ORIGINAL ARTICLE

Police response time to road crashes in south-east of Iran

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Abstract

Objectives: To investigate post-crash time management by police.

Methods: The retrospective study comprised data related to all road traffic crashes from March 2009 to March 2010 in Sistan and Baluchistan province of Iran. Data was retrieved from the standard national form designed for road traffic crashes completed by police officers present at the scene. SPSS 15 was used for statistical analysis.

Results: The median time for police to be informed in the total 2442 accidents was 10 minutes and the police response time was 15-20 minutes for non-fatal cases, while the corresponding duration for fatal cases was 15 minutes and 30 minutes ($p<0.001$). Police arrival was not dependent on road condition ($p=0.178$).

Discussion: Police arrival at the crash scene was beyond the average response time by Emergency Medical Services in Iran. It is vital to provide quicker ways of informing the police and to have more police stations along the highways.

Keywords: Police management, Time response, Road traffic crash, Zahedan. (JPMA 63: 1523; 2013)

Introduction

Road traffic injuries are responsible for about 1.2 million deaths and 50 million injuries worldwide annually.[1-4] Of these, 85% of the deaths and 95% of the burden of disease are estimated to occur in low- and middle-income countries.[4] Without intervention and new initiatives, the number of fatal and non-fatal injuries is expected to rise by 65% worldwide between 2000 and 2020, and up to 80% deaths in low- and middle-income countries.[1] Moreover, road traffic injuries are estimated to move up in the ranking of leading causes of death globally from 10th in 2004 to 5th in 2030.[5]

In Iran, the incidence of death due to traffic crashes was estimated to be the highest death rate in the world over 2000-2001; 30 per 100,000 Iranian people compared to 22.6 per 100,000 worldwide and 13.9 per 100,000 in the Eastern Mediterranean Region. Males were at greater risk of death than females (47.1 versus 12 per 100,000).[6] The male-to-female ratio of disability-adjusted-life-year (DALYs) lost due to road traffic injuries was 5:1 in Iran in 2003.[7] The most affected age group is young people who have years of productive life ahead of them. In 2005, annual road traffic death rate was estimated to be 44 per 100,000 people so that road traffic crashes were responsible for 52% of all deaths in age group 15-24.[4]

In Iran, the Emergency Medical Services (EMS), the police and the fire brigades are first responders to road traffic crashes. While these services exist, they suffer from lack of coordination, involvement of laypeople, inadequate pre-hospital services and shortcomings in materials. Apart from insufficient number of ambulance dispatch sites, existence of parallel organisations (EMS, military ambulances, Red Crescent, fire services, private and public hospitals), substandard tele-communication equipment, undeveloped satellite navigation like the global positioning system (GPS), and cultural background factors also play a substantial role in post-crash management. Anecdotal information suggests that individuals who are present or who arrive first at the crash scene have limited knowledge regarding emergency numbers, provision of the needed information to the EMS and firstaid. However, these bystanders often feel responsibility for removing the injured persons from the crash scene and moving them to the hospital. While the bystanders may assist in saving lives or reducing the negative consequences of the crash, untrained people may also increase the risk of another crash, secondary injuries or even contribute to mortality when extricating victims from the vehicle or in transport to hospital. Moreover, individual curiosity, excitement and disorganised cooperation lead to a crowded crash scene which may interfere with emergency services.[8]

The role of police in such a scenario is to document the

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crash by taking statements from the individuals involved as well as from any witnesses. Police also organise and secure the crash site. This includes crowd-control, moving people and vehicles to safer locations, placing temporary traffic signs, assisting, if required, in fire-fighting and first-aid. These steps reduce hazards and assist EMS personnel.[8] Therefore, police arrival at the crash scene is an important factor in secondary prevention of road traffic injuries and it could play a vital role in reducing severity of injury and mortality. Although a vast body of literature has focused on EMS performance,[9-18] but to our knowledge, there is no report on police time management after a crash. Therefore, the current study was planned to investigate the time needed for people to inform the police, and for the latter to arrive at the crash scene.

Material and Methods

The retrospective study was carried out in Sistan and Baluchistan province, in the south-east of Iran. The province is the largest in Iran with an area of 181,785 km^2 and a population of 2.4 million. It shares borders with Afghanistan and Pakistan. Hot-dry weather in the north and most parts of the west and hot-wet weather in the south makes the area one of the driest regions in Iran. The only airway is from Zahedan in the north to Chabahar in the south of the province. Therefore, roads are commonly used for transportation. Primary roads are two-way and narrow with insufficient road repairs, road lighting and many black spots. Secondary roads are also narrow and sandy. Therefore, the area is one of the most high-risk regions of the country for road traffic crashes whereas it is one of the most deprived parts of the country to cope with such eventualities effectively.

For the purpose of the study, a road traffic crash was defined as any type of road crash between two or more objects; one of the involved objects must be any kind of moving vehicle. The study included all recorded road traffic crashes from March 2009 to March 2010. For every crash, data had been registered in a standard national form designed for road traffic crashes. The forms had been completed by police officers who were present at the crash scene. The data maintained at the central police station of the province included information regarding main characteristic of accident victims, human, vehicle and environmental causes of the crash as well as interval times: crash occurrence, police being informed and police arrival. However, this manuscript has focused on the latter part of data related to police response time.

After official permission from police authorities, the required data was extracted from the recorded forms. All the relevant documents were reviewed systematically. For ethical considerations, no individual-identifying information was extracted from the original documents.

Data was analysed using descriptive statistics, Kaplan-Meier graph and Log-Rank test through SPSS 15.

Results

There were a total of 2442 road crashes during the study period. There was some data missing in police documents; 133 (5.4%) for vital status; and 144 (5.9%) for lighting condition. The road crash rate varied from 112 (4.6%) to 247 (10.2%) over the 12 months of the year. The crash rate peaked in August (10.2%) when schools are on summer holidays, and dropped to the lowest rate in March (4.6%). Besides, 1781 (75.7%) crashes were reported between 8am and 8pm.

There was a daylight peak with 1528 (66.5%) and night trough with 683 (29.7%) crashes. Only 87 (3.8%) of the crashes occurred at either sunrise or sunset. On average, the speed at the time of crash was 52.5 kilometre/hour with a 95% confidence Interval (CI). Further, 1081 (50%) crashes occurred after about 33 kilometres of driving.

Median time for police to be informed was 10 minutes and to attend the crash was 30 minutes (Table-1). Police arrived at 1499 (80%) and 1665 (90%) of the crash scenes in less than 75 and 140 minutes respectively (Figure). Light quality made a significant difference in the time that elapsed between the crash and the notification to police. In daylight and night, a median time of 10 and 30 minutes was needed to inform the police and for the police to arrive respectively. However, these time periods increased

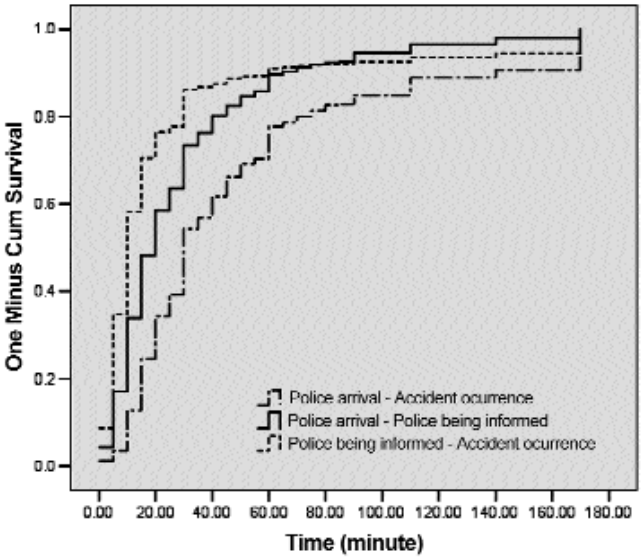

Figure: Probability of time period (report the crash to the police, police arrival after being informed, police arrival after the crash) less than indicated time in X axis.

Table-1: Time period of reporting the crash to the police, police arrival after being informed and police arrival after the crash occurrence in terms of lighting condition.

Time period (minute)		Overall	Lighting Condition			
			Daylight	Night	Sunrise & sunset	Log-Rank P-value
Police being informed – Crash occurrence	Median	10	10	10	20	0.002
	IR	15	15	20	36.25	
	95% CI for Median	(9.53,10.47)	(9.39, 10.61)	(9.14, 10.86)	(11.48, 28.52)	
	Mean	26.78	23.39	31.48	38.11	
	SD	44.07	38.57	51.73	47.76	
	95% CI for Mean	(24.82,28.74)	(21.25,25.54)	(27.12,35.83)	(26.37,49.84)	
Police arrival – Crash occurrence	Median	30	30	30	45	<0.001
	IR	40	45	50	62.5	
	95% CI for Median	(28.71,31.29)	(29.13,30.87)	(26.63,33.37)	(36.23, 53.77)	
	Mean	50.28	45.76	57.6	62.08	
	SD	47.55	43.07	54.24	51.82	
	95% CI for Mean	(48.13,52.44)	(43.31,48.21)	(52.96,62.24)	(49.24,74.92)	
Police arrival – Police being informed	Median	20	15	20	20	0.001
	IR	25	20	31.25	30	
	95% CI for Median	(19.09,20.91)	(13.87,16.13)	(17.53,22.47)	(16.80,23.20)	
	Mean	29.91	27.68	34.74	31.31	
	SD	33.37	30.26	39.72	35.1	
	95% CI for Mean	(28.38,31.43)	(25.94,29.41)	(31.31,38.17)	(22.61,40.01)	

SD: Standard deviation. CI: Confidence Interval. IR: Interquartile Range.

Table-2: Time period of reporting the crash to the police, police arrival after being informed and police arrival after the crash occurrence in terms of vital status of vehicle occupants.

Time period (minute)		Vital Status			Log-Rank
		Not-injured	Injured	Death	P-value
Police being informed- Crash occurrence	Median	10	10	15	0.014
	IR	15	25	23.75	
	95% CI for Median	(9.42, 10.58)	(8.80, 11.20)	(11.52, 18.48)	
	Mean	25.99	26.69	32.8	
	SD	44.49	40.87	49.04	
	95% CI for Mean	(23.52,28.44)	(23.04,30.34)	(23.78,41.82)	
Police arrival – Crash occurrence	Median	30	40	50	<0.001
	IR	45	45	60	
	95% CI for Median	(29.12,30.88)	(35.75,44.25)	(40.49, 59.51)	
	Mean	46.76	54.59	66.05	
	SD	47.38	46.3	49.46	
	95% CI for Mean	(44.08,49.44)	(50.42,58.76)	(56.87,75.23)	
Police arrival – Police being informed	Median	15	20	30	<0.001
	IR	20	30	40	
	95% CI for Median	(13.84,16.16)	(17.07,22.93)	(22.59,37.41)	
	Mean	27.3	33.81	40.4	
	SD	32.26	35.65	33.45	
	95% CI for Mean	(25.46,29.14)	(30.57,37.07)	(34.16,46.63)	

SD: Standard deviation. CI: Confidence Interval. IR: Interquartile Range.

to 20 and 45 minutes at sunrise and sunset respectively.

As for the road surface condition, median time needed to report a crash to police was 10 and 15 minutes in asphalt and sandy roads respectively. Also, median time for police arrival was significantly less in asphalt roads (30min versus 45min). However, median time of police reaction remained 20 minutes in both cases (p=0.178).

Median time for police to be informed of a non-fatal road crash was 10 minutes whereas it lasted 15 minutes for a fatal crash (p=0.014). Furthermore, police took more time

in arriving at the more severe crashes (p<0.001); the median time being 50 minutes for a fatal crash compared to 30-40 minutes for less severe crashes. The notable point was police reaction to a road crash. After being informed, police needed a median time of 30 minutes to arrive to a fatal crash compared to 15-20 minutes for less severe crashes (Table-2).

Discussion

The study focussed on police management of road traffic crashes. Police arrival to the crash scene took more than the average response time by EMS in Iran.[19] Lighting condition and vital status of vehicle occupants were related to police reaction. However, police arrival was not dependent on road conditions.

In 80% of crashes, police response time was estimated to be 40 minutes compared to 15 minutes by EMS.[19] Although there was no information about EMS response time in Zahedan, the same standard is predictable in Zahedan. EMS and police are usually informed by car occupants or people who arrive at the crash scene. In case of death or injury, most people would call EMS first rather than police. Furthermore, in the studied area, cities are located far away from each other due to hot and dry weather resulting in a fewer police stations in inter-urban roads. Therefore, police arrival could be delayed. This makes EMS personnel under more pressure for postcrash management in the presence of many bystanders who try to intervene.

Police reaction was better in daylight rather than night, sunset and sunrise which is understandable. Considering higher risk of crash severity and traffic deaths after dark, this delay could result in more severe consequences. It must be noted that there is no overhead lighting on roads in the study area which makes it more difficult to assess the speed of other vehicles, particularly at roundabouts and junctions.

In fatal crashes, police was informed 5 minutes later on average compared to the less severe crashes. It seems car occupants were not able to call for help in more severe crashes and had to wait for the vehicles passing by to come to their rescue. An unpredictable result was police response to fatal crashes. Police arrival was more delayed as the severity of a crash increased. The relationship between level of injury with lighting, road condition and police station distance to the crash scene needs to be investigated further.

Although time needed to inform police about crashes on sandy roads was more than asphalt roads, but police was able to arrive at the crash scene in about 20 minutes regardless of the road surface condition.

Although a programme of comprehensive road safety interventions, including seat-belt law, motorcycle helmet law and the general traffic law, was introduced in 2005 in Iran,[5] but the number of cars produced by local companies increases every year and people can take a loan to purchase a car. Therefore, the number of road crashes has increased exponentially which is not consistent with police force employment and police facilities. That is why the need for the presence of police on roads is felt, especially during holidays which make it easy for drivers to ignore traffic laws due to lack of modern equipment for traffic police monitoring and low fines for traffic offences. As a result, police is not able to manage the load of traffic and crashes adequately.

The study was based on the registry form filled out by policemen present at the crash scene. Therefore, missing data related to some questions was one of the limitations of this study. However, the available data was a good source to focus on time management by police after a road crash occurs. Our results can be partly related to the geographic characteristics of the study area.

Conclusion

Police needs to be better equipped to attend to and manage road traffic crashes effectively. For instance, modern equipment can help police to monitor road traffic from a control centre which would enable police to be present at the crash scene in a short time. This can also reduce accident-related consequences.

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