Original article

Risk factors contributing to road traffic accidents in Bangladesh: A cross sectional hospital-based study

*Saha Biswas T[1], Das D[2], Tarafder MA[3], Anwar KS[4], Biswas B[5], Sharmin A[6], Banik J[7]

Abstract

Background: Road traffic accident (RTA) has become one of the major concerns worldwide and Bangladesh is not beyond it. Because of the huge population, the authority can't pay proper attention to the traffic rules and transportation, also the poor illiterate people in the country are not aware of the traffic rules and regulations.

Method: Aim of this study was to identify the role of socio-demographic factors contributing to RTA and also, awareness on knowledge regarding traffic rules among the victims. It is a hospital based cross-sectional study conducted among 800 victims in a tertiary hospital namely Rangpur Medical College and Hospital in between 1st July to 1st December, 2021, in Rangpur, Bangladesh.

Results: Among the victims, 70.1% were male and 29.9% were female with a mean age of 32.8 ± 16.6 years. 60.1% were from urban area, 41.6% were illiterate. Also, 58.4% and 31.5% came from middle and low socio-economic condition respectively. Among the patients, 41.8% were passenger, 34.6% passerby and the remaining 23.6% were drivers. 37.3% accidents took place in national highway. Comparatively lower percentage, 10-12% occur in weekends. In general, 53.1% have proper knowledge about traffic rules.

Conclusion: In case of drivers, 74.1% had proper traffic knowledge. Now there is a crying need to focus on safety education of general public on traffic rules. Arranging traffic awareness programs, broadcasting traffic rules on social media, undertaking multidisciplinary approach are needed to prevent the accidents and to ensure safety, discipline and awareness among the citizens in our country.

Introduction

Road traffic accident (RTA) has become one of the major concerns worldwide and Bangladesh is not beyond it. About 3,700 people are killed worldwide everyday as a result of road traffic accident.[1] It is one of the top leading cause of death worldwide in middle and low-income countries. Whereas the global rate of road traffic death is 18.2 per 100,000 population, regional rates due to RTA in South-East Asia is 20.7 deaths per 100,000 population respectively. There has been no change noticed in low-income country since 2013.[2]

Transport is an essential part of everyday life, and one can't but use it. In spite of great progress in technology and road traffic management, road accident has remained as one of the major concerns in Bangladesh in the recent times. Bangladesh ranks number 8th among the most densely populated countries with a land area of 1,30,170 km^2 and is equivalent to 2.11% of the total world population.[3] In addition, the literacy rate is 74.9% and the population living below the national poverty line is 20.5%.[4,5] Accidents are not only frequent because of ignorance but also because of reckless driving, overconfidence, violating traffic rules which results from illiteracy, socio-economic condition etc.[6] Because of the huge population, the authority can't pay proper attention to the traffic rules and transportation, also the poor illiterate people in the country are not aware of the traffic rules and regulations. Approximately, 5,088 people were killed in 5,472 road accidents in 2021. However, 3,918

Author's affiliation

1. *Trisita Saha Biswas, Lecturer, Department of Community Medicine, Z.H. Sikder Women's Medical College, Dhaka, Bangladesh

2. Dhruba Das, Medical Officer, Center for Kidney Disease and Urology Hospital, Dhaka, Bangladesh.

3. Monowar Ahmad Tarafder, Professor and Head, Department of Community Medicine, Z.H. Sikder Women's Medical College, Dhaka, Bangladesh.

4. Kazi Selim Anwar, Head, Research Unit, Ad-din Women's Medical College, Dhaka, Bangladesh

5. Brindaban Biswas, Professor, Department of Transfusion Medicine, TMSS Medical College and Hospital, Bogura, Bangladesh

6. Afsana Sharmin, Lecturer, Department of Community Medicine, Z.H. Sikder Women's Medical College, Dhaka, Bangladesh

7. Joye Banik, Lecturer, Department of Community Medicine, Z.H. Sikder Women's Medical College, Dhaka, Bangladesh.

*Address of Correspondence: *Dr. Trisita Saha Biswas, Lecturer, Department of Community Medicine, Z.H. Sikder Women's Medical College, Dhaka, Bangladesh. Email: trisitasahabiswas132@gmail.com

people were killed in 4,198 road accidents in 2020 across the country. That means, road crashes fatalities leap by 30 percent in 2021 over 2020 according to the police report.[7]

Road Safety Agency in USA have reported that RTA is associated with a number of problems and each of them is needed to be addressed separately.[6] Rapid urbanization, lack of appropriate infrastructure, non-existing injury prevention programs, poor enforcement of traffic laws, sharing same roads with large and small vehicles etc. are causing RTA, also there are some risk factors such as age, literacy rate, socioeconomic condition, types of road, working days or weekends etc. The comprehensive approach to control, reduce and prevent the effect of RTA requires understanding of a number of associated factors, including the socio-demographic studies, which in not well studied previously in Bangladesh. Therefore, considering this background the study is undertaken to identify the role of socio-demographic factors contributing to RTA and also, awareness on knowledge regarding traffic rules among the victims in the tertiary hospital of Rangpur division in Bangladesh.

Methods

It is a cross-sectional study conducted in Rangpur Medical College and Hospital, a tertiary hospital from 1st July to 1st December, 2021 with a sample size of 800. A pre-tested structured interviewer administered questionnaire was used. Data was collected and then analyzed using Statistical Package for Social Sciences (SPSS) version 22. All reported P values were made on the basis of 5% differences and compared to a significant level of 5%; differences were considered statistically significant at $P < 0.05$.
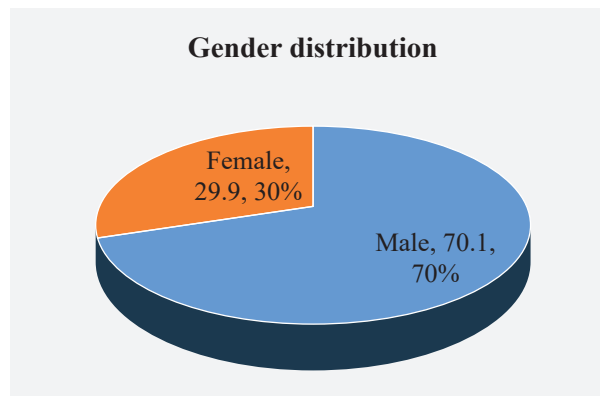
Results

Fig 1: Distribution of the victims on the basis of gender

In the present study, the socio-demographic status of the respondents was assessed among 800 victims of a tertiary hospital of which 561 (70.1%) were male and 239 (29.9%) were female (Fig 1), with a mean age of 32.8 ± 16.6 years.

Table 1: Gender-wise distribution of socio-demographic factors of the respondents (n=800)

Variables	Responses	Male n (%)	Female n (%)	Total n (%)	Calculated chi-square value(x^2)	P value
Age	≤15	92(11.5)	23(2.9)	115(14.4)		
	16-30	240(30)	82(10)	322(40.2)		
	31-45	132(16.5)	64(8)	196(24.5)	79.163	0.000
	46-60	47(5.9)	55(6.9)	102(12.8)		
	≥60	50(6.2)	15(1.9)	65(8.2)		
Locale	Rural	252 (31.5)	67(8.4)	319(39.9)	19.934	0.000
	Urban	309(38.6)	172(21.5)	481(60.1)		
Literacy	Primary school	58(7.3)	73(9.1)	131(16.4)		
	Secondary school	136(17)	30(3.8)	166(20.7)	82.808	0.000
	Higher secondary	61(7.6)	46(5.7)	107(13.4)		
	Graduate and above	60(7.5)	3(0.4)	63(7.9)		
Socio-economic condition	High	76(9.5)	5(0.6)	81(10.1)		
	Middle	302(37.7)	165(20.6)	467(58.4)	29.107	0.000
	Low	183(22.9)	69(8.6)	252(31.5)		
Categories of victims	Passerby	214(26.7)	63(7.9)	277(34.6)		
	Driver	187(23.4)	2(0.2)	189(23.6)	160.360	0.000
	Passenger	160(20)	174(21.7)	334(41.8)		
Knowledge about traffic rules	Proper	319((39.9)	106(13.2)	425(53.1)	10.535	0.001
	Improper	242(30.2)	133(16.6)	375(46.9)		

Table 1 shows majority of the victims (40.2%) belonged to 16-30 year age group, followed by 31-45 year age group

(24.5%) with the least (8.2%) in ≥60 age group. 60.1% were from urban area. Most of the patients (41.6%) are illiterate while a mere of 7.9% were graduate. Also, 58.4% and 31.5% came from middle and low socio-economic condition respectively. Among the patients, 41.8% were passenger, 34.6% passerby and the remaining 23.6% were drivers. In general, more than half population (53.1%) have proper knowledge about traffic rules.
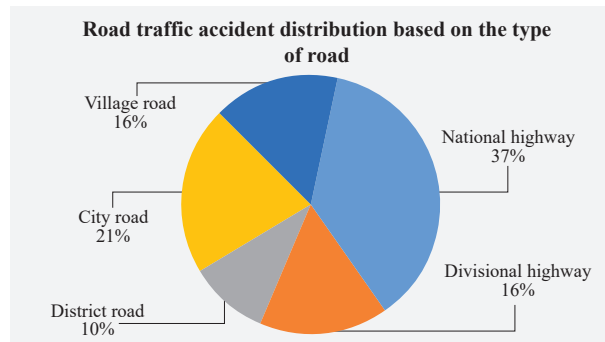

Fig 2: Distribution of road traffic accident based on the type of road
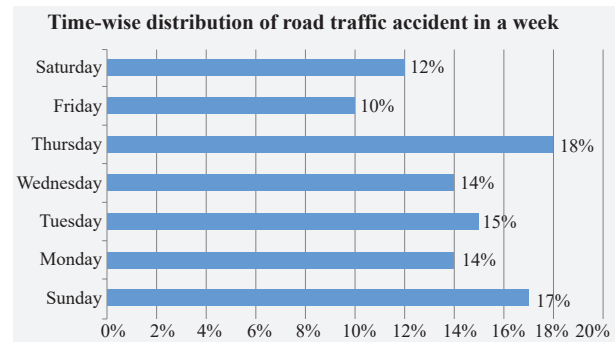

Fig 3: Time-wise distribution of road traffic accident in a week

Fig 2 illustrates 37.3% accidents took place in national highway followed by 20.9% accidents in city road. Fig 3 shows lower percentages of traffic accidents, 10% and 12% accidents occur in weekends, Friday and Saturday respectively.

Table 2: Association of contributing factors with knowledge regarding traffic rules among the victims (n=800)

Variables	Responses	Knowledge about traffic rules		Total n	Significance (p-value)
		Proper	Improper		
Gender	Male	319 (56.9)	242(43.1)	561	0.001
	Female	106(44.4)	133(55.6)	239	
Age	≤15	38(25.3)	112(74.7)	150	
	16-30	176(64.7)	96(35.3)	272	
	31-45	100(54.6)	83(45.4)	183	0.000
	46-60	69(59.0)	48(41.0)	117	
	≥60	42(53.8)	36(46.2)	78	
Locale	Rural	140 (43.9)	179(56.1)	319	0.000
	Urban	285(59.3)	196(40.7)	481	
Literacy	Illiterate	96(28.8)	237(71.2)	333	
	Primary school	59(45.0)	72(55.0)	131	
	Secondary school	123(74.1)	43(25.9)	166	0.000
	Higher secondary	89(83.2)	18(16.8)	107	
	Graduate and above	58(92.1)	5(7.9)	63	
Socio-economic condition	High	78(96.3)	3(3.7)	81	
	Middle	267(57.2)	200(42.8)	467	0.000
	Low	80(31.7)	172(68.3)	252	
Categories of victims	Passerby	146(52.7)	131(47.3)	277	
	Driver	140(74.1)	49(25.9)	189	0.000
	Passenger	139(41.6)	195(58.4)	334	

Table 2 demonstrates association between the socio-demographic factors with knowledge regarding traffic rules which is highly statistically significant (p <0.05). Table 3 shows male (56.9%) have more traffic knowledge than female (44.4%). 16-30 age group had the highest knowledge (64.7%) and those who resides in urban area (59.3%) had more knowledge than those of rural area. Respondents who are graduated (92.1%) and of high socioeconomic condition (96.3%) possess more knowledge regarding traffic rules. In terms of categories of victims, out of 277 passerby, 52.7% and out of 139 passengers, 53.1% were aware of the traffic rules. However, in case of drivers (189), 74.1% had the knowledge about traffic rules and regulations.

Discussion

In this study, males (70.1%) outnumbered females (29.9%). The similar findings were also reported in other studies.[9,10,11] However, the high percentage of males may be due to high mobility and exposure to traffic along with their tendency of risks taking. Male also showed to have more traffic knowledge (56.9%) than female in our study which was anticipated because the literacy rate is higher among male in our country due to gender disparities.[4]

The highest figure of RTA cases (40.2%) belonged to the age group of 16-30 years which is similar to the findings observed in the studies from Uttar Pradesh, Delhi, Lucknow and Punducherry in India.[12,13,14,15,16] The increased proportion of young people can be due to higher mobility of this age-group due to economic productivity and also due to high risk taking behavior. Studies from developed countries show a different figure [17,18] because of less difference in employment and mobility of either sex male or female. Only 64.7% of these young group had proper knowledge regarding traffic rules. However, a study conducted in Taif University, Saudi Arabia reported that 90% of their students had proper knowledge of road traffic regulations[7]. In contrary, the lack of traffic knowledge and violation of traffic rules is reported the most signification reason behind RTA in Saudi Arabia, Poland, and Canada.[19,20,21]

It is obvious that the people of our country are very less aware about the knowledge of traffic rules resulting in much more accidents and injuries. These indicate that the effective traffic rules education should be incorporated in school level, safety awareness programs should be arranged, rules and regulations broadcasted in social media should be increased etc.

The study illustrates that most of the victim were illiterate which is almost similar to that of Mishra et al[22] and Chauhan et al[14] as a higher percentage of illiterate have no proper knowledge of traffic rules. But also the study shows contradiction as the majority of the victims are from urban area (60.1%) which is different from the figures from the Mishra et al and Chauhan et al where more cases from rural areas faced RTA. This is may be due to rural people are more migrating to industrial urban areas to seek job opportunities and increase trade and commerce.

In the present study, the highest number of patients seeking health care in our hospital were of middle class (58.4%) followed by low class (31.5%) which is similar to Chauhan et al.[14] Studies found that low educational level, behavioral risk factors such as alcohol consumption while driving, illegal joy driving, excessive speed are the risk factors for causing accidents which are more found among the people who comes from low socioeconomic condition.[23-28]

The present study demonstrates that most of RTA victims were passengers with a significant amount of drivers and pedestrians in Bangladesh, which is similar with the result of a study in developing countries[29] but shows a contradiction with several previous studies.[30,31,32] In Bangladesh, the drivers possess more knowledge on traffic rules than the passengers and pedestrians. A study in West Indies[34] reported that most of the drivers are aware of traffic rules but their practice often diverged however another study in India[35] showed lack of awareness and poor driving skill. In addition, previous studies have mentioned Bangladesh being a low middle-income country, the pedestrians are at high risk of getting involved in RTA.[30,31,32]

Patel et al.[33] reported the highest numbers of fatal accidents (40%) were recorded in national highway which is similar to our case (37.3%) whereas Mehta et al[13] and Chauhan et al[14] reported, most of road accidents were on village roads.

In our study, the figure of accidents didn't fluctuate significantly in between weekdays, however, less number of accidents were reported on weekends, Friday (10%) and Saturday (9.01%) which is similar to Chauhan et al[14] where the figure was approximate 10% in weekends but contradicts the studies from Mehta eta al[13] and Jha et al [15] where majority of accidents occurred on weekends.

Research context

Evidence before this study

Industrialization has improved the lifestyle of people, but everything has a cost to pay. The number of fatal and disabling injuries is increasing day by day. To our knowledge, only few similar studies were carried out in our country. All of them have established the fact that RTA has become an alarming issue in our country. Although the epidemiology and effect of RTA has been investigated considerably, there are very few data available concerning the contributing factors and knowledge regarding traffic rules. This study will contribute a deeper understanding of the risk factors that are influencing road traffic accidents and the knowledge of traffic rules among the general population.

Added value of this study

Road traffic accident has become an important public health issue which can only be dealt through comprehensive approach. Also, the effect of road traffic accidents on healthcare is tremendous. Medical professionals can play a great role in the prevention and control of RTA This study is aimed to identify the demographic socio- demographic factor that are contributing to RTA along with awareness on traffic rules. This study may open a window through which the

magnitude of this problem can be seen in a wider range so that necessary measures can be taken to deal with this situation.

Implications of all the evidence available

Bangladesh is trying to modernize its transportation system, but population and industrialization continue to outpace its demand, turning the roads into death traps. One of the biggest hindrance is the lack of traffic knowledge. Thus, there is a need to focus on safety education of general public to make sure the care is comprehensive and strict enforcement of the existing legislations is a must as an immediate follow up to the advocacy measure. Proper implementation of Road Transport Act-2018 of Bangladesh, raising awareness on road safety through the media, reclaiming pavements, parts of highway from illegal occupants and providing training to drivers will decrease the RTA cases further.

Conclusion

The study intended to analysis the risk factors contributing to RTA in the present traffic stream of Bangladesh. The results show higher percentage of young illiterate male, residing in urban area and of middle socioeconomic condition are more susceptible to RTA. Now there is a crying need to focus on safety education of general public on traffic rules. To decrease RTA cases, a multidisciplinary approach (integrated with psychologists, engineers, doctors, sociologists, vehicle experts, civil engineers etc.) should be taken for traffic planning and road network designing. Arranging traffic awareness programs, broadcasting traffic rules on social media are absolutely needed to minimize the accidents and to ensure safety, discipline and awareness among the citizens in our country.

Limitation

This study does not provide detailed information about individual accident cases. Also, the sample size was limited. To identify proper preventive measures, further research is required and in-depth analysis of crash injuries are needed.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

1. World Health Organization (WHO), Newsroom, Road Traffic Injuries. Cited 2021 June 21; Available from: https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries

2. World Health Organization (WHO). Global Status Report on Road Safety 2018.Published 2018 June 17; Available from: https://www.who.int/publications/i/item/9789241565684

3. Bangladesh population (2022), Worldometer. Cited Available from: https://www.worldometers.info/world-population/bangladesh-population/

4. World Data Atlas, Bangladesh Adult Literacy Rate, 1960-2021. Available from: https://knoema.com/atlas/Bangladesh/topics/Education/Literacy/Adult-literacy-rate

5. Asian Development Bank, Poverty Data, Bangladesh. Available from : https://www.adb.org/countries/bangladesh/poverty

6. Al-Zahrani A, Ahmed E. Knowledge and attitude toward road traffic regulations among students of Health Sciences College in Taif Region, KSA. Int J Med Sci Public Health 2014;4(2):241-4

7. The Daily Star, Road crash fatalities leap by 30 percent, January 21, 2022. Available from: https://www.thedailystar.net/news/bangladesh/accidents-fires/news/road-crash-fatalities-jump-30pc-2943661

8. Trivedi A, Rawal D. Prevalence of road traffic accidents and driving practices among young drivers, 2011, healthline, Volume 2, Issue 2: 72-25

9. Bhuyan PJ, Ahmed F. Road traffic accident: an emerging public health problem in Assam. Indian J Community Med. 2013 Apr; 38(2):100-4. doi: 10.4103/0970-0218.112441

10. Tiwari RR, Ganveer GB. A study on human risk factors in non-fatal road traffic accidents at Nagpur. Indian J Public Health. 2008 Oct-Dec;52(4):197-9

11. Bayan P, Bhawalkar JS, Jadhav SL, Banerjee A. Profile of non-fatal injuries due to road traffic accidents from a industrial town in India. Int J Crit Illn Inj Sci. 2013 Jan; 3(1):8-11. doi: 10.4103/2229-5151.109409

12. K. Jaiswal, S. Kumar, S. Sant, A. Singh, A. Kumar, A. Singh et al. Injury pattern of road traffic accident cases in a rural hospital of central Uttar Pradesh. Int J Med Sci Publ Health.2015;(4) :1347-1350

13. Mehta SP. An epidemiological study of road traffic accident cases admitted in Safdarjang Hospital, New Delhi. Indian J Med Res 1968;56(4):456–66

14. Chauhan A, Ahmed N, Singh JV, Singh VK, Singh A, Kumar S. Epidemiology of road traffic injuries in a tertiary care centre of Lucknow. Indian J Commun Health. 2014; 26(2):181–6.

15. Jha N, Srinivasa DK, Roy G, Jagdish S, Minocha RK. Epidemiological study of road traffic accident cases: a study from south India. Indian J Community Med 2004; 29(1):20–24.

16. Sathiyasekaran BWC. Study of the injured and the injury pattern in road traffic accident. Indian J Forensic Sci 1991; 5:63–68.

17. Kudebong M, Wurapa F, Nonvignon J, Norman I, Awoonor-Williams JK, Aikins M. Economic burden of motorcycle accidents in Northern Ghana. Ghana Med J, 2011 ;45(4) : 135-142

18. Pérez-Núñez R, Híjar-Medina M, Heredia-Pi I, Jones S, Silveira-Rodrigues EM. Economic impact of fatal and nonfatal road traffic injuries in Belize in 2007. Rev Panam Salud Publica. 2010,Nov;28(5):326-36

19. Ansari S, Akhdar F, Mandoorah M, Moutaery K. Causes and effects of road traffic accidents in Saudi Arabia. Public Health. 2000;114:37–9

20. Goniewicz K, Goniewicz M. Causes and Effects of Road Traffic Accidents in Poland (896). Injury Prevention. 2016; 22 :A319–20.

21. Zhang J, Lindsay J, Clarke K, Robbins G, Mao Y. Factors affecting the severity of motor vehicle traffic crashes involving elderly drivers in Ontario. Accid Anal Prev. 2000;32: 117–25.

22. Mishra B, Sinha Mishra ND, Sukhla S, Sinha A. Epidemiological study of road traffic accident cases from Western Nepal. Indian J Community Med. 2010;35:115–21

23. Shults RA, Elder RW, Sleet DA, Nichols JL, Alao MO, Carande-Kulis VG. et al. Reviews of evidence regarding interventions to reduce alcohol-impaired driving. Am J Prev Med. 2001;21 (4 Suppl):66–88.

24. Dinh-Zarr TB, Sleet DA, Shults RA, Zaza S, Elder RW, Nichols JL. et al. Reviews of evidence regarding interventions to increase the use of safety belts. Am J Prev Med. 2001;21(4 Suppl):48–65.

25. Braver ER. Race, Hispanic origin, and socioeconomic status in relation to motor vehicle occupant death rates and risk factors among adults. Accid Anal Prev. 2003; 35(3):295–309.

26. Harper S, Lynch J. Trends in socioeconomic inequalities in adult health behaviors among US, 1990–2004. Public Health Rep. 2007; 122(2):177–89.

27. Shinar D, Schechtman E, Compton R. Self-reports of safe driving behaviors in relationship to sex, age, education and income in the US adult driving population. Accid Anal Prev. 2001; 33(1):111–6.

28. Quinlan KP, Brewer RD, Siegel P, Sleet DA, Mokdad AH, Shults RA. et al. Alcohol-impaired driving among US adults, 1993–2002. Am J Prev Med. 2005; 28(4):346–50.

29. Nantulya VM, Reich MR. The neglected epidemic: Road traffic injuries in developing countries. BMJ. 2002;324:1139–41

30. Constant A, Lagarde E. Protecting vulnerable road users from injury. PLoS Med. 2010;7 (3):e1000228.

31. Naci H, Chisholm D, Baker TD. Distribution of road traffic deaths by road user group: A global comparison. Inj Prev. 2009;15:55–9.

32. Rus Ma D, Peek-Asa C, Baragan EA, Chereches RM, Mocean F. Epidemiology of road traffic injuries treated in a large Romanian emergency department in Tîrgu-Mureş between 2009 and 2010. Traffic Inj Prev. 2015;16:835–41

33. M. Patel, K. Girija, H.K. Mehta. An analysis of pedestrian accidents in Sabarkantha district

    Natl J Commun Med. 2010;1 (2) :79-81

34. Gopaul, C, Singh-Gopaul A, Sutherland J and Chadee, D. Knowledge, Attitude and Practice among Drivers in Trinidad, West Indies. Journal of Transportation Technologies, 2016; 6: 405-419.

35. Kharde A, Jain A, Phulambrikar R, Kharde A. Study on awareness of road traffic rules among drivers of rural area: A cross-sectional study. Int J Med Sci Public Health 2018;7(12):969-972