ABSTRACT

Pedestrians are the most vulnerable road users in Bangladesh. Upto 50% of urban road accident deaths are pedestrians alone. In Dhaka Metropolitan City roads are hostile to pedestrians, and the danger and inconvenience of walking in turn leads people to use rickshaws, CNG, baby taxis or other motor vehicles just make the traffic worse and the city more hostile to pedestrians – a vicious circle. Yet pedestrians have received far less attention than vehicular traffic. Seven years (1998 to 2004) of pedestrian accident data were extracted from the traffic accident database. The purpose of this study is to find out the pattern of accidents by using Microcomputer Accident Analysis Package Five (MAAP 5) report. Broadly, the investigation involves collection and analyses of accident data, summarizing the findings and proposing recommendations.

The results of pedestrian accidents in different developed and developing countries and cities are used to evaluate pedestrian safety situation in Dhaka Metropolitan City with regard to that countries and cities in to encourage governments and other private agencies to adopt necessary steps to reduce pedestrian accidents.

INTRODUCTION

The problem of deaths and injuries as a result of road crashes is now to be considered as a global phenomenon and virtually all countries of the world are concerned about the growth in the number of people killed and seriously injured in the road accidents.

Nearly 60 percent of urban trips involved walking alone in Dhaka city and it is particularly prevalent for short trips (DITS). In terms of road usage, at some locations, pedestrians accounted for the highest number, representing nearly 62 percent of the total user groups in Dhaka, the capital of Bangladesh. In regard to safety, the pedestrians are of considerable cause for concern as they represent up to 72 percent of road traffic fatalities in Dhaka Metropolitan City. Commercial vehicles are found to have very high rate of involvement in pedestrian accidents and fatalities. Pedestrian accidents are a serious and growing problem in Dhaka city. Low motorisation levels, unplanned haphazard land use, road side industry, inadequate pedestrian facility and the severe lack of priority and attention given to pedestrians in the traditional transport planning and traffic management actions is the main causes of such dangerous situation.

The seriousness of pedestrian accidents problem of Bangladesh is clearly evident from the comparative data of pedestrians involvement in fatal and injury accidents for many countries in the selected developed and developing world. Current statistics revealed a deteriorating situation in Metropolitan Dhaka. Pedestrians are now making up approximately 72% of road fatalities, 45% of casualties and are involved in about 48% of all reported accidents. Over all Bhutan (59) and Nepal (50), had the highest share of pedestrian deaths whereas industrialized countries like Denmark (11.3), France (10.3), Germany (12.3), USA (11.1) has much lower deaths.

To promote and enhance road safety, urban areas of developing countries like Dhaka should have programs to implement well-known engineering and educative measures, leading to larger and longer lasting effects at low expenses, widely and systematically.

WALKING - AN IMPORTANT TRAVEL MODE

As stated earlier walking represents a significant share of all urban trips in developing countries. In regard to safety, pedestrians are of considerable cause for concern as they represent up to 70 percent of road traffic fatalities in some developing countries. Commercial vehicles are found to have very high rate of involvement in pedestrian accidents and fatalities. Since walking is a represents a major contributor to a sustainable transport strategy, it requires special
treatments. Yet pedestrian can still claim to be our most forgotten and neglected user group. Some further characteristics of pedestrians include:

- Pedestrians do not need a license to use the roads, they are a mobile group and are generally able to go almost anywhere.
- Pedestrians are dispersed across the road network and can be seen all time, day and night, in all weathers, and on all types of roads.
- They constitute the most vulnerable group of road users and, in the event of an accident with a motor vehicle, the pedestrian is the most likely to be injured - more frequently and quite seriously.
- Pedestrians need protection in the form of facilities by ensuring their legitimacy is safety and convenience.

**RISK FACTORS FOR PEDESTRIAN ACCIDENTS**

Pedestrian fatality risk as a function of the impact speed of a car

- The principal risk factor for unprotected road users is the mixing of unprotected people with motor vehicles capable of high speeds.
- Other risk factors for pedestrians and cyclists include:
  - Poor roadway facilities.
  - Poor street visibility.
  - Poor understanding on the part of pedestrians of road safety.
  - Poor design of the fronts of cars.


**PEDESTRIAN ACCIDENT SITUATION IN DHAKA**

Pedestrian is the most vulnerable road user group. In Bangladesh, with a low level of motorization, the role of walk mode is quite significant. Pedestrians have received far less attention than vehicular traffic. Up to 61 percent of urban road accident deaths are pedestrians alone. Pedestrians accounted for 51 percent of all reported fatalities in the accident database. Indeed walking appears to be a major contributor to sustainable transport strategy. Pedestrians can still claim to be our most forgotten and neglected road user group. It is the motorists not pedestrians who normally receive the attention and greater share of priority.

Accident type analysis showed ‘hit pedestrian’ as the dominant accident type both in urban and rural areas, 45 percent involvement in fatal accidents. Accident types which are highly overrepresented in fatalities and injuries are ‘hit pedestrian’, ‘head-on’, ‘running-off-the-road’ and ‘out-of-control’ vehicles. The accident analysis of 2001 presented by the National Road Safety Council in their Annual Report shows that hit pedestrian is the dominant accident type (51.4%) Source: National Road Safety Council Annual Report (2001)

**MAJOR FINDINGS OF PEDESTRIAN ACCIDENT CHARACTERISTICS ANALYSIS (Year 1998-2004; Data sources:MAAP5 Data base)**

Research on pedestrian accident characteristics and safety is concerned with accident statistics because they provided basic information on the relative importance of the many and various factors which contribute to accidents. The following are the major findings of pedestrian accidents in metropolitan Dhaka city.

1. Pedestrians accounted for 72% for all reported fatalities in the accident data base.
2. While during night time and with light and dusk /dawn conditions the proportions are 26.3% and 12.67%. City road pedestrian accident is higher than other road classes. The amount of city road accident is 98.85%
3. About 81 % fatal accident in Dhaka metropolitan involved male and 19% pedestrian accident involved female pedestrians.
4. The high rate of pedestrian causalities crash occur between the age 26 and 30 and the rate is 15% low rate of pedestrian causalities involve persons over 75 years age and the rate is 1%.
5. About 47% pedestrian fatalities in Dhaka metropolitan occurred at center of road and about 47.65%pedestrian fatalities occur on road side.
6. Nearly 11% pedestrian casualties occur on January and July individually.
7. Most pedestrian causalities related accidents occur on link sections of roads and the amount of accident is (67%) and about 99% pedestrian accident occurred on straight and flat roads.
8. Nearly 74% of pedestrian casualties occurred in daytime, 68% pedestrian accident casualties occurring between 8 A.M and 5 P.M.
9. Roads with no traffic controls constitute the most dangerous roads for pedestrians. About 85% of pedestrian casualties occurs on this type of roads. Nearly 96% pedestrian casualties occurs on two lane two-way roads.

**PEDESTRIAN SAFETY IN DIFFERENT COUNTRIES**

To evaluate the risk of pedestrian in the Dhaka Metropolitan City as well as in Bangladesh, a relative study has been made with some selected developed and developing countries. Table 1 presents that percent pedestrian fatalities and pedestrian fatalities per 10,000 motor vehicles in selected developed and developing countries.

<table>
<thead>
<tr>
<th>Developed Country</th>
<th>Percent Pedestrian Fatalities</th>
<th>Pedestrian fatality per 10,000 MV</th>
<th>Developing Country</th>
<th>Percent Pedestrian Fatalities</th>
<th>Pedestrian fatality per 10,000 MV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>11.3</td>
<td>0.20</td>
<td>India</td>
<td>10</td>
<td>1.3</td>
</tr>
<tr>
<td>Finland</td>
<td>15.6</td>
<td>0.22</td>
<td>Indonesia</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>France</td>
<td>10.3</td>
<td>0.17</td>
<td>Nepal</td>
<td>50</td>
<td>21.0</td>
</tr>
<tr>
<td>Germany</td>
<td>12.3</td>
<td>0.15</td>
<td>Sri Lanka</td>
<td>32</td>
<td>2.9</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>21.9</td>
<td>0.25</td>
<td>Thailand</td>
<td>6</td>
<td>0.3</td>
</tr>
<tr>
<td>Australia</td>
<td>14.3</td>
<td>0.18</td>
<td>Myanmar</td>
<td>na</td>
<td>na!</td>
</tr>
<tr>
<td>New Zealand</td>
<td>12.6</td>
<td>0.21</td>
<td>Malaysia</td>
<td>na</td>
<td>na!</td>
</tr>
<tr>
<td>Japan</td>
<td>30.9</td>
<td>0.34</td>
<td>Bhutan</td>
<td>59</td>
<td>4.5</td>
</tr>
<tr>
<td>Korea</td>
<td>40.2</td>
<td>1.65</td>
<td>Singapore</td>
<td>24</td>
<td>na</td>
</tr>
<tr>
<td>Canada</td>
<td>13.7</td>
<td>0.20</td>
<td>Turkey</td>
<td>15</td>
<td>na</td>
</tr>
</tbody>
</table>
From the above table and figure it is seen that the percent of pedestrian fatalities of all fatalities is the second highest among the selected countries and fatalities per 10,000 MV is the highest (58.77) position of all selected countries in Bangladesh.

Though the pedestrian fatality rate in developed countries is very low (less than 10%) than developing countries like Bangladesh, take much initiatives for reducing of pedestrian accidents developed countries. For example: variety of overhead and side-mounted signs to draw motorists’ attention to crosswalks, pedestrian crossing signs flashing because crosswalks can alert motorists to pedestrians in a crosswalk, especially at night. A wide variety of treatments has been used in the United States and other countries, with the intent of enhancing developed pedestrian safety at unsignalized crossing locations. Some devices were found to be high beneficial. VMS display panel are used to guide pedestrian. Thus, overall there are wide differences between developed and developing countries in the behavior, knowledge and attitudes of the pedestrians and the preferential treatment they deserve, their logic and technology may be sheared compensated with the condition of our country.

STUDY ON TWO DEVELOPING CITY

To verify the pedestrian safety situation of Dhaka Metropolitan City objectively, a study has been conducted in the separate urban area of selected countries of nearly same socio-economic, cultural and infrastructural condition. The finding of this study is pointout below:

In just over a decade since 1990 WHO estimates suggest that road traffic death rates per head of population between 1975 and 1998 increased by 44% in Malaysia, by 79% in India.

Special Boards of Inquiry investigated fatal traffic accidents in Delhi, India, within the main project 300-400 accidents were investigated annually. The main project included those motor vehicle accidents in which a person in the vehicle dies within three days of accidents. The causes causing fatalities were identified as Human factors accounted for 79.7%, condition of vehicle for 10.7% and traffic conditions 9.6%.

A study was conducted with the objective of studying various aspects of cranio-intracranial injuries in roadside vehicular accidents cases in India.

- The analyzed 1132 vehicular accidents, pedestrians (50.7%) and motorcyclists (18.28%) comprised most common victims.
- The common age group involved was 21-40 years (46.01%). Head injury was responsible for causing death in 71.99% of the cases.
- Most of the victims died on the spot (36.30%), incidences of crashes were highest among cyclists (78.9%) and motor cyclists (72.46%), pedestrians (6.02%).
A retrospective study analysis for a 10-year period (1976-1985) of road traffic accidents (RTA) fatalities was in Port Moresby, the capital of Papua New Guinea.

- Highest fatality rates are in the age group 15-44 years, followed by children below 14 and then adults above 45 years of age. Males were far more prone to be involved in RTA fatalities than females.
- In 40.2% of all the fatalities the accidents occurred between 6 PM to 6 AM, in 35.3% between 6 AM to 6 PM.
- Most fatal accidents occurred during the weekend. Head injury was the dominant and possible cause of death in all these categories of victims.

Source: Anil Aggrawals

Judging against the above findings with the pedestrian accident characteristics in Metropolitan Dhaka which is described, it is also evident that the safety situation of pedestrian of Dhaka is very risky and vulnerable.

**PEDESTRIAN SAFETY PRINCIPLES AND RECOMMENDATIONS**

In Dhaka Metropolitan City, there is specific need and much scope for improvements of road environment aimed at correcting the most common deficiencies through wider application of road and traffic engineering approaches. It is argued that priorities be placed on principles like traffic segregation to provide facilities and road space for the most vulnerable users particularly pedestrians and non-motorised vehicles, force correct road user behaviour (self enforcing measures) via channelisation, speed reduction measures etc. With resource constraints the greater emphasis should be placed on low cost improvement schemes. Implementation of such measures should take place at high pedestrian movement area identified by systematic accident investigation (rather than in an ad-hoc manner). To promote enhanced pedestrian safety, should have programs to implement well-known engineering, policy, enforcement, educational measures and systematic collection of accident data and research approach with sufficient infrastructural and logistic support. Some of the measures which should have initiated provided below on the basis of this analysis:

**Recommendation for Improvement in Reporting**
1. Detailed of accident incidence reporting is necessary to be developed through a good networking system in the police department.
2. Awareness campaign may be organized to make the people aware about the pure use of road. Observance of traffic week might play an important role in this respect.

**Recommendation for Enforcement Measures**
1. Rehabilitation of street hawkers from carriageways and footpaths would ensure safe vehicle and pedestrian movement.
2. Sidewalks/ Physical separations like overpasses, underpasses, and barriers can reduce the problem.
3. Elimination of curb side parking, taxi stand, bus stoppage and illegal parking from traffic congested area.
4. Speed limit should be enforced properly.
5. More traffic police should be deployed at least during the peak hours of traffic flow.

**Recommendation for Engineering Measures**
1. Raised medians, crossing islands, conventional road markings (domestic paint for pavement markings), conventional signs, side walks, pedestrian refuge, intensity of light should be installed and investigation providing better service and reduce accident.
2. Facilities for non-motorised vehicles and designated truck lanes.
3. Crossing facility by over pass with median barrier at mid block and separate phase with pavement marking at intersection mainly in front of education institution and multistoried market.
4. Installation and upgradation of median barriers, small changes/improvements in road layout and use of roundabouts.

**Recommendation for Educational Awareness**
1. Print media should publish regular columns on traffic safety rules. Electronic media should carry out regular traffic safety campaigns for the listeners and viewers.
2. A chapter on pedestrian accident characteristics and safety must be included in the primary school book.

**CONCLUSIONS**

This paper is set out to highlight pedestrian accident features in Metropolitan Dhaka. The study exhibit that a large number of pedestrian accident occurs in mid block location and major pedestrian accident occurs as collision type of hit pedestrian. Some recommendations are also proposed in this paper. Successful and effective implements of these
measures can substantially reduce the number of pedestrian accidents. Efforts to adopt, implement and assess the effectiveness of strategies that are relevant in developing countries must be given priority. It should be emphasize that pedestrian accidents are a serious and growing problem in Metropolitan Dhaka and they continue to make up a significant portion of the nations traffic death. So a great deal of research in this field is needed to analyze of accident statistics and evaluated effective countermeasures.

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