

Pidemiological Features of Road Traffic Accident Deaths in Babylon Province during the Period 2010-2014

Bashaer Diah

Babylon health directorate-family physician

Hasan Alwan Baiee

community medicine –Babylon Medical College

hassanbaey@yahoo.com

Mohend AlShalah

General surgery-Babylon Medical College

Abstract

Background

Road Traffic Accidents are the fifth leading cause of morbidity and mortality worldwide. In Iraq, traffic accidents are increasing continuously leading to more fatalities that rank Iraq as a number four in the world.

Objectives:

To assess the epidemiological features of fatal RTIs in a time, place, person epidemiologic model and to identify the trend of Road Traffic Injury mortalities in Babylon province during 5 years.

Materials and Methods:

This was a descriptive cross-sectional study included a retrospective analysis of the forensic medicine data presented in the records for the period 2010-2014. The time needed to conduct this study from 1st of February to end of May, 2015. After the approval of the study protocol by the local health ethical committees, a structured questionnaire was used to collect data according to the descriptive epidemiologic model (time, place and person).

Results:

During the period 2010 – 2014, mortality rates were higher in males than females with male to female ratio of 3.25:1. Higher mortality rates reported in the year 2012. Most mortalities occurred during June, October, November and December. Most mortalities due to RTIs occurred among unemployed (38.8%) and student (18.0%) that lives in urban areas. Main roads were most common places for fatal Road Traffic Injuries (RTIs) in Babylon province and represent (72%). Head injury was the dominant site of injury (33.1%) followed by lower limbs. The overall proportional mortality ratio of RTIs was (30.8%).

Conclusions:

During the period 2010-2014, higher proportion of mortalities reported due to RTIs and the trend of RTI fatalities peaked in 2012 and declined in the next two years.

Key Words: Road traffic accidents, Babylon province, 2015.

الخلاصة

الخلفية: تعد حوادث الطرق خامس سبب للوفيات والمرض على المستوى العالمي، الوفيات بسبب حوادث السير في العراق يتزايد باستمرار لدرجة تبوء البلد المرتبة الرابعة عالميا في هذا السبب من الوفاة.

الهدف: تقييم الصفات الوبائية لحوادث السير وتحديد نمطها لمدة خمس سنوات في المحافظة.

طريقة العمل: دراسة وبائية وصفية مقطعية اعتمدت النمط الوبائي الوصفي لدراسة الحادثة المرورية ونتائجها (المكان، الزمان، الشخص المتوفى)، اجريت هذه الدراسة للمدة من بداية شباط الى نهاية شهر ايار 2015، تم مراجعة جميع سجلات الوفيات في قسم الطب العدلي في محافظة بابل لسنوات الدراسة الخمسة واعدت ورقة استبانة تتضمن معلومات تلي النمط الوبائي المتبع في منهجية هذه الدراسة.

النتائج: اظهرت الدراسة ان اكثر الوفيات كانت في عام 2012، وان الذكور هم الأكثر تعرضا للموت من الاناث ونسبة اكثر من 3:1 كانت اشهر تشرين الاول وحزيران وكانون الاول هي الاكثر تسجيلا لحالات الموت بسبب حوادث السير قياسا بالشهر الاخرى وبفارق احصائي معنوي مهم $p < 0.05$ ، كان غير الموظفين يليهم الطلبة هم الاكثر موتا بسبب الحوادث، وكانت اصابات الراس هي الأكثر بين الضحايا.

الاستنتاج : حوادث السير في المحافظة السبب الرئيسي للموت في وقائع الطب العدلي قياسا بالأسباب الدفينة الأخرى للموت في المحافظة , ضحاياها هم الذكور في عمر الانتاج والطلبة , اجراءات عاجلة يجب ان يشارك بها الجميع وابدارة واعية من الجهات المختصة للحد من هذا الدمار الصحي والاقتصادي والاجتماعي للمجتمع.
الكلمات المفتاحية :حوادث المرور، محافظة بابل، 2015.

Introduction

Globally, Road Traffic Injuries (RTIs) have increased in the last twenty years, this makes RTIs one of the main five causes of morbidity and major cause of fatality all over the world particularly in the low-and middle-income countries (Mishra *et. al.*,2010). The RTA is defined as any vehicle accident occurring on a public road or highway and includes accidents where the place of occurrence is unspecified (Singh *et. al.*,2012).

The growth in the global economy in the last century has changed many aspects of people's lives including their use of various means of transportation, this leads to a corresponding increase in the number of automobiles usually resulting in an increase in RTAs and consequent injuries and deaths (Peden *et. al.*, 2004, Kopits *et. al.*, 2005). The overall global RTIs fatality rate estimated to be 19.5 per 100 000 population, middle-income countries have the highest annual road traffic fatality rates, at 20.1 per 100 000, while the rate in high-income countries is the lowest, at 8.7 per 100 000 . There is a wide variety in road traffic death rates in different regions of the world; the highest rate was reported in African regions, 24.1 per 100 000 and lowest in the European Region 10.3 per 100 000. Also, there is a considerable disparity within each region (WHO,2013).

In the Eastern Mediterranean Region, one of the major challenges to the region is the constantly increasing incidence of RTIs (WHO,2004). This region has one of the world's highest traffic fatality rates, mostly due to a lack of simple measures to reduce RTIs (Razzak,2010)and inadequate pre-hospital medical emergency systems (Al-kharusi,2008). The available data referred to different death rates due RTIs in some Arab and regional countries; moderate to high fatality rates reported in United Arab Emirates (Hammoudi *et. al.*,2014), Saudi Arabia (Al-Naami,2010) and Kuwait (Ziyab *et. al.*,2012) . However, RTI fatality rates range from 9 in Turkey to 44.75 per 100 000 population in Iraq (World health ranking).

In Iraq, traffic accidents are increasing continuously leading to more fatalities (Ewadh & Neham,2008).According to the latest WHO data about Iraq the age adjusted death rate, rank Iraq as number 4 in the world regarding the RTI fatalities, preceded only by Namibia,Swaziland and Malawi (WHO 2013;World health ranking).

It is worth mentioning that in 2011 the injury toll from RTIs is almost four times greater than that from acts of terrorism in Iraq (WHO,2015).According to the agreement between Iraq and WHO, the Ministry of Health and the Ministry of Interior with the full cooperation of the WHO, Iraq launches the Decade of Action for Road Safety 2011-2020 and pledges to reduce the level of road traffic fatalities by 2020 (WHO,2015).

Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and person distribution (Jha & Agrawal ,2004; Jha ,2004).

Previous studies referred that majority of the victims are within the age15 to 50 years, furthermore, children account for approximately 13% of fatalities.The main victims of RTIs are males. (Ganveer & Tiwari , 2005; Reddy & Kumar , 2013).

The global burden of disease project is estimated that around 20 to 50 million people are being injured or disabled each year with considerable social and economic losses (Murray, 2001; Puvanachandra *et. al.*, 2012), so that, the current study tried to assess the epidemiological features of fatal RTIs in a time, place and person model in Babylon province and to identify the epidemiological trend of RTI mortalities in the province.

Methods

The study protocol was approved by the ethical committee of family and community medicine department in Babylon university-medical college. The acceptance of ethical committee of Hilla health directorate was taken to conduct this study. This was a cross-sectional descriptive study depended on a retrospective analysis of RTIs mortalities that recorded in the forensic medicine department for the years 2010–2014. The time needed to conduct this study from 1st of February to end of May, 2015. Data that were recorded in the forensic medicine department for the last five years were reviewed by the researcher himself. The data for each victim during the five years included, age, gender, occupation, marital status and residence of the victims, in addition to the place of accident, date of accident (in day and month) and the site of injury in the body. Statistical analysis was done using Spss version 17 to calculate the Chi square test to evaluate the significant of difference between variables, $P < 0.05$ considered as the statistical significant level.

Results

Figure (1) revealed that the total mortalities reported in 2010 were 352 represented (19.2%) of the total mortalities over the 5 years, raised to 396 (21.5%) in 2011 and reach the peak in 2012 with 441 (24.0%) mortalities then declined in 2013 to 334 (18.2%) and declined more in the year 2014 to reach 315 (17.1%). Moreover, higher mortality numbers was reported in October 180 (9.8%), followed by June 179 (9.7%), December 175 (9.5%) and November 172 (9.4%), while the lower rate reported in September, 117 (4.6%), (**Figure 2**).

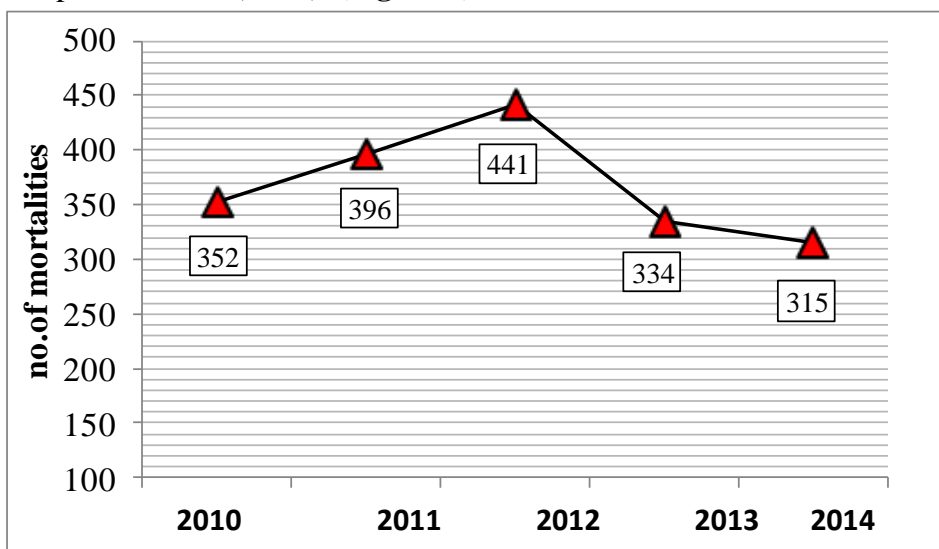
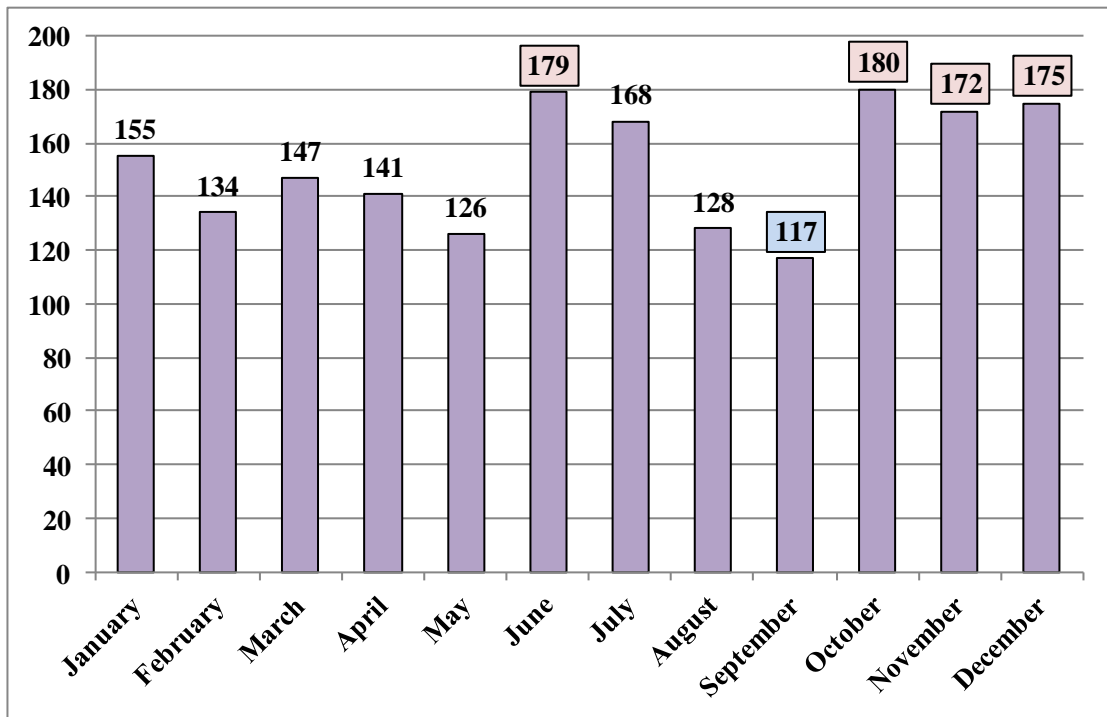


Figure (1) Trend of Road Traffic Accidents mortalities in Babylon province as reported in the forensic medicine department during the period 2010 – 2014.



Chi square value=37.236 df =11 p<0.001

Figure(2) Distribution of monthly deaths due to road traffic injuries in Babylon province during the period 2010 – 2014 .

Table (1) shows the total mortalities reported during the whole period was higher in urban areas than rural,1032 (56.1%) and 806 (43.9%), respectively, on the other hand, this dominance of the urban residence mortalities was noticed over the first 4 years (2010-2013), while in 2014 the mortalities were lower in urban than rural areas, (44.8%) and (55.2%), respectively.

Table (1) Annual road traffic mortalities registered in the forensic medicine department during the period 2010 – 2014 according to place of residence.

Year	Residence				Total	
	Urban		Rural			
	No.	(%)	No.	(%)	No.	(%)
2010	202	(57.4)	150	(42.6)	352	(19.2)
2011	232	(58.6)	164	(41.4)	396	(21.5)
2012	270	(61.2)	171	(38.8)	441	(24.0)
2013	187	(56.0)	147	(44.0)	334	(18.2)
2014	141	(44.8)	174	(55.2)	315	(17.1)
Total	1032	(56.1)	806	(43.9)	1838	(100.0)

P<0.05

Table (2) during the period 2010 –2014, the higher overall number of mortality due to RTIs was reported on the main roads,(72.0%),compared to(18.5%) on secondary roads and only(9.5%) on the highways. Similarly, at each individual year, the mortalities were higher on the main roads than secondary or highway.

Table(2) Annual road traffic accidents mortalities registered in the forensic medicine department during the period 2010 – 2014 according to roads where the accidents occurred.

Year	Place of Accidents						Total	
	Main road		Secondary road		Highway			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2010	252	(71.6)	59	(16.8)	41	(11.6)	352	(19.2)
2011	303	(76.5)	71	(17.9)	22	(5.6)	396	(21.5)
2012	315	(71.4)	97	(22.0)	29	(6.6)	441	(24.0)
2013	195	(58.4)	69	(20.7)	70	(21.0)	334	(18.2)
2014	258	(81.9)	44	(14.0)	13	(4.1)	315	(17.1)
Total	1323	(72.0)	340	(18.5)	175	(9.5)	1838	(100.0)

T

able (3) shows the distribution of mortalities for the five years according to gender, higher number of mortalities was reported among males at each year and over the whole period; out of the 1838 mortalities, males constituted 1406 (76.5%) while females were 432 (23.5%) with a male to female ratio of (3.25:1).

Table (3) Distribution of RTI mortalities registered in the forensic medicine department during the period 2010 – 2014 according to gender

Year	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
2010	268	(76.1)	84	(23.9)	352	(19.2)
2011	298	(75.3)	98	(24.7)	396	(21.5)
2012	350	(79.4)	91	(20.6)	441	(24.0)
2013	251	(75.1)	83	(24.9)	334	(18.2)
2014	239	(75.9)	76	(24.1)	315	(17.1)
Total	1406	(76.5)	432	(23.5)	1838	(100.0)

P<0.001

Table (4) shows the total mortalities reported during the 5 years were higher among unemployed, (38.8%), followed by students (18.0%), employed (16.7%), housewives (13.4%) and children (13.1%).

Table (4) RTI mortalities registered Annual in the forensic medicine department during the period 2010 – 2014 according to occupation of victims.

Year	Occupation										Total	
	Employed		Unemployed		Housewife		Student		Child			
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2010	60	(17.0)	146	(41.5)	46	(13.1)	68	(19.3)	32	(9.1)	352	(19.2)
2011	71	(17.9)	146	(36.9)	62	(15.7)	65	(16.4)	52	(13.1)	396	(21.5)
2012	81	(18.4)	176	(39.9)	58	(13.2)	70	(15.9)	56	(12.7)	441	(24.0)
2013	52	(15.6)	126	(37.7)	45	(13.5)	63	(18.9)	48	(14.4)	334	(18.2)
2014	43	(13.7)	120	(38.1)	35	(11.1)	64	(20.3)	53	(16.8)	315	(17.1)
Total	307	(16.7)	714	(38.8)	246	(13.4)	330	(18.0)	241	(13.1)	1838	(100.0)

P<0.001

Figure (3) demonstrates the distribution of sites of injuries among victims, a total of 5196 sites were injured among the 1838 victims, where some victims had multiple injuries at more than one site, however, among the all sites injured, head injury was the dominant, it accounts for 1722/5196 represented (33.1%) of all injured sites followed by lower limb 1265/5196 (24.3%), upper limb 1020/5196 (19.6%), chest 568/5196 (10.9%), abdomen 369/5196 (7.1%) and the less frequent was pelvis account for only 252/5196 (4.8%).

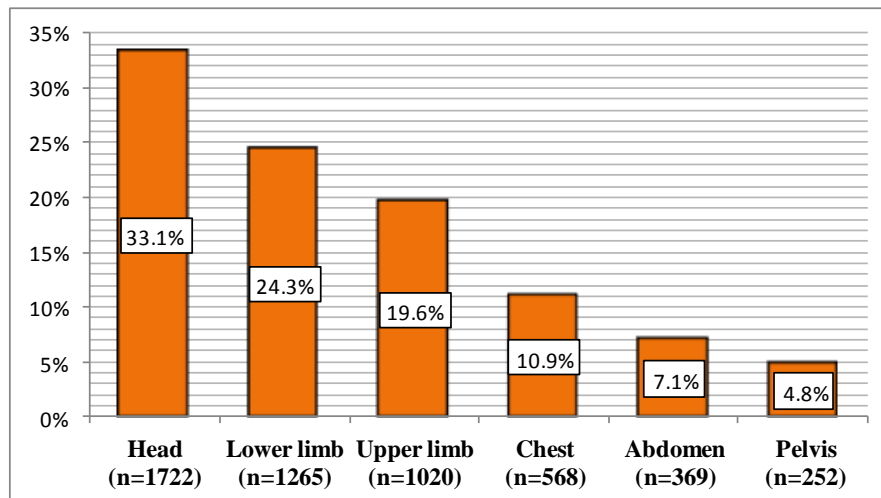


Figure (3) Distribution of RTI mortalities registered in the forensic medicine department during the period 2010 – 2014 according to site of injury.

Table (5) demonstrates the total reported deaths due to all causes during the period 2010-2014 were 5975 deaths. Deaths due to RTIs account for 1838 deaths giving an overall Proportional Mortality ratio of 30.8%. Moreover the higher Proportional Mortality ratio,(48.6%), was reported in the year 2012, and the lower ratio of (21.1%) was reported in the year 2014.

Table (5) Proportional Mortality Ratio among RTI cases in Al-Hilla city during the period 2010 - 2014

Year	Total deaths	Death of RTIs	Proportional Mortality ratio
2010	1098	352	32.1%
2011	1190	396	33.3%
2012	908	441	48.6%
2013	1287	334	26.0%
2014	1492	315	21.1%
Total	5975	1838	30.8%

Discussion

Each year, many people killed or disabled due to RTIs all over the world. In Iraq, there are lacking in the reliable data on the incidence of RTIs, nonetheless, it is one of the public health priority of Iraq that will need to be addressed and investigated (Al Saad & Sondorp, 2013; Mohammed,2012).

Analysis of these data revealed that the total mortalities for the five years was 1838 with male predominance this finding is similar to the finding reported by other study (Barrimah *et. al.*,2012), on the other hand it had been noticed that the death numbers increased during the years 2011 and 2012 then declined in the next two years, this decline in the trend of RTIs mortalities might be attributed to the increase of public and drivers awareness about this increasing serious (health, economic and social problem), the safety measures in the newly imported outmobiles, in addition to some activities and monitoring program applied according to the agreement between Iraq and WHO, where, Iraq launches the Decade of Action for Road Safety 2011-2020 and pledges to reduce the level of road traffic fatalities by 2020 (WHO 2015)towards achieving the objectives of the decade at the national and international levels, additionally, the traffic police in last three years enforced in some areas of Iraq the use of seatbelt, helmet, and having driving license particularly in the safe zones of Iraq.

Despite this decline reported in the current study, the death numbers still higher than what were reported in neighbouring countries such as Saudi Arabia, and Iran (Mansuri *et. al.*,2015).

This study showed that more than half of the victims lives in urban areas, higher proportion of victims were unemployed and the majority of deaths occurred on the main roads, which consistent with other studies (Donroe *et. al.*, 2008; Zwerling *et. al.*, 2005).

This findings might be attributed to different factors such as no speed limit on the roads in urban areas and inside the cities, crowded roads, presence of different types of vehicles (two wheels, three wheels and four wheels vehicles),absence of road signs, additionally, other possible reasons for the higher RTI related fatalities such as insufficient government policies that promote cycling, walking and investing in public transport as it found in some countries in the region, lack of education about the safety measures, like seat belt, helmets and periodic safety check for the vehicles (Soori *et. al.*, 2011).

The higher death numbers were reported in 4 months; October, June, December and November. Almost, similar findings were reported in previous Iraqi study (Mohammed,2012), however, this might be due to the crowding roads during these months due to starting the academic year and the beginning of schools holiday in June for large sector of pupils as well as the effect of stress of hot weathers, as in July and August, or cold or rainy weathers as in December and January .

The current study found that head was the dominant site of injuries among victims, during the whole period which account for 93.7%, followed by lower limbs and upper limbs. Different studies documented that head injury was the most common cause of death and morbidity in RTIs (Tandle & Keoliya, 2011, Bener, 2009) this clarified the significance of wearing helmet among motorcycle users and seat belts in car users to reduce head injuries.

During an accident, the car occupants experienced two main destructive crash mechanisms: ejection from the vehicle and sudden forward movement to glove compartment and steering wheel, which increases the probability of severe injuries and death. The seat belt usage as cost-effective protective safety device by car occupants decreases the risk of severe injuries and mortality and could prevent up to 80% of all car crash fatalities (Mohammadzadeh *et. al.*,2015;Spainhour,2012). From other point of view, previous studies referred that the wearing of helmet correctly among motorcycle riders can reduce the risk of death by almost 40%-42% and the risk of severe head and facial injuries by almost 70%. Therefore, the main strategies advocated by the WHO are the use of helmets and seatbelts (Spainhour, 2012, Elvik,2011).

Conclusions

During the period 2010-2014, higher proportion of mortalities reported was due to RTIs and the trends of RTI fatalities seemed to be declined after 2012. Most fatalities occurred among males, urban residents, and unemployed and during June, October, November and December. Head and lower limbs were the commonest sites of injuries and the main cause of fatality.

References

- Al-kharusi,W,2008,Update on road traffic crashes: progress in the Middle East. *Clinical Orthopedics and Related Research*; 466(10):2457-2464.
- Al-Naami,Y,Arafah M,Al-Ibrahim,F.Trauma,2010,care systems in Saudi Arabia:an agenda for action. *Ann Saudi Med Jan-Feb*; 30(1): 50-58.
- Al Saad,NA,Sondorp,E. Road, 2013,traffic injuries in Iraq. *Lancet*;381 (9879):1720-1.
- Barrimah,I,Midhet,F,Sharaf,F.,2012,Epidemiology of Road Traffic Injuries in Qassim Region,Saudi Arabia:Consistency of Police and Health Data. *International Journal of Health Sciences*;61 (12):31-41.
- Bener,A,Rahman,YS,Mitra,B.,2009, Incidence and severity of head and neck injuries in victims of road traffic crashes: In an economically developed country. *Int Emerg Nurs*;17 (1):52-9.
- Donroe,J, Tincopa,M,Gilman,RH,Brugge,D,Moore,DA.,2008,Pedestrian road traffic injuries in urban Peruvian children and adolescents: case control analyses of personal and environmental risk factors. *PIOS One*; 3(9):3166-71.
- Ewadh, H,Neham,S.A,2008,study of traffic safety at four-leg signalized intersections using traffic conflict technique. *AL-TAQANI Journal*; 21: 30-49.
- Elvik,R.,2011,Developing an accident modification function for speed enforcement. *Safety Science*;49(6): 920-5.

- Ganveer,GB,Tiwari RR.,2005, Injury Pattern among non-fatal Road Traffic Accident cases: a cross sectional study in central India. *Indian J Med Sci*; 59(1): 9-12.
- Hammoudi,A, Karani, G,Littlewood,J., 2014, Road Traffic Accidents Among Drivers in Abu Dhabi,United Arab Emirates.*Journal of Traffic and Logistics Engineering*; 2(1):7-12.
- Jha,N,Agrawal,CS.,2004,Epidemiological study of road traffic accident cases: a study from Eastern Nepal. In *Regional health forum*; 8 (1):15-28.
- Jha,N,Goutam,R,Jagadish,S.,2004,Epidemiological study of road traffic cases:A study from south India.*Indian Journal of Community Medicine,Jan-Mar*;29(1): 20-24.
- Kopits, E, Cropper, M., 2005, Traffic fatalities and economic growth. *Accident Analysis & Prevention*; 37(1): 169-178.
- Mansuri,FA,Al-Zalabani,AH,Zalat,MM,Qabshawi,RI.,2015,Road safety and road traffic accidents in Saudi Arabia. A systematic review of existing evidence. *Saudi Med J.*;36 (4): 418-24.
- Mishra,B,Sinha,N D,Sukhla,S K,Sinha,A K.,2010,Epidemiological study of road traffic accident cases from Western Nepal. *Indian journal of community medicine:official publication of Indian Association of Preventive & Social Medicine*; 35(1):115-19.
- Mohammed, SJ.,2011,Epidemiological study on road traffic accidents in Al-Najaf city during. *kufa Journal for Nursing sciences*, 2012; 2 (3):138-142 .
- Mohammadzadeh, M, Paravar M, Mirzadeh AS, Mohammadzadeh J, Mahdian S., 2012, Seat Belt Usage in Injured Car Occupants: Injury Patterns, Severity and Outcome After Two Main Car Accident Mechanisms in Kashan, Iran.*Archives of Trauma Research*. 2015;4(1):222-3.
- Murray, CJL. , 2001, The Global Burden of Disease 2000 project: aims, methods and data sources. Geneva, World Health Organization; GPE Discussion Paper No.36
- Peden, M, Scurfield R, Sleet D, Mohan D, Hyder A, Jarawan E., 2004,World report on road traffic injury prevention, World Health Organization Geneva, WHO Library Cataloguing-in-Publication Data; 92(9):1-203.
- Puvanachandra, P, Hoe C, Ozkan T, Lajunen T., 2012, Burden of road traffic injuries in Turkey. *Traffic injury prevention*; 13(1): 64-75.
- Razzak, JA. , 2010, The Eastern Mediterranean Status Report on Road Safety: World Health Organisation, Regional Office for the Eastern Mediterranean.
- Reddy, P,Kumar H. , 2013, Retrospective Study of Road Traffic Accident Cases at Harsha Hospital Nelamangala, Bangalore Rural. *Indian Journal of Forensic Medicine & Toxicology*; 7(1): 254-287.
- Singh, A,Bhardwaj A, Pathak R, Ahluwalia S. K., 2012, An epidemiological study of road traffic accident cases at a tertiary care hospital in rural Haryana. *Indian Journal of Community Health*; 23(2): 53-55.
- Soori, H, Hussain S, Razzak A., 2011,Road safety in the Eastern Mediterranean Region--findings from the Global Road Safety Status Report. *East Mediterr Health J*;17(10):770-6.
- Spainhour, L,Brill, D, Sobanjo, J, Wekezer, J,Mtenga,P.,2012,Evaluation of traffic crash fatality causes and effects: A study of fatal traffic crashes in Florida from 1998-2000 focusing on heavy truck crashes. *Mid-America Transportation Center, University of Nebraska–Lincoln*; pp:41.
- Tandle,R, Keoliya,N.,2011, Patterns of head injuries in fatal road traffic accidents in a rural district of Maharashtra-Autopsy based study. *J Indian Acad Forensic Med.*; 33 (3): 228-31.

- World,Health Organization.WHO global status report on road safety 2013: supporting a decade of action. World Health Organization 2013; pp. 109.
- World Health Organization, Regional Office for the Eastern Mediterranean (EMRO), Health systems priorities in the Eastern Mediterranean Region: challenges and strategic directions. World Health Organization 2004; 51(6):3-11.
- World,health ranking, Road traffic accidents, available from <http://www.worldlifeexpectancy.com/iraq-road-traffic-accidents>.
- World health Organization, regional office EMRO, Iraq committed to improving road safety, available at <http://www.emro.who.int/irq/iraq-news>. Accessed on 21 June 2015.
- Ziyab,AH,Akhtar,S.,2012,Incidence and trend of road traffic injuries and related deaths in Kuwait: 2000-2009. Injury. Dec;43(12):2018-22.
- Zwerling, C, Peek-Asa C, Whitten PS, Choi S-W, Sprince NL, Jones MP. , 2005,Fatal motor vehicle crashes in rural and urban areas: decomposing rates into contributing factors. Injury Prevention; 11: 24-8.