself (self harm). The average annual incidence was 8.1/100,000 of FP. **See table 2&3. Figure 1** shows that



the trend of unintentional fatal injuries inflicted by self from 2010 to 2015 is decreasing, while it shows nearly no change for the unintentional injuries inflicted by others.

About 30 % of the victims were in age group of 20-30 years followed by those in age group of 10-19 years, while the least was reported in those 80 years of age and above. The highest annual incidence of female victims was also among those aged 20-29 years (14.9/100,000 FP) followed by those aged 80 and more years (12.1/100,000 FP) (**See table 4**). **Figure 2** shows

Table 4: Distribution and Incidence Rate Per 100,000 FP of Unintentional Fatal Domestic Injuries among Female in Iraq from 2010-2015 by Age Group

Age group in years	N	%	Incidence Rate
0-9	1,215	18.4	5.5
10-19	1,560	23.6	9
20-29	1,917	28.9	14.9
30-39	895	13.6	8.9
40-49	378	5.8	5
50-59	191	2.9	4.3
60-69	138	2.1	5.2
70-79	76	1.1	8.7
80+	47	0.7	12.1
Unknown	196	2.9	
Total	6613	100%	

that the trend in age groups, 10-19, 20-29, and 80 years were decreasing from 9.4, 14.8, and 18 to 7.9, 13.4, and 11.1 per 100,000 FP respectively.

Burn and electric injuries were the cause of in 5702 (86.4 %). The average annual incidence for burn was 6.1/100,000 FP and for electric injury was 1.2/100,000 FP (See Table 5). Figure 3 shows that while the annual incidence of burn as a cause for FUFDI decreased from 6 to 5.4 /100,000 FP, the incidence of electric injury remained stationary at 1.4/100,000 FP.

The time of injury was recorded in only 3,090 cases out of the total number of injuries (6,613), the other were missed. Figure 4 shows that 73 % of the FUFDI occurred from 6 am to 5 pm (day-

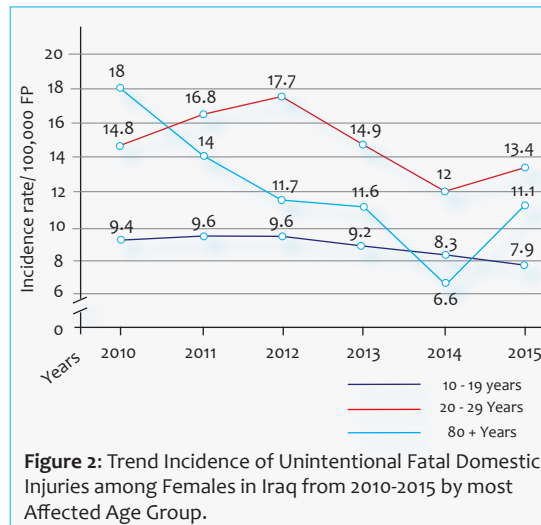


Figure 2: Trend Incidence of Unintentional Fatal Domestic Injuries among Females in Iraq from 2010-2015 by most Affected Age Group.

time).

Regarding the time needed for the victim to be brought to hospital as measure from the time of the injury to the time of arrival to hospital, 8.6 % were brought in less than an hour, 72.6 in more than an hour to less than 24 hours, and 18 % in more than 24 hours. Table 6

Regarding the mode of arrival, only 17.5 % of the victims were brought hospitals by ambulances while the majority were brought by other vehicles. Figure 5

DISCUSSION

In our study, the average annual incidence

Table 5: Distribution and incidence rate per 100,000 FP of unintentional fatal domestic injuries among females in Iraq from 2010-2015 by mechanism

Mechanism	N	%	Incidence Rate
Burn	4702	71.2	6.1
Electric injury	1000	15.2	1.2
Fall	293	4.5	0.3
Gun fire	141	2.2	0.1
Drowning	117	1.7	0.1
Suffocation	91	1.3	0.2
Blunt	67	1	0.07
Poisoning	17	0.2	0.01
Sharp tools	9	0.1	0.01
Animal bite	8	0.1	0.009
Others	165	2.4	0.2
Unknown	3	0.04	0.004
Total	6613	100%	

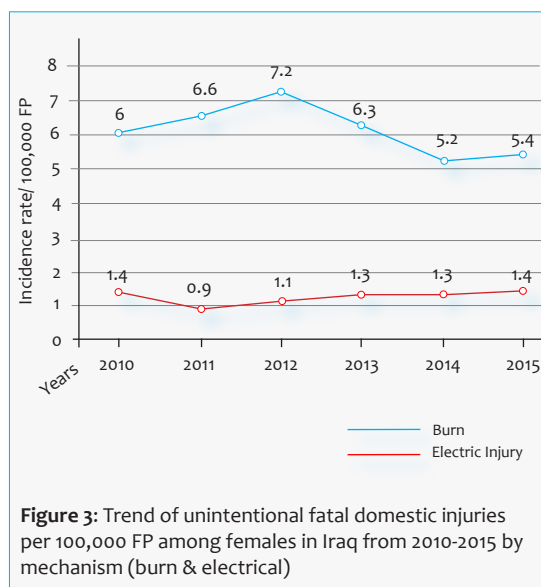
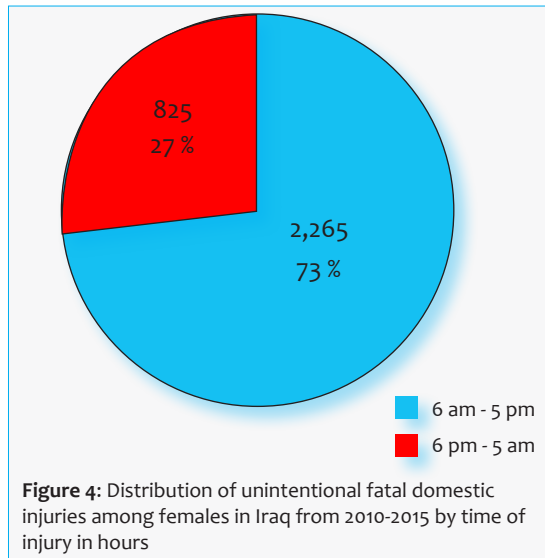


Figure 3: Trend of unintentional fatal domestic injuries per 100,000 FP among females in Iraq from 2010-2015 by mechanism (burn & electrical)



of FUFDI from 2010 to 2015 was 8.4/100,000 of female population. Since 2012, the incidence was decreasing reached the lowest in 2014. This trend can be explained by the increase awareness of females about their safety or effect of preventive programs adopted. However, this positive trend was broken in 2015 which showed mild increase in the incidence of FUFDI. This increment was explainable by the fact of hard situation of the country which enforced large number of families to be internally displaced and living in unsafe homes. The authors did not find plenty of figures about the fatality of unintentional domestic injury in females as many do measure the whole fatality of women for example in a study from China, the injury mortality rate in females was also decreasing from 40.4/100,000 FP in 2004 to 31.3/100,000 FP in 2010.¹⁶

We reported that unintentional injuries inflicted by self is more common than intentional and this might be explainable by the saying that injuries in or around the home occur without any intention and that they may occur as a result of the home hazard. In addition, the intentional self-harm injuries were under reporting due to social and cultural barriers. These results contradict that of Victorian Coroners' Facilitation System (VCFS) data. Therein, over one-half (55.6%) of reported home injury of adult female deaths, were intentional (suicide and homicide). Unintentional injury accounted for more than a quarter (28.7%) of deaths.¹⁷ In the United State of America (USA), uninten-

Table 6: Distribution of unintentional fatal domestic injuries among females in Iraq from 2010-2015 by time from injury to arrival.

Time from injury to arrival	N	%
Within 1 hour	566	8.6
Within 24 hours	4,800	72.6
More than 24 hours	1,190	18
Unknown	57	0.8
Total	6,613	100%

tional injuries are the leading cause of death for women ageing 18-34 and it is the eighth leading cause of overall deaths for adult women. In 2001, (31,400) adult women died as a result of unintentional injuries.¹⁸ Another study from the USA,¹⁹ has reported that the incidence of FUFDI from 2000 to 2008 was 8.2 per 100,000 women/girls; an incidence which is similar to ours, however, the incidence was increased significantly during the same period and this has contradicted ours. The increment in the incidence of unintentional home injury death in females in the USA was also evident in two other studies; Runyan et al²⁰ has reported an incidence as low as 4.97 per 100,000 FP in 1992 to 1999. While a study in California has shown that unintentional injury deaths in females has increased by 25.6% in 2010 when compared to the 2000 rate.²¹

Age Group: The current study showed that the most affected age group by FUFDI was 20-29 years, followed by those aged 10-19 years. Members of these age groups are highly active and they usually carry out more duties that require more physical efforts so more prone for injuries.

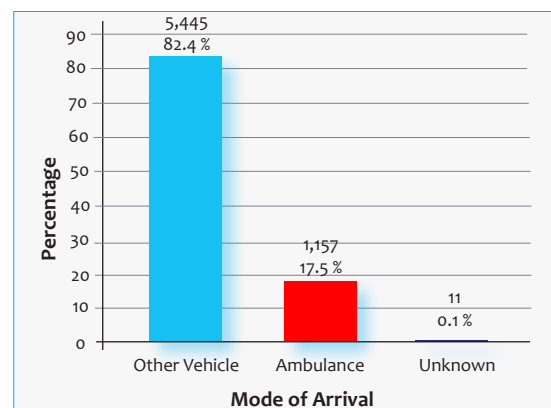


Figure 5: Distribution of unintentional fatal domestic injuries among females in Iraq from 2010-2015 by mode of arrival

While women over age of 80 years are least affected because they are less active and they gain much attention from other younger members of the family because of the social bonds in our community making them less vulnerable for injuries. These results contradict that reported by Mack et al from the USA¹⁹ where the highest percentage (30.4%) was recorded in the age group ≥ 80 years, while the least affected age group was 10-19 years (1.7%). The highest average annual incidence was recorded among the age group 20-29 years, followed by ≥ 80 years.

Mechanism of FUFDI: The current study shows that the main causes of FUFDI were burn and electrical injuries. Causes that is consistent with women's responsibilities at home which characterize the Iraqi society.

Burn: This is the first cause of FUFDI among females in Iraq, reported in 71.2 %. Burn may take place because of increased exposure of women to resources of fire at home during cooking and in door heating in winter and lack of proper safety measures during daily domestic activities whether these measures are due to use of poor quality devices or improper or poor attention for using others. In addition, exploitation of young girls with immature domestic experience or women with underlying medical conditions that interfere with their perception about the danger of burn in household roles such as cooking may augment the danger of burn. Globally, according to the Disease Control and Prevention most burn injuries occur in a domestic setting.²² According to the WHO, burns are the fourth most common type of trauma worldwide, following traffic accidents, falls, and interpersonal violence.²³ An estimated 265,000 deaths occur each year from fires alone.²⁴ In Australia in 2015, The most common cause of the fires was unattended cooking, responsible for almost half of all home fires; 25 fire deaths occurred in New South Willis or Wales (NSW) in 2010; home fires represented 94% of all fire-related deaths.²⁵ According to the VCFS on average, between 9 and 10 adult women die each year in Victoria from fire and burns that occur in the house.¹⁷ In a study from Western India from 2008 to 2011,²⁶ 82.2 % of deaths due to burn are in women. Afify et al in a study in Cairo/ Egypt²⁷ from 2006-2010 has stated that 82.1 % of burns have occurred at home, one third has involved females. A systematic review was undertaken to describe the

epidemiology of burns in the EMR between the years 1997 and 2007. In the review, seventy-one studies were included, from 12 countries, and showed that burns most commonly occurred at home²⁸ ranging from 72%²⁹ to 94%.³⁰

Electrical injuries: This is the second most common cause of FUFDI among females in our study reported in 1000 (15.2 %). Exposure to variety of machines, tools, appliances or light fixtures; some of them are of bad quality and poor safety measures can explain occurrence of electric injuries at homes and involvement of women. Increasing dependent on portable home generators due to inadequate national power supply adds more risk for electric injuries at homes. Our result is higher than that reported from South Australia³¹ were death from electrical injury was uncommon with only 162 cases reported over four years between 2001 and 2004, twelve cases only were females and in 35 % occurred at homes. In the USA electrical injury is rare but kills on average a few hundred people per year in the home.³²

Other mechanisms of unintended domestic death among women at home are rare in our study.

We found the incidence of burn as a mechanism for FUFDI was 6.1 per 100,000 FP. World-wide, the incidence in low and moderate-income countries is 1.3 per 100,000 populations compared with an incidence of 0.14 per 100,000 populations in high income countries.³³ In a study from Colombia, 21.6 % of death by burn injury from 2000 to 2009 involved females with a crude burn mortality annual incidence of 1.270 per 100,000.³⁴ In the EMR study,²⁸ in Kuwait it was reported that the mortality rate was 0.6 per 100,000 per year for all age groups³⁵ while two Iranian studies have reported a higher mortality rate of 4.6 per 100,000 per year³⁰ and 5.6 per 100,000 per year.³⁶ This difference is remarkable as we should take in consideration that the figure from other countries are not specific for women at home but to include are types of injuries in both sexes. Although the explanation of this huge difference can be attributed to the design of each study or whether the study is community based like ours or limited to few hospitals, this huge difference is expected as most of the houses in Iraq lack provision of safety measure and most of women are unaware of them.

Our annual incidence rate of FUFDI due to electric injuries was 1.2 per 100,000 of FP. This is a higher incidence than the 0.14/100,000 FP reported in a study from Calgary Health Region in Canada from 1996 to 2002.³⁷ This may be explained by the observed variation between Canada and Iraq regarding the electrical safety especially at home.

In our study, the trend of incidence FUFDI due to burn decreased from 2010 to 2015, while the trend of the electrical injuries did not change. Comparing with the trend of death from burn internationally, we could not find figures about women only; in the USA, the rate of medically-attended burn injuries has declined from about 10/10,000 to 4.2/10,000,³⁸ and Fire and burn deaths declined about 40% from 1971 to 1995.³⁹ For electrical injuries, a study from Ghana The trend over the 4-year period shows an increase from 1 in the last six months of 2009 to 5 cases in 2010; thereafter, there was a gradual decrease to 4 and 3 cases in 2011 and 2012 respectively and no electrical burn injury was recorded within the first half (January – June) of 2013.⁴⁰

Regarding the time of occurrence of the FUFDI in hours of the day, the results have shown that 6 am-5 pm is the daytime period showing the highest number of FUFDI. This is not surprising as these periods represented the highly active hours for doing the housework by women in Iraq. These results contradicted others for example in the USA, Injury Facts reports of 2017 has shown that fires usually start at night, when family members are asleep⁴¹ and half of home fire deaths in 2016 result from fires reported between 11 pm and 7 am.⁴² Also a study from South India reported that fifty-two percent of the injuries occurred between 8 am and 5 pm.⁴³

We also assessed the time from injury to arrival of victims of FUFDI to the emergency department, less than 10 % of victims were brought to hospital in the first hour after the injury, majority in less than 24 hours, and surprisingly about 20 % of them delayed to more than 24 hours. Poor perception of seriousness of the injury by the families, their carelessness, or lack of financial resources and transportation may explain this result. These results are in agreement with that reported from England⁴⁴ in which it has stated that 30% of injured children below age of 17 years reached hospital in

less than 60 minutes from time of the injury. In South India 52% of the injuries which occur between 8 am and 5 pm presented to the ED within less than 24 hours.⁴³

Regarding the mode of Arrival of the victims to hospital, the current study revealed that over 80 % of the victims were brought to hospital in vehicles other than ambulances. It seems that the families in Iraq are less confident or less aware that ambulances will shorten the time of arrival to hospital. This result is similar to that from Uganda in 2004-2005 in which only less than 5% of all injured patients are brought to the ED by ambulance⁴⁵ and that from Ghana where 14.8% of injured patients arrived to hospital by ambulance.⁴⁶

CONCLUSIONS

FUFDI remains a prominent public health problem in Iraq despite the decline in the incidence from 2010-2015. Young women are the usual victims of fatal unintentional domestic injurers. Burn followed by electric injury are the majority of the mechanisms leading to fatal unintentional domestic injury in women. The highest percentage of FUFDI occurs in the 1st half of the day. Transportation of the victim to health institutions is usually delayed and made by private vehicle other than the ambulances.

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Abbreviation list: Coroner Offices (CO), Directorates of Health (DOH), Eastern Mediterranean Region (EMR), Emergency Department (ED), Female Fatal Domestic Injuries (FFDI), Female Population (FP), Female Unintentional Fatal Domestic Injuries (FUFDI), Iraqi Injury Surveillance System (IISS), Komfo Anokye Teaching Hospital (KATH), Ministry of Health (MoH), Ministry of Planning (MOP), New South Wales (NSW), Operations Center Department (OCD), Population (P), Victorian Coroners' Facilitation System (VCFS), Unintentional Fatal Domestic Injuries (UFDI), United State America (USA), World Health Organization (WHO).

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