

Female Victims of Road Traffic Accidents and Its Associated Factors Admitted at Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh

Mst. Sumsun Nahar¹

¹. Nursing Instructor, Bogura Nursing College, Bogura, Bangladesh
Corresponding author: Mst. Sumsun Nahar

Abstract

Background: Road traffic injuries are a major public health problem and an important cause of preventable trauma, disability, and premature death, particularly in low- and middle-income countries. Female victims may experience substantial injury burden related to vehicle involvement, road conditions, and safety practices.

Aim of the study: To assess the characteristics and associated factors of road traffic accidents among female victims admitted to SZMCH, Bogura.

Methods: This cross-sectional descriptive study included 270 female road traffic accident victims admitted to SZMCH, Bogura, from September to December 2019. Participants were selected using purposive sampling. Data were collected through a pre-tested, partially structured questionnaire covering sociodemographic characteristics, accident circumstances, injuries, vehicle-related factors, road conditions, safety practices, and immediate outcomes. Data were analyzed using SPSS/PC+, and statistical significance was considered at $p < 0.05$ and $p < 0.01$, as appropriate.

Result: The mean age was 37.93 ± 16.93 years, with 43.3% aged 20–39 years. Most respondents were passengers (68.1%), followed by pedestrians (30.4%). Local roads accounted for 95.6% of accidents. Lacerated wounds (34.1%) and cut injuries (32.6%) were predominant, while multiple-site trauma occurred in 44.8%. Three-wheelers (40.0%) and motorcycles (34.4%) were the most frequently involved vehicles. Poor road conditions were reported by 56.3%. Educational status was significantly associated with vehicle involvement ($p < 0.01$), while age was significantly associated with both injury type and vehicle involvement ($p < 0.01$).

Conclusion: Female road traffic injury victims showed substantial involvement of three-wheelers and motorcycles, multiple-site trauma, and poor road conditions. Strengthened road-safety measures, enforcement, safer infrastructure, protective-device use, and timely trauma care are important for reducing road traffic injuries.

Keywords: Road traffic accidents, Female victims, Road traffic injuries, Three-wheeler, Road safety

I. INTRODUCTION

Road traffic injuries (RTIs) are the leading cause of unintentional injuries, accounting for the greatest proportion of deaths from unintentional injuries. They are the leading cause of injury-related disability-adjusted life years (DALYs), and they pose a significant economic and societal burden. Despite this burden, RTIs remain a largely neglected public health problem, especially in low- and middle-income countries (LMICs), where urbanization and motorization are rapidly increasing [1,2]. Adolescent males are more likely to enjoy with their friends and prove their individuality and freedom by breaking traffic rules and regulations. So the adolescence has been shown to be significantly correlated to risky driving [3,4]. Moreover, road traffic accidents are more common among young drivers who use alcohol, marijuana, or other drugs while driving. A Road Traffic Accident (RTA) was defined as accident, which took place on the road between two or more objects, one of which must be any kind of a moving vehicle. The major causes for RTAs in our country are rapid increase in personalized modes of transport, a mixture of slow and fast moving vehicles, lack of road discipline, drunken driving and use of mobile phones while driving [5]. Since most of these causes are preventable, in order to create awareness, WHO's theme for 2004 was "ROAD SAFETY IS NO ACCIDENT" [6]. The number of accidents while riding bikes was extremely high among high school and younger students, while it accounted for only 20 percent of all the traffic accidents that took place in Japan in 2008 [7]. Accidents, tragically, are not often due to ignorance, but are due to carelessness, thoughtlessness and over confidence. Human; vehicle and environmental factors play roles before, during and after a trauma event. Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and person distribution. Traffic accidents are the leading cause of death among young people between 10 and 24 years, according to a new report published by WHO. The

report, Youth and Road Safety, says that nearly 400,000 young people under the age of 25 are killed in road traffic crashes every year [8]. Youth and Road Safety stresses that the bulk of these crashes are predictable and preventable [9]. Among 28 states of India, RTA mortality rate/1,00,000 population varied from as low as 1 in Haryana to as high as 18 in Goa, with national average of 8/1,00,000 [10]. In a study conducted by department of civil engineering, Kuwait University, Safat, Kuwait, Gulf in Jan 1994, to know the impact of seat belt use on road accident injury and injury type among road accident. It was found that seat belt use had a positive effect in reducing both road traffic fatalities and multiple injuries [11]. The present study aimed to find out the associated factors of road traffic accidents among female victims admitted in SZMCH, Bogura.

II. METHODS & MATERIALS

This cross-sectional type of descriptive study was carried out through the Department of Public Health, Varendra University, Rajshahi. The research was conducted over a period of four months, from September 2019 to December 2019. A total of 270 eligible patients were included consecutively according to predefined inclusion and exclusion criteria. Purposive sampling technique was followed for the entire study.

Inclusion criteria

- Female victims of road traffic accidents admitted to SZMCH, Bogura during the study period.
- Respondents who were willing to participate and provided informed consent.
- Respondents who were able to provide relevant information regarding the accident, injury and related circumstances.

Exclusion criteria

- Individuals who were unwilling to participate in the study.
- Patients whose relevant accident-related or sociodemographic information was substantially incomplete.
- Patients who were unable to provide reliable information and had no appropriate accompanying informant.

Ethical considerations

Before commencement of the study, the research protocol was approved by the local ethical/research committee of the Department of Public Health, Varendra University, Rajshahi. Permission for data collection was obtained from the concerned hospital authority. The purpose, objectives, procedures, potential risks and benefits of the study were explained to each respondent in understandable language, and informed consent was obtained before interview. Participation was voluntary, confidentiality of information and records was maintained, and the collected information was used solely for research purposes.

Data collection

Data were collected using a partially structured, pre-tested questionnaire. The researcher collected information through face-to-face interviews with female road traffic accident victims admitted to SZMCH, Bogura during office hours. The questionnaire covered sociodemographic characteristics, accident circumstances, injury characteristics, vehicle-related factors, road and environmental conditions, safety-related practices and knowledge, and immediate outcomes. Respondents were allowed to express their views freely, particularly for open-ended questions, and leading questions were avoided to minimize response bias.

The sociodemographic information included age, monthly family income, posting during the accident, occupation, educational status and type of family. Accident-related information included place of accident, type and area of injury, type of vehicle involved, helmet use during motorcycle accidents, vehicle quality, road condition, and mode of transportation after the accident. Information on the presence of a duty person at the accident site was also recorded.

The questionnaire additionally assessed perceived vehicle-related, person-related and environmental/road-condition

causes of road traffic accidents, as well as respondents' knowledge of route permits, driving licences and traffic signals. Immediate outcome within 24 hours was recorded as referred, local management or other. Sociodemographic variables were examined in relation to accident-related characteristics, particularly type of injury and vehicle involved.

Data analysis

After checking the collected information for completeness, validity and consistency, the data were coded and entered into a computer and analyzed using SPSS/PC+ software. Categorical variables were summarized using frequencies and percentages, while continuous variables were summarized using appropriate descriptive measures, including mean and standard deviation. Associations between relevant sociodemographic

characteristics and accident-related factors, including injury type and vehicle involved, were assessed using appropriate statistical tests. Statistical significance was considered at $p < 0.05$ and $p < 0.01$, as appropriate.

III. RESULTS

The mean age was 37.93 ± 16.93 years, with 43.3% aged 20–39 years, followed by 40–59 years (29.3%), 60 years or older (15.2%), and below 20 years (12.2%). The mean monthly family income was $13,547.23 \pm 9,156.67$ Taka, with 72.2% reporting an income of $\leq 15,000$ Taka. Most respondents were passengers (68.1%), followed by pedestrians (30.4%) and drivers (1.5%). Regarding occupation, 28.9% were classified as others, 24.4% were involved in business, and 21.5% were drivers. More than half had education up to class VI–XII (55.9%), while 19.0% were illiterate. Nuclear families comprised 74.8% of the respondents (Table 1). Most accidents occurred on local roads (95.6%). The predominant injury types were lacerated wounds (34.1%) and cut injuries (32.6%), followed by blunt trauma (18.9%) and head injury (8.9%). Multiple-site trauma was most common (44.8%), followed by lower-limb (23.7%), upper-limb (17.0%), and head trauma (14.4%). Three-wheelers (40.0%) and motorcycles (34.4%) were the most frequently involved vehicles. Among motorcycle-related accidents, 23.7% reported helmet use, whereas 10.7% did not (Table 2). Most vehicles were rated as good quality (73.0%), while 17.0% were considered bad. More than half of the respondents reported poor road conditions (56.3%). Relatives (28.5%) and public transport (25.6%) were common modes of post-accident transportation, while 40.7% reported other modes. A duty person was absent at the accident site in 78.1% of cases (Table 3). Among perceived causes, underage driving (40.4%) was the leading person-related factor, while narrow roads (20.0%) and busy roads (17.8%) were prominent environmental factors (Table 4). Knowledge of route permits, driving licences, and traffic signals was reported by 91.1%, 78.9%, and 88.1%, respectively. Within 24 hours, 73.3% received local management and 24.1% were referred (Table 5). Educational status was significantly associated with vehicle involvement ($\chi^2 = 49.22$, $p < 0.01$) (Table 6). Age was significantly associated with injury type ($\chi^2 = 98.44$, $p < 0.01$), with cut injuries highest at 40–59 years (49.4%) (Table 7). Vehicle involvement also varied significantly by age ($\chi^2 = 66.272$, $p < 0.01$), with three-wheelers highest among those aged ≥ 60 years (75.6%) (Table 8). The figures 1 showed that 97.85% of respondents were Muslim and 2.20% Hindu (Figure 1). Figure 2 presents that 91.85% was not using a seat belt and 8.15% used one (Figure 2). Vehicle authorization was reported as absent in 82.22% and present in 17.78% (Figure 3).

Table 1: Sociodemographic characteristics of the respondents (n=270)

Variables	Frequency (n)	Percentage (%)
Age (years)		
<20 years	33	12.2
20–39 years	117	43.3
40–59 years	79	29.3
60+ years	41	15.2
Mean ± SD	37.93 ± 16.93	
Monthly family income (Taka)		
Up to 15000	195	72.2
15001–30000	56	20.7
>30000	19	7.0
Mean ± SD	13547.23 ± 9156.67	
Posting during accident		
Driver	4	1.5
Passenger	184	68.1
Pedestrian	82	30.4
Occupation		
Driver	58	21.5
Service	32	11.9
Business	66	24.4
Lay labor	23	8.5
House wife	13	4.8
Others	78	28.9
Educational status		
Illiterate	53	19.0
Up to class V	54	20.0
Class VI–XII	151	55.9
Graduate plus	12	4.4
Type of family		
Nuclear	202	74.8
Joint/Extended family	68	25.2

Table 2: Accident, injury and vehicle-related characteristics of the respondents (n=270)

Variables	Frequency (n)	Percentage (%)
Place of accident		
Local road	258	95.6
Foot-path	12	4.4
Type of injury		
Head injury	24	8.9
Lacerated wound	92	34.1
Cut injury	88	32.6
Blunt trauma	51	18.9
Others	15	5.6
Area of trauma		
Head	39	14.4
Upper limb	46	17.0
Lower limb	64	23.7
Multiple	121	44.8
Type of vehicle involved		
Bus	6	2.2
Truck	6	2.2
Car	21	7.8
Motorcycle	93	34.4
Three-wheeler	108	40.0
Others	36	13.3
Helmet use during motorcycle accident		
Yes	64	23.7
No	29	10.7
Not applicable	177	65.6

Table 3: Vehicle, road and post-accident characteristics of the respondents (n=270)

Variables	Frequency (n)	Percentage (%)
Quality of vehicle		
Very good	27	10.0
Good	197	73.0
Bad	46	17.0
Road condition		
Good	118	43.7
Bad	152	56.3
Carrier after accident		
Police	13	4.8
Public	69	25.6
Relatives	77	28.5
Fair fighter	1	0.4
Other	110	40.7
Duty person at accident site		
Yes	52	19.3
No	211	78.1
I don't know	7	2.6

Table 4: Perceived causes of road traffic accidents among the respondents (n=270)

Variables	Frequency (n)	Percentage (%)
Vehicle-related causes		
Over speeding	62	23.0
Unfit vehicle	8	3.0
Others	200	74.1
Person-related causes		
Under age driving	109	40.4
High risk driving	10	3.7
Driver addicted	12	4.4
Unmindful pedestrian	19	7.0
Others	120	44.4
Environment/road-condition causes		
Busy road	48	17.8
Narrow road	54	20.0
Fog	44	16.3
Poor lighting	33	12.2
Others	91	33.7

Table 5: Road-safety knowledge and immediate outcome of the respondents (n=270)

Variables	Frequency (n)	Percentage (%)
Knowledge about route permit		
Yes	246	91.1
No	24	8.9
Knowledge about driving license		
Yes	213	78.9
No	57	21.1
Knowledge about signal		
Yes	238	88.1
No	32	11.9
Immediate outcome within 24 hours		
Referred	65	24.1
Local management	198	73.3
Others	7	2.6

Table 6: Association between educational status and type of injury and vehicle involved (n=270)

Variables	Bus (n, %)	Truck (n, %)	Car (n, %)	Motorcycle (n, %)	Three-wheeler (n, %)	Others (n, %)
Illiterate	2 (3.8%)	2 (3.8%)	0 (0.0%)	8 (15.1%)	28 (52.8%)	13 (24.5%)
Up to Class V	0 (0.0%)	0 (0.0%)	13 (24.1%)	20 (37.0%)	15 (27.8%)	6 (11.1%)
Class VI–XII	3 (2.0%)	4 (2.6%)	7 (4.6%)	60 (39.7%)	60 (39.7%)	17 (11.3%)
Graduate+	1 (8.3%)	0 (0.0%)	1 (8.3%)	5 (41.7%)	5 (41.7%)	0 (0.0%)

$\chi^2 = 49.22$, $p < 0.01$.

Table 7: Association between age group and type of injury involved (n=270)

Age group	Head injury (n, %)	Lacerated wound (n, %)	Cut injury (n, %)	Blunt trauma (n, %)	Others (n, %)	χ^2	p-value
<20 years	0 (0.0%)	4 (12.1%)	13 (39.4%)	8 (24.2%)	8 (24.2%)	98.44	<0.01
20–39 years	24 (20.5%)	39 (33.3%)	30 (25.6%)	24 (20.5%)	0 (0.0%)		
40–59 years	0 (0.0%)	29 (36.7%)	39 (49.4%)	4 (5.1%)	7 (8.9%)		
60+ years	0 (0.0%)	20 (48.8%)	6 (14.6%)	15 (36.6%)	0 (0.0%)		

Table 8: Association between age group and type of vehicle involved (n=270)

Age group	Bus (n, %)	Truck (n, %)	Car (n, %)	Motorcycle (n, %)	Three-wheeler (n, %)	Others (n, %)	χ^2	p-value
<20 years	0 (0.0%)	1 (3.0%)	0 (0.0%)	13 (39.4%)	8 (24.2%)	11 (33.3%)	66.272	<0.01
20–39 years	2 (1.7%)	1 (0.9%)	20 (17.1%)	45 (38.5%)	38 (32.5%)	11 (9.4%)		
40–59 years	2 (2.5%)	3 (3.8%)	1 (1.3%)	28 (35.4%)	31 (39.2%)	14 (17.7%)		
60+ years	2 (4.9%)	1 (2.4%)	0 (0.0%)	7 (17.1%)	31 (75.6%)	0 (0.0%)		

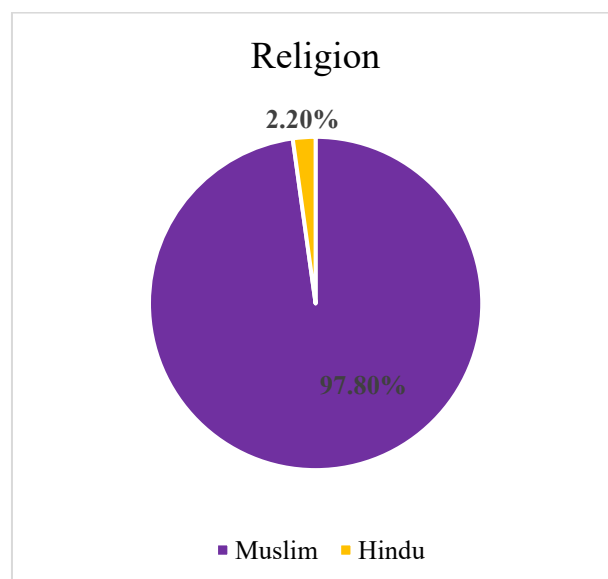


Figure 1: Distribution of the respondents by religion (n=270)

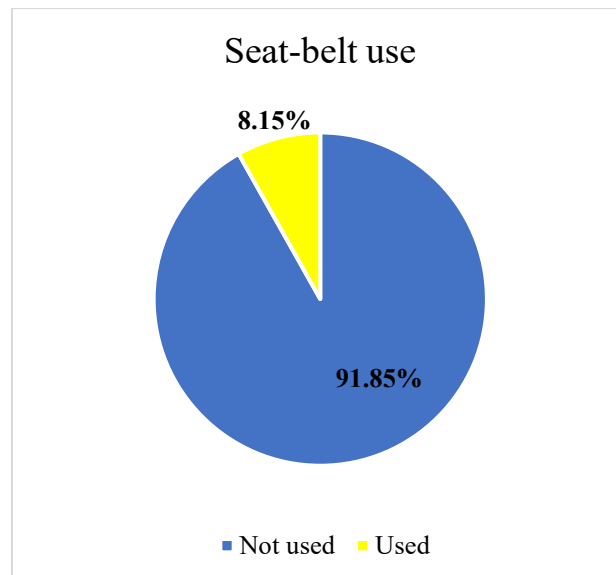


Figure 2: Distribution respondents by binding seat belt (n=270)

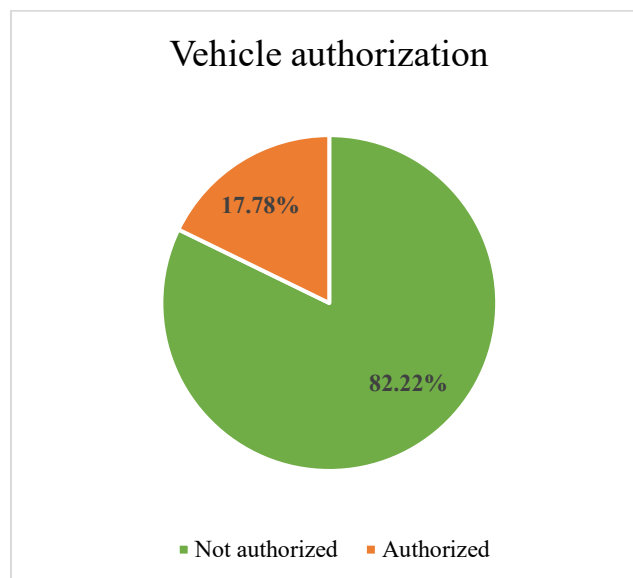


Figure 3: Distribution of the respondents by vehicle authorized(n=270)

IV. DISCUSSION

Road traffic injuries are a major public health problem and an important cause of preventable trauma, disability, and premature death, particularly in low- and middle-income countries. Globally, road traffic injuries remain the leading cause of death among people aged 5–29 years [03]. In the present study, female road traffic injury victims were predominantly young and middle-aged adults, with the largest proportion belonging to the 20–39-year age group. This finding is consistent with Bangladeshi evidence showing a substantial burden among economically productive age groups [12,13]. A considerable proportion of respondents belonged to lower-income households and had educational attainment up to secondary or higher-secondary level. Similar socioeconomic patterns have been reported in Bangladesh [13,14]. Education may influence knowledge of traffic regulations, although knowledge does not necessarily ensure safe behavior. Islam et al. reported significant relationships between educational and demographic characteristics and awareness of traffic rules among Bangladeshi road users [14]. Studies from other settings have also reported differences between knowledge of traffic regulations and actual road-user behavior [14,18]. Local roads accounted for almost all reported accident locations. Lacerated and cut injuries were prominent, while multiple-site trauma represented an important injury pattern. Singh et al. reported varied injury patterns, including lacerations and multiple-body-region injuries, among road traffic injury patients in North India [12]. Similar findings were reported among road traffic accident cases in South India [12]. Roy et al. also documented substantial involvement of multiple anatomical regions among hospitalized road traffic injury patients in Bangladesh [12]. Three-wheelers and motorcycles were the most frequently involved vehicle

categories. This finding is consistent with Bangladeshi evidence identifying motorcycles and motorized three-wheelers as important contributors to road traffic injuries [12]. The significant association between educational status and vehicle involvement ($p < 0.01$) indicates variation in exposure to different vehicle categories across educational groups. Driver-related and environmental factors have also been identified as important contributors to crash occurrence and severity [16]. Protective-device use was suboptimal, with helmet use reported by only a minority of respondents involved in motorcycle crashes. Motorcycle users are particularly vulnerable to serious head injuries. The World Health Organization reports that proper helmet use reduces the risk of death and serious head injury and emphasizes appropriate helmet standards, legislation, and enforcement [15]. Road-safety evidence also supports protective measures and compliance with traffic regulations for reducing injury severity [03,13]. More than half of the respondents perceived road conditions as poor, although most vehicles were considered to be in good condition. The absence of a duty person at the accident site was also reported by most participants. These findings indicate that road traffic injury prevention involves factors beyond vehicle condition. Road infrastructure, driver characteristics, traffic conditions, and environmental factors can influence crash occurrence and severity. Hassan and Al-Faleh identified road, driver, and environmental factors as important contributors to roadway crash characteristics [16]. Underage driving was the most frequently identified person-related factor, while narrow and busy roads were prominent environmental factors. Over-speeding was also identified among vehicle-related causes. These findings correspond with evidence that driver behavior and road conditions contribute to road traffic crashes [16]. Research on road traffic knowledge and behavior has shown that knowledge of regulations may not correspond with actual behavior [14]. Similarly, studies of attitudes and practices toward traffic regulations have emphasized the importance of compliance [18]. Although awareness of route permits and traffic signals were relatively high, knowledge regarding driving licences was comparatively lower. This difference between reported knowledge and safety practices is important because awareness does not necessarily translate into compliance. Islam et al. reported variation in traffic-rule knowledge and awareness according to demographic and educational characteristics among Bangladeshi road users [14]. Ali Abu Hussein and El-Zobeir also reported differences between drivers' knowledge of road regulations and their behavior [14]. Weather and environmental conditions may also influence road traffic injury occurrence. Nofal and Saeed reported seasonal and weather-related variation in road traffic accidents in Riyadh [17]. Although weather was not a major focus of the present study, these findings indicate the relevance of environmental conditions when interpreting road traffic injury patterns. Age was significantly associated with injury type and vehicle involvement ($p < 0.01$), while educational status was significantly associated with vehicle involvement ($p < 0.01$). These findings indicate variation in injury characteristics and transportation exposure across demographic groups. Singh et al. similarly reported age-related differences in injury patterns among road traffic injury patients in North India [12]. Many injured individuals were managed locally within 24 hours, highlighting the importance of timely and organized trauma care. Transportation, accessibility, and time to hospital care can influence injury management and outcomes. Bangladeshi studies have emphasized the substantial burden of road traffic trauma and the importance of timely healthcare access [12,13]. Overall, female road traffic injury victims experienced passenger and pedestrian vulnerability, motorcycle and three-wheeler involvement, inadequate protective-device use, poor road conditions, and unsafe driving practices. The associations between age, education, vehicle involvement, and injury characteristics indicate that road traffic injuries involve interacting individual, vehicle, and environmental factors. Road-safety approaches therefore require attention to safer roads, protective devices, enforcement, road-user behavior, and timely trauma care [03,13].

Limitations of the study: Every hospital-based study has some limitations, and the present study is no exception. The study was conducted in a single hospital with a relatively small sample size and a short study period, which may limit the generalizability of the findings to other settings. As the study used purposive sampling and collected information through interviews, selection and recall bias cannot be excluded. The cross-sectional design also limited assessment of temporal relationships and long-term outcomes.

V. CONCLUSION AND RECOMMENDATIONS

Road traffic accidents among female victims were predominantly observed among young and economically vulnerable women, with local roads, three-wheelers, poor road conditions, and multiple-site trauma representing prominent characteristics. Educational status was significantly associated with vehicle involvement, while age was significantly associated with both injury type and vehicle involvement ($p < 0.01$). These findings highlight the need for strengthened road-safety measures and targeted prevention. Community-based awareness programmes, improved enforcement of traffic regulations, promotion of protective practices, safer road and vehicle conditions, and strengthened emergency care should be prioritized to reduce road traffic injuries and their consequences.

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