🔓 OPEN ACCESS

Community Medicine

In-patient Service Management of Road Traffic Accident Patients in a Specialized Hospital

Dr. Zobaid Mohammad Rahat Chowdhury[1*], Dr. Tahsin Tasneen Tabassum[2], Dr. Kazi Azmiri Hoque[3], Dr. Nur-A-Safrina Hossain[4], Dr. S. M. Shakhawat Hossain[5]

[1]Assistant Professor, Department of Community Medicine, East West Medical College, Bangladesh
[2]Lecturer, Department of Community Medicine, East West Medical College, Bangladesh
[3]Lecturer, Department of Pharmacology, Medical College for Women and Hospital, Bangladesh
[4]Public Health Epidemiologist, Save the Children, Bangladesh
[5]Ex-Senior Medical Officer, Evercare Hospital, Chattogram, Bangladesh

*Corresponding author: Dr. Zobaid Mohammad Rahat Chowdhury
Assistant Professor, Department of Community Medicine, East West Medical College, Bangladesh

Abstract	Original Research Article

Background: Road Traffic Accidents (RTA) is a major threat to life in our country which are increasing exponentially day by day all over the world. The major consequences of road traffic accidents are associated with multiple traumatic injuries and are the leading cause of death both in developed and developing countries. The death rate would be reduced with a properly organized system of trauma care. Prompt, effective, and efficient healthcare services save a significant amount of lives and also reduce the suffering and duration of illness. RTA patients require immediate attention and treatment as well as long-term comprehensive healthcare under the direct supervision of a medical team. The study aimed to assess the In-patient service management for Road Traffic Accident patients in a specialized hospital in Bangladesh. **Methods:** A cross-sectional study was conducted among 120 respondents (74.20% male, mean age = 24.6 ± 1.62 years) In-patient department of the National Institute of traumatology and orthopedic rehabilitation Centre (NITOR) in Bangladesh through purposive sampling technique. Data were collected from February 2019 to February 2020 via face-to-face interviews using a semi-structured questionnaire. **Results:** The relationship between the residence of the respondents and the satisfaction level of IPD service was significantly found. ($P = 0.002$). The relationship between the level of education and satisfaction regarding IPD service was also significantly found ($P = 0.026$). **Conclusions:** Skilled manpower should be increased and out of pocket expenditure should be reduced for the provision of better treatment care. All facilities-related services should be enriched, modernized, and ensure the availability of these services.
Keywords: In-patient service, management, road traffic accident, patients, specialized hospital.

INTRODUCTION

Increasing Road Traffic Accidents (RTA) are a major threat to life in many parts of the world [1]. RTA is a 'global tragedy' with ever-rising trends in fatalities and injuries in developing countries [2]. Road traffic-related crashes impose an enormous public health burden on our country. The huge number of injuries and death due to road traffic accidents reveals the story of the global crisis of road safety [3]. Due to rapid motorization and urbanization in Bangladesh, RTIs are on the rise as in other LMICs, and RTIs also represent a leading cause of injury deaths [4-7]. Bangladesh has a very high road accident fatality rate with official figures indicating more than 60 deaths per 10,000 motor vehicles. Every day around eight persons dies in road accidents [8]. The actual rate of fatality is likely to be even higher. According to the police report, the total number of road traffic accidents was 40,927 in Bangladesh from 2001 to 2010, and the number of killed people was 32,261. In 2010; 3,300 people were killed in RTAs, which rose to 5928 in 2011, a rise of 80% [9]. According to the 'World Report on Road Traffic Injury Prevention-2004', worldwide an estimated 1.2 million people are killed in traffic accidents each year and as many as 50 million are injured [10]. The most common cause is RTA, fall from heights, bullet injuries, etc [11]. Most of the patients with multiple trauma land in the tertiary level hospital in the country [12]. Multiple traumas are a medical term describing the condition of a person who has been

subjected to multiple traumatic injuries [13]. Multiple trauma is a major cause of morbidity and mortality in both developed and developing countries [14]. Trauma remains the leading cause of death and disability in people [15]. The incidence and prevalence of multiple trauma vary from region to region [16]. The world health organization (WHO) estimates that by 2020, trauma will be a leading cause of death in both developed and developing countries [17]. RTA forms a big proportion of trauma recorded in registries [18]. RTAs become the sixth in order among all the leading causes of total death [19]. Road Traffic Accidents are responsible for approximately 10% of all global deaths and almost 16% of global disabilities [20]. Common victims of death are caused by young age groups (10-24 years). The death rate would be reduced with a better-organized system of trauma care [21]. Prompt, effective, and efficient health care saves a significant amount of lives and also reduces the suffering and duration of illness but the costs are huge. The average cost of RTA in developing countries is estimated at 65 billion dollars; the global annual cost of RTA is almost 230 billion dollars [22]. The estimated cost of road accidents is 7500 crore Bangladeshi takas (1 USD=82 BDT) per year. Road Traffic Accident patients require immediate attention and treatment as well as long-term comprehensive health care under the direct supervision of a medical team. Approximately 33% of the beds in primary and secondary level hospitals in Bangladesh were occupied by injury-related patients. Prompt, efficient, and effective indoor service management can reduce the extent of death and disability and also reduce suffering and duration of illness. Immediately or soon after admission through the emergency or outpatient department many of these cases need urgent management for proper diagnosis, investigation, treatment, and surgical procedure as well as rehabilitation. In-patient service includes the ward and nursing station and all over facilities necessary for good patient cares [23]. IPD provides care under direct supervision for a patient at the point of illness when dependence on others is at its highest by admission to a hospital bed. The IPD strives to provide all types of comprehensive care under direct supervision for all major medical and surgical patients at the point of illness when dependence on others is at its height it ensures proper management for pre and post-operative patients. National Institute of Traumatology and Orthopedic Rehabilitation (NITOR) has the biggest inpatient service department in the tertiary level government hospital, receiving referral patients from all over the country. Round the clock, an orthopedic team is available for the management of RTA patients. Over the last decade, there has been a tremendous increase in the number of patients being treated at NITOR due to an increase in the number of RTA every year in our country. Road Traffic Accidents patients lead to an increase in the average length of stay (ALS) of the patients [24]. The study aimed to assess the In-patient service management for Road Traffic Accident patients in a specialized hospital under the Ministry of Health and Family Welfare, Government of Bangladesh.

METHODOLOGY
Study design and population
A Cross-sectional descriptive type of study was conducted from February 2019 to February 2020. The study population consisted of RTA patients admitted at IPD of NITOR and the service provider of that hospital. The participants were interviewed using a semi-structured questionnaire that included 120 patients and 60 service holders. The inclusion criteria of the participants were included (a) All road traffic accident patients who were admitted to the in-patient department, (b) Conscious and able to answer, (c) Willing to participate in the study, and exclusion criteria included (a) Bellow 12 years of age, (b) Who were psychologically disturbed, (c) Those who were not willing to participate in the study.

Study Area
The study was done among the patient and service providers of the In-patient department of the National Institute of traumatology and orthopedic rehabilitation. It is an orthopedic hospital and post-graduate institution situated at Sher-e- Bangla Nagar, Dhaka. It was established in 1972 and is the only specialized tertiary level orthopedic hospital. The study place was selected purposively depending on the availability of the sample and according to the convenience of the researcher.

Sample size determination:
The sample size was calculated using the following formula:

$$n \quad \frac{z^2 pq}{d^2}$$

Where, z = 1.96 at 5% level of significance and 8% acceptable margin of error (d = 0.07). Since there was no similar study in this cohort in the study area, we consider the maximum sample proportion as 50%. So, the minimum required sample size calculated for this study was 150. However, 120 patients and 60 service providers were selected purposively as a sample from the patients and service providers of IPD at NITOR.

Sampling procedure:
The respondents were selected by the purposive sampling technique.

Data collection tools and techniques:
Data were collected by the researcher through face-to-face interviews using two semi-structured questionnaires and an observational checklist by the researcher. Then data were collected from the respondent. Questions were asked in Bengali. The

respondents were given full assurance from some ethical point of view that under no circumstances any part of the interview would disclose to any unauthorized person.

Data analysis:

At the end of the data collection, the individual question was edited through checking and rechecking to see whether it was filled completely and consistently. All statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS) version 23.0. An analysis plan was developed keeping in view the objective of the study. Some descriptive statistics (frequencies, percentages) were computed. Chi-square tests were performed to determine the association between the dependent and independent variables as appropriate. The levels of significance for all statistical analyses were considered as $p < 0.05$.

Ethics:

The study protocol was reviewed and approved by the Institutional Review Board of the National Institute of Preventive and Social Medicine (NIPSOM), Mohakhali, Dhaka-1212, Bangladesh and written permission was taken from the concerned authorities of the National Institute of traumatology and orthopedic

rehabilitation for data collection. Informed written consent was obtained from all the participants before data collection. The objectives of the research were explained to the participants and they were informed that they could choose to participate (or not) in the study. The confidentiality of information and anonymity of the participants were strictly maintained.

RESULTS

Socio-demographic characteristics of the participants

A total of 120 IPD Patients participated in this study, with a mean age of 24.6 (SD = 1.62) years. Majority of the respondents (74.20%, n = 89) were male and 56.70% (n = 68) respondents were married and 72.54% (n = 87) were Muslims (Table 1). Almost half of the respondents 48.30% (n = 58) were from urban areas and 39.1% (n = 47) of the participants were educated to graduation & post-graduation degrees. For the majority of participants (23.20%, n = 28) occupational status was service and approximately half of the participant's 53.3% (64) range was up to 10 thousand BDT. The mean income of the respondents was 13,745 (SD = 2140) BDT.

Table 1: Socio demographic characteristics of the participants

Variables	Category	Frequency (n)	Percentage (%)
Age	Up-to 20 years	18	15.0
	21-30 years	53	44.2
	31-40 years	30	25.0
	41-50 years	9	7.5
	51-60 years	4	3.3
	More than 60 years	6	5.0
Sex	Male	89	74.2
	Female	31	25.8
Marital Status	Married	68	56.7
	Unmarried	45	37.5
	Others	7	5.8
Religion	Islam	87	72.54
	Hindu	29	24.16
	Others	4	3.2
Residential Area	Urban area	58	48.30
	Rural area	25	20.80
	Sub-rural area	37	31.10
Occupation of the Respondents	Business	20	16.70
	Service	28	23.20
	Farmer	17	14.20
	Housewife	21	17.60
	Day labor	8	6.70
	Student	20	16.70
	Others	6	5
Level of education	No formal education	9	7.5
	Class I- V	20	16.7
	Class VI to X	19	15.8
	SSC and HSC	25	20.8
	Graduate	40	33.3

	More than graduate	7	5.8
Monthly income	Up-to 10k	64	53.3
	11-20k	35	29.2
	21-30k	13	10.8
	31-40k	3	2.5
	41-50k	1	.8
	More than 50k	4	3.3

Respondent's accidental and IPD service-related information:

Respondents' complications and IPD service-related information are presented in table 2 and 27.5% (n = 33) of accidents occurred by Rickshaws whereas 25% (one-fourth of) accidents (n = 30) had occurred by motorbikes and CNG. In most of the accidents, 47.5% (n = 57) occurred during their travel at the time they were sitting in the vehicles, 25.5% (n = 31) occurred while driving the vehicles, and 25% (n = 30) occurred during crossing the road. Almost half of the respondents 53.3% (n = 64) came with multiple injuries and only a few numbers of respondents 16.7% (n = 20) claimed that they faced problems finding out the IPD in the hospital. 66.7% (n = 80) of respondents said that bed availability of the IPD for the RTA patients is enough. Maximum respondents 57.5% (n = 69) needed 30 to 60 minutes to get their treatment. Availability of drugs advised for investigation and place for investigation, Opinions about satisfaction were also included in Table 2.

Table 2: Respondents' accidental and IPD service-related information

Variables	Category	Frequency (n)	Percentage (%)
Types of vehicles	Bus	16	13.30
	CNG	30	25
	Rickshaw	33	27.5
	Truck	6	5
	Bike	30	25
	Others	5	4.20
Accidents occurring situation	While crossing the road	30	25.0
	While driving the car	31	25.8
	Sitting in the vehicle	57	47.5
	Others	2	1.7
Site of the body involved in an accident	Limb injury	35	29.2
	Head injury	13	10.8
	Chest injury	8	6.7
	Multiple injuries	64	53.3
Facing problems to find IPD	Yes	20	16.7
	No	100	83.3
Types of problems to find IPD	Lack of sign	14	70
	No information center	2	10
	Lack of manpower	4	20
Bed availability in IPD	Yes	80	66.7
	No	40	33.3
Waiting time for getting service	Within 10min	24	20.0
	10-30 min	69	57.5
	30-60 min	24	20.0
	More than 1hr	3	2.5
Availability of drugs	Yes	17	14.2
	No	10	8.3
	Partially	93	77.5
Satisfactory level of the hospital food	Highly satisfactory	14	11.7
	Satisfactory	82	67.5
	Dissatisfactory	24	20
Advised for investigation	Yes	100	83.3
	No	20	16.7
An advised place for investigation	Inside hospital	59	59
	Outside hospital	8	8
	Both	33	33

Opinion about satisfaction	Satisfied	38	31.66
	Neither satisfied nor dissatisfied	56	46.67
	Dissatisfied	26	21.67

Socio-demographic characteristics of the Hospital staff:

A total of 60 hospital staff participated in this study. Maximum participants 55% (n = 33) were belonging to 36-46 years age category and majority of the respondents (56.67%, n = 34) were male. Among them 45% (n = 27) were doctor.

Table 3: Socio-demographic characteristics of the Hospital staff

Variables	Category	Frequency (n)	Percentage (%)
Age in the group (Years)	25-35	16	26.67
	36-46	33	55
	47-59	11	18.33
Sex	Male	34	56.67
	Female	26	43.33
Designation	Doctors	27	45
	Nurse	20	33.33
	Word boy	6	10
	Sweeper	5	8.33
	Guard	2	3.34

Availability of Human resource-related information in each ward of IPD

The availability of human resource-related information in each ward of IPD can be shown in Table 4. This table demonstrated that there is no vacant post in the IPD ward.

Table 4: Availability of Human resource-related information in each ward of IPD

Name of the post	No sanctioned post	No. of occupied post	No. of vacant post
Doctor	6	6	0
Nurse	12	12	0
Word boy	6	6	0
Aya	6	6	0
Sweeper	3	3	0
Guard	2	2	0

Hospital problems faced by the respondents and their opinion & suggestions:

Hospital problems faced by the respondents and their opinion & suggestions were presented in table 5. From this table, we found that 76.6% (n = 46) of the respondents faced problems serving their duties due to overcrowding in the hospital, and one-fourth of 26.7% (n = 16) respondents thought that they did not serve well due to lack of manpower. More than 63.3% (n = 38) of the respondents suggested that the cleanliness of the IPD and toilets should be increased whereas 45% (n = 27) of the respondent hope that the diagnostic facilities should be modernized.

Table 5: Hospital problems faced by the respondents and their opinion & suggestions

Variables	Category	Frequency	Percentage (%)	Rank
Opinion	Overcrowding	46	76.6	1st
	Lack of co-operation from patient attendance	38	63.4	2nd
	Diagnostic resource constraint	24	40	3rd
	Lack of manpower	16	26.7	4th
	Cleanliness should be increased	38	63.3	1st
	Diagnostic facilities should be modernized	27	45	2nd
Suggestion	Visiting hours should be maintained strictly	25	41.7	3rd
	No. of MLSS should be increased	14	23.3	4th
	Others	12	20	5th

IPD facilities-related information:

IPD facilities-related information was presented in table 6. We found from this table that though there was a provision of maintain privacy it did not maintain regularly. The waiting area with the sitting arrangement of the ward was not sufficient. The toilets of the IPD were untidy whereas there was no provision of drinking water and wastebasket. There were sufficient signposts and display boards and the register book was maintained regularly. The equipment like Glucometer, Torchlight, Oxygen cylinder, sterile gauze, Stethoscope, and BP machine, Suturing material and Suction machine available but not sufficient amount and the status of diagnostic facilities of the IPD was partially functioning whereas there were available X-ray, ECG, and CT scan facilities. There were no USG facilities the MRI machine was not functioning.

Table 6: IPD facilities-related information

Variables	Types of facilities	Remarks		Comments
		Available/Present	Not available	
Physical	Provision of maintaining privacy	Maintained		Not always
	The waiting area with sitting arrangement	Available		Not sufficient
	Toilet facilities	Available		Untidy
	Drinking water facilities		Not available	
	Wastebasket		Not available	
	Signpost and display board	Available		
	Register book	Available		
Equipment	Glucometer	Present		
	Torchlight	Present		
	Oxygen cylinder	Present		Not sufficient
	Sterile gauze and dressing material			Not sufficient
	Stethoscope and BP machine	Present		
	Suturing material			Not sufficient
	Suction machine	Present		
Diagnostic	Pathological facilities	Available		Partially
	X-ray facilities	Available		
	ECG facilities	Available		
	USG facilities		Not Available	
	MRI facilities	Available		Not functioning
	CT scan facilities	Available		

The association between the residence of respondents and satisfaction level regarding IPD service

The association between the residence of respondents and satisfaction level regarding IPD service can be seen in Table 7. The respondents' opinion regarding IPD service (χ^2 = 12.569, df = 2, p-value = 0.002) was found statistically significant association with residence of the respondents.

Table 7: The association between residence of respondents and satisfaction level regarding IPD service

Residence of respondents	Satisfaction	Dissatisfaction	Total	Significance
Urban	12 (20.7%)	46 (79.3%)	58 (100%)	χ^2=12.569
Sub urban	11 (29.7%)	26 (70.3%)	37 (100%)	df=2
Rural	15 (60%)	10 (40%)	25 (100%)	p-value= 0.002

The association between the education level of the respondents and satisfaction level regarding IPD service:

The association between the education level of the respondents and satisfaction level regarding IPD service is presented in table 8. The respondents' opinion regarding the management of IPD (χ^2 = 12.78, df = 5, p-value = 0.026) was found statistically significant association with the educational level of the service receiver.

Table 8: The association between the education level of the respondents and satisfaction level regarding IPD service

Level of Education	Satisfaction	Dissatisfaction	Total	Significance
No formal education	4 (44.4%)	5 (55.6%)	9 (100%)	χ^2=12.781
Class I-V	11 (55%)	9 (45%)	20 (100%)	
Class VI-X	8 (42.1%)	11 (57.5%)	19 (100%)	df=5

SSC and HSC	8 (32%)	17 (68%)	25 (100%)	
Graduate	6 (15%)	34 (85%)	40 (100%)	p-value = 0.026
More than Graduate	1 (14.3%)	6 (85.7%)	7 (100%)	

DISCUSSION

The present study showed that the management of In-patient department (IPD) service was significantly associated with road traffic accident patients (RTA). The distribution of respondents by age group shows that the highest number of respondents 44.2% (n = 53) were found to age group 21 to 30 years 44.2% (n =53) and lowest number of the respondents found to age group 51 to 60 years 3.3% (n = 4). The distribution of respondents by sex shows that the majority of the respondent 74.2% (n = 89) were male and 25.8% (n = 31) were female. A similar study done by (Hailemichael *et al*., 2015) reported that 77.6% were male and 22.4% were female trauma victims on the road in Ethiopia. The distribution of respondents by their marital status shows that 56.7% (n = 68) were married and 37.5% (n = 45) were unmarried [25]. A similar study done by (Shrivastava *et al*., 2014) in India found 56.5 were married RTA victims who came to the hospital for management. The distribution of the respondent's residential areas found that almost half of the respondents 48.3% (n = 58) were from urban areas while one-fifth of the respondents 20.8% (n =25) were from rural areas and the remaining 38.9% (n = 37) respondents were from sub rural areas. A similar study by WHO, 2015 reported that 58% of victims were from urban [26].

The distribution of respondents' education level shows that 7.5% (n = 9) of respondents had no formal education whereas 16.7% (n = 20) were completed class I-V, 15.8% (n = 15) were class VI-X passed, 20.8% (n = 25) of respondents were SSC & HSC passed, 39.1% were of respondents were completed their graduation& post-graduation degree. A similar study done in Nigeria found that graduate-level respondent was more which was 56% [27].

It was a positive note that only 8% (n = 8) of the patient did their advised investigation outside the hospital. The above finding indicates that there are good indoor investigation facilities that bring interest to the people to do the investigations inside the hospital. Of all the respondents 67.5% (n = 82) of the patients were satisfied with their provided food while 20% (n = 24) of the respondents were dissatisfied with their supplied food from the hospital. It denotes that the arrangements of food inside the hospital are very planned and appreciable. One-third of the respondents 33% (n = 40) were facing their problems. Out of all the respondents above three quarters, 76.6% respondents were reported that the hygienic condition of the ward & toilet was poor. More than half of the respondents faced the disturbance by mosquitoes and insects during their staying days in the hospital and said that there was a lack of sufficient ventilation and light in the ward. This reveals that there would be the possibility of developing communicable diseases from the insects and from one person to another. Due to lack of oxygen and light, the patients would develop suffocation and headache. This may be due to a shortage of space in the hospital than the patient load. The respondents were distributed with their suggestions for improvement and the majority of the respondents suggested the improvement of the cleanliness. Almost half of the respondents told about an increased number of beds, provision of recreation facilities, and others.

In this study, the service provider was asked to mention the problem that they faced to serve the patient. The respondents claimed that they faced problems to serve their duties due to overcrowding in the hospital and they did not get co-operation from the patient attendance. The respondents were distributed with their suggestions for improvement. They suggested that the cleanliness of the IPD and toilets should be increased the diagnostic facilities should be modernized. Regarding the checklist in the category of the physical facilities provision of maintaining privacy was not always maintained. Waiting for the area with sitting arrangement, drinking water facility, water basket, pathological facilities like USG was not sufficiently available, but the sign of post and display board and register book, equipment facilities (like

Glucometer, Torchlight, Stethoscope and BP machine and Suction machine), diagnostic facilities (like X-ray facilities, ECG facilities, CT scan) were available. Pathological facilities were partially available and Toilet facilities were untidy.

There was a statistically significant relationship between the residence of the respondents and the educational level of the respondents. We found the types of vehicles involved in accidents that of accidents were occurred Rickshaws (27.5%) motorbikes (25%) and CNG (25%). It was also found that 13.3% of accidents occurred by bus, 5% by truck, and 4.2% accidents occurred by other vehicles. A similar study was done by reported that 37% of RTA victims occurred by rickshaws and two-wheelers. Most of the accidents occurred among the respondents during their travel at the time they were sitting in the vehicles (47.5%), while driving the vehicles (25.5%), and during crossing the road (25%). A similar study was not found to correlate it. The site of the body involved in an accident among the respondent found that the patients came with multiple injuries (53.3%) and limb injuries (29.2%). A similar study done by (Bhavesh *et al.*, 2014) found that 40% were involved in multiple injuries and 30% were involved only limbs. The respondents

waiting time to get service that 20% respondents were required 10 minutes, and 57.5% of respondents needed 10 to 30 minutes to get their treatment [28, 29]. This study was associated with other studies and reported that 70% of victims need 10-15 minutes for getting their management in secondary and tertiary level hospitals in India.

LIMITATIONS

The present study has several limitations which need to be taken into consideration while interpreting the findings. First, it was limited by the use of self-reported data which might have influenced the results through the method, social desirability, and memory recall biases. Second, due to the cross-sectional nature of the study, no conclusions can be drawn regarding causality. Furthermore, our study only collected data during the respondent's stayed in the in-patient department of this hospital. The study is also limited by the relatively small sample size and study participants in NITOR. So, the generalization to the whole tertiary level of hospital in-patient department services in Bangladesh is highly limited. Future studies need to overcome such limitations by employing longitudinal designs with larger and more representative samples.

CONCLUSION

Our study indicated the current status of in-patient department service management for RTA patients at the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR). The toilet's hygienic condition in in-patient departments was very poor, faced disturbance of mosquito and the light and ventilation of the IPD was not satisfactory, and supplied drugs for the patient was not sufficient The IPD service was hampered due to lack of skilled manpower and constrain of diagnostic resources. The majority of the patients had to wait for 10 to 30 minutes for getting service and the quality of supplied diet was satisfactory and no provision of safe drinking water and waste bin MSR materials were found insufficient. Pathological facilities were partially available and USG facilities were not available and MRI facilities were not functioning. However, the cleanliness of IPD and toilet facility for both genders should be improved. Adequate skilled manpower for all the time should be ensured in IPD. A waiting area with a good sitting environment should be ensured. All the diagnostic and treatment facilities should be available in functioning condition and modernized. Out of pocket expenditure should be reduced and the rules for the visitor and visiting hours of patients should be strictly maintained. Finally, the finding of the study may be useful in the improvement of the management status of the in-patient service department in the specialized hospital.

ACKNOWLEDGMENTS

REFERENCES

1. Biswas, S. K. (2012). Road traffic injuries: An emerging problem in Bangladesh. *Faridpur Medical College Journal*, *7*(1), 5.
2. Peden, M., Scurfield, R., Sleet, D., Mathers, C., Jarawan, E., Hyder, A. A., Mohan, D., Hyder, A. A., & Jarawan, E. (2004). *World report on road traffic injury prevention*. World Health Organization.
3. Anjuman, T., Hasanat-E-Rabbi, S., Siddiqui, C. K. A., & Hoque, M. M. (2020). Road traffic accident: A leading cause of the global burden of public health injuries and fatalities. *InProc. Int. Conf. Mech. Eng. Dhaka Bangladesh*, 29–31.
4. Khan, Alam, T., & Islam, J. (2010). *Urbanization in Bangladesh: Present Status and Policy Implications A.K.M. Helal uz Zaman*.
5. Mashreky, S. R., Rahman, A., Chowdhury, S. M., Giashuddin, S., Svanström, L., Linnan, M., Shafinaz, S., Uhaa, I. J., & Rahman, F. (2008). Epidemiology of childhood burn: yield of largest community based injury survey in Bangladesh. *Burns*, *34*(6), 856–862.
6. Mashreky, S. R., Rahman, A., Khan, T. F., Faruque, M., Svanström, L., & Rahman, F. (2010). Hospital burden of road traffic injury: major concern in primary and secondary level hospitals in Bangladesh. *Public Health*, *124*(4), 185–189.
7. Staton, C., Vissoci, J., Gong, E., Toomey, N., Wafula, R., Abdelgadir, J., Zhou, Y., Liu, C., Pei, F., & Zick, B. (2016). Road traffic injury prevention initiatives: a systematic review and metasummary of effectiveness in low and middle income countries. *PloS One*, *11*(1), e0144971.
8. Maniruzzaman, K. M., & Mitra, R. (2005). Road accidents in Bangladesh. *IATSS Research*, *29*(2), 71.
9. Arif, A. (2012). Lowest motor vehicle but highest road accidents in Bangladesh. *Amar Desh*, 1.
10. Peden, M., & Hyder, A. (2002). Road traffic injuries are a global public health problem. *Bmj*, *324*(7346), 1153.
11. Bajracharya, A., Agrawal, A., Yam, B. R., Agrawal, C. S., & Lewis, O. (2010). Spectrum of surgical trauma and associated head injuries at a university hospital in eastern Nepal. *Journal of Neurosciences in Rural Practice*, *1*(01), 2–8.
12. Kunreuther, H. (2002). Risk analysis and risk management in an uncertain world 1. *Risk*

Analysis: An International Journal, *22*(4), 655–664.

13. Rehbein, D. K. (2008). *Statement of David K. Rehbein National Commander The American Legion Before a Joint Session of the Veterans' Affairs Committees United States Congress on the legislative priorities of The American Legion*.

14. Abhilash, K. P. P., Chakraborthy, N., Pandian, G. R., Dhanawade, V. S., Bhanu, T. K., & Priya, K. (2016). Profile of trauma patients in the emergency department of a tertiary care hospital in South India. *Journal of Family Medicine and Primary Care*, *5*(3), 558–563. https://doi.org/10.4103/2249-4863.197279

15. Mahaisavariya, B. (2008). Musculoskeletal trauma service in Thailand. *Clinical Orthopaedics and Related Research*, *466*(10), 2323–2328.

16. Benjet, C., Bromet, E., Karam, E. G., Kessler, R. C., McLaughlin, K. A., Ruscio, A. M., Shahly, V., Stein, D. J., Petukhova, M., & Hill, E. (2016). The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. *Psychological Medicine*, *46*(2), 327–343.

17. Bhalla, K., Naghavi, M., Shahraz, S., Bartels, D., & Murray, C. J. L. (2009). Building national estimates of the burden of road traffic injuries in developing countries from all available data sources: Iran. *Injury Prevention*, *15*(3), 150–156.

18. Onyachi, N. W., Maniple, E., & Santini, S. (2011). *Preparedness for mass casualties of road traffic crashes in Uganda: assessing the surge capacity of highway general hospitals*.

19. Gomes, E., Araújo, R., Carneiro, A., Dias, C., Lecky, F. E., & Costa-Pereira, A. (2008). Mortality distribution in a trauma system: From data to Health policy recommendations. *European Journal of Trauma and Emergency Surgery*, *34*(6), 561–569.

20. Jabbar, M. A., Islam, M. Z., Sultana, R., & Akhter, S. F. U. (2009). Risk factors of road traffic accidents (RTA) in context of Bangladesh. *Journal of Dhaka Medical College*, *18*(2), 161– 165.

21. Fitzgerald, M., Dewan, Y., O'Reilly, G., Mathew, J., & McKenna, C. (2006). India and the management of road crashes: Towards a national trauma system. *Indian J Surg*, *68*(4), 226– 232.

22. Madan, V. S. (2006). Road traffic accidents: emerging epidemic. *Indian Journal of Neurotrauma*, *3*(01), 1–3.

23. Itumalla, R., Acharyulu, G., & Shekhar, B. R. (2014). Development of hospitalqual: a servicequality scale for measuring in-patient services in hospital. *Operations and Supply Chain Management: An International Journal*, *7*(2), 54–63.

24. Payal, P., Sonu, G., Anil, G. K., & Prachi, V. (2013). Management of polytrauma patients in emergency department: An experience of a tertiary care health institution of northern India. *World Journal of Emergency Medicine*, *4*(1), 15.

25. Hailemichael, F., Suleiman, M., & Pauolos, W. (2015). Magnitude and outcomes of road traffic accidents at Hospitals in Wolaita Zone, SNNPR, Ethiopia. *BMC Research Notes*, 8(1), 1–5.

26. Shrivastava, S. R., Pandian, P., & Shrivastava, P. S. (2014). Pre-hospital care among victims of road traffic accident in a rural area of Tamil Nadu: A cross-sectional descriptive study. *Journal of Neurosciences in Rural Practice*, *5*(Suppl 1), S33–S38. https://doi.org/10.4103/0976-3147.145198.

27. Agbonkhese, O., Yisa, G. L., Agbonkhese, E. G., Akanbi, D. O., Aka, E. O., & Mondigha, E. B. (2013). Road traffic accidents in Nigeria: Causes and preventive measures. *Civil and Environmental Research*, *3*(13), 90–99.

28. Gopalakrishnan, S. (2012). A public health perspective of road traffic accidents. *Journal of Family Medicine and Primary Care*, *1*(2), 144–150. https://doi.org/10.4103/2249-4863.104987

29. Pathak, A., Desania, N. L., & Verma, R. (2008). Profile of road traffic accidents & head injury in Jaipur (Rajasthan). *Journal of Indian Academy of Forensic Medicine*, *30*(1), 6–9.