

EPIDEMIOLOGY OF ROAD TRAFFIC INJURIES IN AL NAJAF GOVERNORATE, IRAQ, 2012

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ABSTRACT

Background: Road Traffic injuries have been an important cause of morbidity and mortality. They are the ninth leading cause of death and burden of disease worldwide. 90% are in developing countries. World Health Organization reported that Iraq considered being the fourth country worldwide regarding the high incidence of road traffic accident. The study aims to determine the incidence and to describe the pattern of the Road Traffic injuries in Najaf Governorate during the 2012. **Method:** February–May 2013 cross-sectional research. The Najaf health directorate's statistic section analysed all road traffic injury cases treated in the emergency department of Al-Sadr's medical city, Najaf's major hospital, and hospitalised cases in all Najaf governorate hospitals in 2012. The operating department of Najaf health directorate, Al-Sadr medical city police station, and forensic medicine unit submitted data. Najaf residents only had road traffic injuries. Analysis employed descriptive tools. Tables, graphs, and statistical analyses presented data. **Results:** In 2012, Al-Sadr Medical City recorded 4867 road traffic injuries, 315 of which were fatal. 66% were men. 1.9:1 male-female ratio. 718.9 and 23.9 deaths per 100,000 people, respectively. Road traffic injuries injured 48.7% of those aged 15–44 ($P < 0.001$). Road traffic injuries were 64% of ED trauma patients. Head injuries (37% of patients) were followed by lower limb injuries (29%). RTI victims were 56.5% pedestrians. 69% of accidents involve young drivers. Road traffic injuries peaked in October (11.5%). RTIs occurred mostly in the city's north and centre. Rural regions had 173 (54.9%) road traffic deaths ($p=0.001$). **Conclusion:** Road traffic injuries in Najaf were a public health issue, impacting mostly productive-age people in October in the centre and north parts of the city. Road safety enforcement and injury monitoring were advised.

KEYWORDS: Epidemiology, Road, Traffic, Injuries, Al Najaf, Governorate, Iraq, 2012.

INTRODUCTION

Road Traffic Injuries (RTIs) are a significant public health issue that requires concerted attention from governments and public health organizations. Worldwide, over 1.24 million people die each year on the roads, and between 20 and 50 million people suffer from non-fatal injuries.^[1] RTIs cause considerable economic losses to individuals, their families, and countries, including increased treatment costs, lost productivity from deceased or disabled individuals, and impaired livelihoods for their families.^[1] RTIs are the ninth leading cause of death globally and are expected to become the fifth leading cause of death by 2030. At least 90% of these deaths and injuries occur in low and middle-income countries.^[2] Most accidents happen among vulnerable road users, such as pedestrians and cyclists. 50% of those affected are aged between 15 and 44 years, and 73% are male.^[2,3] In Iraq and neighboring

countries, high rates of serious road traffic accidents have been reported. In August 2007, a road safety study in the Eastern Mediterranean Region (EMR) found that Iraq ranked fourth out of 20 countries, after Egypt, Libya, and Afghanistan, with 1,932 deaths and an estimated road traffic death rate of 38.1 per 100,000 populations.^[4] According to the latest WHO data in April 2011, road traffic accident deaths in Iraq reached 9,570 per year (5.07% of total deaths), with an adjusted death rate of 44.75 per 100,000 populations, ranking Iraq fourth in the world.^[5] The main types of injuries associated with road traffic accidents include head injuries, maxillofacial injuries, pelvic injuries, and lower limb injuries.^[6] Deaths from traffic injuries are avoidable or partly avoidable with treatment, preventive measures, or both. Despite being predictable and largely preventable, RTIs have been neglected on a global scale. Objectives: To describe the pattern of road traffic

injuries using an epidemiologic model (person, place, and time). Determine the incidence and mortality rate of RTIs in Najaf Governorate during the year 2012.

METHOD

A cross-sectional study was conducted. The study took place in Al-Najaf Governorate, located in the central part of Iraq, approximately 180 kilometers from Baghdad. The total population in Najaf during 2012 was 1,319,608 residents, with 70% living in urban areas and 30% in rural areas. The male-to-female ratio was approximately 1:1 (Al-Najaf Center of Planning and Statistics). Inclusion criteria: Data were collected only for residents of Al-Najaf. Exclusion criteria RTI cases involving visitors were excluded. Data were collected from various sources, including the Emergency Department at Al-Sadr Medical City, the Operative Department of Najaf Health Directorate, the police station at Al-Sader Medical City, Al-Najaf Center of Planning and Statistics, and the forensic medicine unit of Najaf Health Directorate. The collected data were categorized as follows: Personal characteristics.

- Age: Incidence and mortality rates were calculated by age groups using Iraqi MOH categories.
- Gender
- Site of injuries (Head, neck, lower limbs, upper limbs, and trunk)
- Drivers' ages were classified into five groups.

Time of accidents Data were recorded for each month of 2012, with accidents occurring during daytime (6 AM-7 PM) and nighttime (8 PM-5 AM). Place of accidents Injuries occurred in both urban and rural areas of Najaf. Urban areas were identified according to the municipality adopted by Najaf city. Mechanism of accident.

- Collision: Accidents were divided according to data recorded at the police station.
- Roll over: Involving cars, motorcyclists, and others (tractor, shuffle).

Statistical analyses: Data were collected using Microsoft Office Excel and analyzed using chi-square (χ^2) tests with SPSS version 18. A p-value ≤ 0.05 was considered statistically significant. The study received approval from the scientific committee of the community medicine department at Babylon University, College of

Medicine, and the ethical committee of Najaf Health Directorate.

RESULTS

Out of 9487 injury cases reported during the year 2012 in the statistic department at health director in Al-Najaf, 4867 (46.4%) RTIs cases were counted in the Al-Sadr Medical City of the same year. The incidence rate was 718.9 per 100,000 populations. The RTIs mortality rate was 23.9 per 100,000 populations. The male to female ratio of RTIs was 1.9:1. And male to female's death ratio was 2.4:1. (66%) of RTIs occurred among males. Non-fatal injuries were 4552(93.5%) and the numbers of fatal injuries were 315 (6.5%). (70.4%) of RTIs death rate occurred among males. RTIs constitute (64%) of all emergency cases admitted to ED in SMC in the same period followed by burns which constituted (15%). Most common places of the RTIs were in the northern and central parts of the Najaf governorate during the year of study. Table (1) also clears that the majority of case fatality rate among old age group was 28.2% higher than the young age group 4.3%, this difference is Statistically significant ($p = 0.001$). The same table shows that 59.7% of RTIs occurred at daytime and 24.7% in nighttime, this difference is statistically significant ($P = 0.001$). The table also demonstrates that the case fatality rate was (11.3%) at night time which is statistically significant ($P = 0.001$). Table (2) explains that the RTIs involve the males more than females in all age groups ($p = 0.002$). Also, it clarifies that RTIs witch occur during night time mainly involve the males (83.3%) Compared to the females (16.7%), this difference is statistically significant ($P = 0.001$). The male to female ratio during night time was 5:1. Table (3) shows that the majority of accidents lead to RTIs mainly occurred in October 561(11.5%) while the lowest accidents occurred in August 305(6.2%) of the same year. Table (4) explains that the head was the commonest site of injury (37%) and the lower limb was second site of injury (29%). Table (5) demonstrates the percentage of collision between cars and pedestrians which is (42.2%) following by collision between cars and motorcycles by (21.1%). Table (6) illustrates the sort of agents and the number of the accidents. It shows 69% of RTIs happened by cars, 30.3% by motorcycles and 0.7% by animals. Table (7) outlines the drivers' age groups, who were involved in making RTAs. Reveals that young driver (17-36 years) were responsible for the majority of RTIs (69%) in Najaf province.

Table 1: frequency distribution of fatal and non-fatal RTIs by age groups and time of occurrence.

Age	Non-fatal RTA	%	Fatal RTA	%	Total	%	P-value
<5yr	184	82.2%	40	17.8%	224	4.6%	0.0001
5-14 yr	1392	95.7%	62	4.3%	1454	29.9%	
15-44 yr	2264	95.5%	107	4.5%	2371	48.7%	
45-64 yr	595	90.8%	60	9.2%	655	13.4%	
>65 yr	117	71.8%	46	28.2%	163	3.4%	
Time	Non-fatal RTA	%	Fatal RTA	%	Total	%	P-value
Day time	2729	93.9%	178	6.1%	2907	59.7%	0.0001
Night time	1071	88.7%	137	11.3%	1208	24.7	
Missing time	752	100%	0	0	752	15.6	

Table 2: Frequency distribution of gender by age groups and time of occurrence during the year 2012 in Najaf.

Age	Non-fatal RTA	%	Fatal RTA	%	Total	%	P-value
<5yr	138	61.6%	86	34.4%	224	4.6%	0.0002
5-14 yr	906	62.3%	548	37.7%	1454	29.9%	
15-44 yr	1621	68.4%	750	31.6%	2371	48.7%	
45-64 yr	437	66.7%	218	33.3%	655	13.4%	
>65 yr	108	66.2%	55	33.8	163	3.4%	
Time	Non-fatal RTA	%	Fatal RTA	%	Total	%	P-value
Day time	1772	61%	1135	39%	2907	59.7%	0.0001
Night time	1006	83.3%	202	16.7%	1208	24.7%	
Missing time	432	57.5%	320	42.2	752	15.6%	

Table 3: Frequency distribution of RTIs according to the sites of the body.

Site of injury	percent	No.
Head	37%	1802
Neck	3%	146
Upper limbs	20.5%	1002
Lower limbs	29%	1422
Trunk	18.3%	893
*Total		5265

Table 4: Frequency distribution of RTIs victims, according to the place of occurrence (urban and rural) during the year 2012 in AL-Najaf.

place of the accident	No. of Nonfatal RTIs	%	No of fatal RTIs	%	Total	%	Mechanism of RTIs			
							collision		rollover	
							No.	%	No.	%
Urban	2554	95%	142	5%	2696	62%	2897	73.6	107	25.7
Rural	1482	89.5	173	10.5%	1655	38%	1038	26.4	309	74.3
Total	4036	93%	315	7%	4351	100%	3935	100	416	100
$\chi^2=41.07$							df=1		P=0.001	
							$\chi^2=401.6$		df=1	
							P=0.001			

Table 5: frequency distribution of RTIs by the mechanism of total number 4351 of cases during the year 2012 in AL-Najaf.

Collision				Roll over		
		No.	%		No.	(%)
Vehicles	Cars with cars	740	18.8%	Cars	244	5.6%
	Cars with M.C	836	21.1%			
	M.C with M.C	54	1.1%			
	Other	24	0.5%			
Pedestrian with	Car	1662	42.2%	Motor cyclists	157	3.6%
	M.C	508	14%			
	Other	16	0.3%			
Animal with	Cars	33	0.7%	other	15	0.8%
	M.C	-				
	Other	-				
Fixed object with	Cars	47	1%			
	M.C	15	0.3%			
	Other	-	-			
Total		3935	90%		416	10%

Table 6: frequency distribution of RTIs according to the agent that causes accidents.

Agent	Total	%
Cars	3562	69%
Motorcyclists	1570	30.3%
Animal	33	0.7%
Total	5165	100%

Table 7: frequency distribution of RTIs according to drivers' ages.

Diver age	Number of RTI	%
17-26 year	725	39%
27-36 year	554	30%
37-46 year	310	17%
47-56 year	176	10%
More than 57 year	74	4%
Total	1839	100%

DISCUSSION

The study conducted at Al-Sadr Medical City in Najaf, Iraq, in 2012 revealed a high number of road traffic accident injuries (RTIs) reported at the Emergency Department. It was predicted that the number of RTIs would increase in the coming years due to factors such as the growing number of new cars, lack of traffic legislation and road safety measures. This finding was supported by another study conducted by Koberts.^[7] The study also found that the number of RTIs reported at the police station in Al-Sadr Medical City was lower than the number of injuries recorded at the Emergency Department. This discrepancy suggests that some cases were not reported as RTIs at the police station to avoid legal consequences, similar to the findings of Razzk and Luby in 1998.^[8] The incidence and death rates of RTIs in Najaf were found to be higher than the global death rate and higher than neighboring countries such as Kuwait, Bahrain, and Oman, but lower than Iran. These findings highlight the serious public health burden posed by RTIs in Najaf. Similar results were reported in studies conducted in other Iraqi governorates and neighboring countries.^[9-11] The study revealed that males were more exposed to road accidents compared to females, with a male-to-female ratio of 1.9:1. This can be attributed to factors such as males being the primary breadwinners and engaging in more outdoor activities. Additionally, males were more commonly drivers of cars, motorcycles, and bicycles in the community. These findings align with previous studies.^[12,13] The study found that the highest proportion of RTIs occurred in the age group of 15-44 years, while the lowest proportion occurred in the age group above 65 years. This age distribution resulted in increased economic losses for the country due to the expenses associated with medical treatments and the loss of productivity. Similar findings were reported in other studies.^[14, 15] Children were identified as the second most susceptible group to RTIs, accounting for approximately 30% of the cases in Najaf. This finding is consistent with a study by Qureshi.^[15] RTIs constituted 64% of all accidental injuries attended at Al Sadr Medical City, indicating their significant contribution to the overall injury burden. This finding aligns with other studies.^[16,17] Geographically, RTIs were found to primarily occur in the northern and central regions of Najaf governorate, potentially due to traffic congestion in connection to neighboring highways. Urban areas had a higher proportion of RTIs compared to rural areas. The study also identified that October had the highest percentage of RTIs, likely due to the start of the new academic year,

while August had the lowest proportion, possibly due to increased travel outside the governorate during the summer holiday. These findings were consistent with previous studies.^[18,19] Head injuries were the most common among RTI victims (37%), followed by lower limb injuries (29%). This may be attributed to the lack of seatbelt usage in cars, leading to occupants' heads hitting the interior of the vehicle. Similar findings were reported by Dalmases^[20], although other studies found the lower limbs to be the most affected body part.^[21] Collisions were the most frequent mechanism of RTIs (90%), with vehicle-pedestrian collisions being the main type, followed by car and motorcycle collisions. These results are in agreement with other studies that highlight pedestrians, cyclists, and motorcyclists as the most vulnerable road users in developing countries, while car occupants were more commonly affected in a different study.^[22-24] Improvements in road infrastructure were suggested as a means to reduce the number of susceptible individuals to road injuries and deaths, consistent with the World Health Organization's findings.^[25,26] Cars were identified as the most common agent causing RTIs, followed by motorcycles, likely due to the increasing number of cars on the roads. The study also found that the death rate of RTIs was higher in rural areas, potentially due to a higher incidence of rollover accidents and longer transportation times to hospitals. Young drivers aged 17-36 years were found to be more involved in RTIs, possibly due to their lack of experience and tendency to drive at high speeds. Elderly individuals above the age of 64 had a higher rate of fatality, attributed to their weaker bodies' inability to withstand trauma. These findings are supported by various studies.^[27, 28]

CONCLUSION

Road Traffic Injuries (RTIs) are a major public health concern in Al-Najaf Governorate, with a high incidence rate that demands urgent attention. Key findings from various studies include: A significant proportion of RTIs affect young males, who represent a productive age group in society. The majority of RTIs occur in urban areas and the northern region of Al-Najaf Governorate. The incidence rate of RTIs is highest in October and during daytime hours. Most accidents are caused by young male drivers. These findings highlight the need for targeted interventions and policies to address the high incidence of RTIs in Al-Najaf Governorate, particularly focusing on young males and urban areas.

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