

The State of Road Safety Education for Children in Bangladesh

F. Afifah¹, M. Hossain²

¹ Student, Department of Civil Engineering, Bangladesh University of Engineering and Technology, Dhaka-1000, Bangladesh,

² Professor, Department of Civil Engineering & Director, Accident Research Centre (ARC), Bangladesh University of Engineering and Technology (BUET), Dhaka-1000, Bangladesh

Abstract: Road traffic injuries are a major cause of death and disability globally, with a disproportionate number occurring in developing countries. With the increase in urbanization and mobilization road safety has become a threat to vulnerable road user groups, children in particular. It is important to note the percentage of children under 15 killed in road crashes in developing countries is currently almost three times higher than that in highly motorized industrialized countries. In developing country like Bangladesh, this problem is degrading with increasing number of road accident deaths due to growth in population, motorization and urbanization. In Bangladesh, each year at least 3000 people are reported to be killed in road accidents of which 21 percent are children under 16 years of age. This paper represents some findings of the research study on road accidents involving children, the importance and state of road safety education for children in Bangladesh, the necessity of road safety education based on child development and highlights few measures for their safety improvements in Bangladesh.

Keywords: Child Road Safety; Road Safety Education; Developing countries; Traffic injury

I. Introduction

According to recent studies (WHO) road traffic claim more than 1.2 million lives each year and have a huge impact on health and development. Every 30 seconds a person is killed in a road crash - more than 3300 per day. The majority of these deaths, about 70 percent occur in developing countries. Sixty-five percent of deaths involve pedestrians and 35 percent of pedestrian deaths are children. Over 10 million are crippled or injured each year. It has been estimated that at least 6 million more will die and 60 million will be injured during the next 10 years in developing countries unless urgent action is taken. According to WHO road traffic injuries are the leading cause of death among young people aged between 15 to 29 years and costs governments approximately 3% of GDP. In Bangladesh, 37% accidents occur in urban areas and 63% accidents occur in rural areas. Of all the collision type accidents, hit pedestrian account for 45% of total accidents. In urban areas, pedestrian accounted nearly 63 percent of the total fatalities. Of the total pedestrian death nearly one-third are children under 16 years of age. In fact, children under 16 years of age represent about 21 percent of all fatalities (MAAP5). Indeed, the recent UNICEF study revealed that the road traffic injuries are the leading causes of fatalities to children age group of 10-14 years. This clearly demonstrates the high risk of children in traffic accidents in Bangladesh. The paper presents some findings of the research study on road accidents involving children and highlights few measures for their safety improvements in Bangladesh.

II. Children Road Safety Situation In Bangladesh

Accident Research Centre (ARC) of Bangladesh identified pedestrians as the most vulnerable road user's group in developing countries like Bangladesh. The incidence of risk of children in road accident is also very serious in Bangladesh. Children, in general, are involved in more accidents in developing countries than those in developed countries. Every year more about three thousand people are killed in road accidents (according to the reported data) in Bangladesh and 21% (Table 1) of them are children. But this figure is only about 4% in the developed countries. Figure 1 shows the children fatalities rates in different countries including Bangladesh.

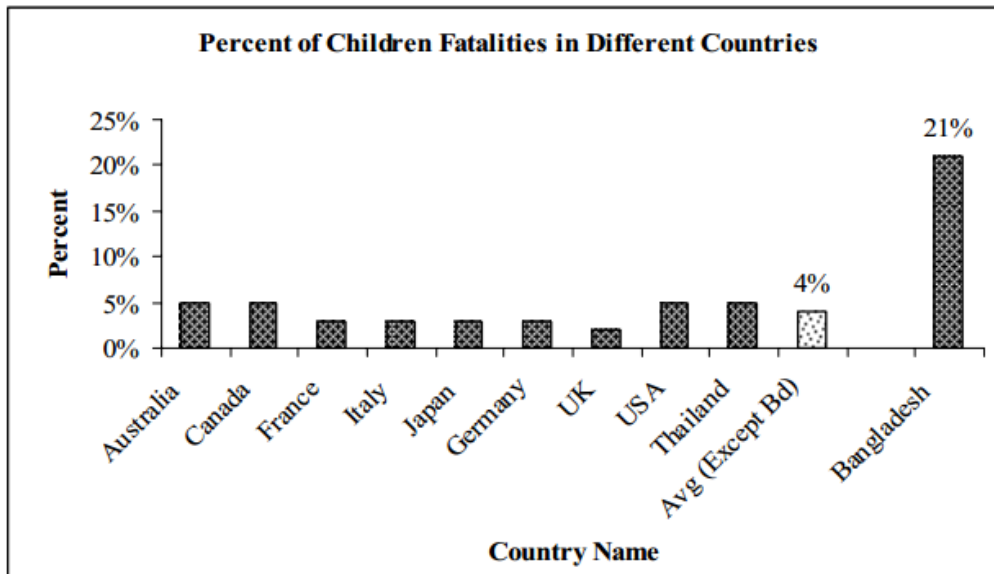


Figure 1: Percentage of Children Fatalities in Different Countries

Source: IRTAD-2005 and ESCAP-2006

Table 1: Children Fatalities and Injuries in Bangladesh (2003-2013)

Year	Total Fatalities	Fatalities	Children Fatalities	%	Total Injuries	Injuries	Children Injuries	%
2003	3334	2667.2	666.8	20	3740	3366	374	10
2004	3150	2488.5	661.5	21	3026	2753.66	272.34	9
2005	2960	2279.2	680.8	23	2570	2261.6	308.4	12
2006	3250	2535	715	22	2412	2194.92	217.08	9
2007	3341	2639.39	701.61	21	2431	2187.9	243.1	10
2008	3570	2820.3	749.7	21	2416	2174.4	241.6	10
2009	2703	2135.37	567.63	21	1746	1571.4	174.6	10
2010	2443	1978.83	464.17	19	1706	1518.34	187.66	11
2011	2052	1580.04	471.96	23	1416	1288.56	127.44	9
2012	2699	2132.21	566.79	21	1307	1176.3	130.7	10
2013	2547	1986.66	560.34	22	1350	1215	135	10
				Avg=21%				Avg=10%

Children Accident in Urban and Rural Areas

Children fatality rates in rural and urban areas are significant among all aged groups of people. Children in rural areas are more vulnerable to road accident than those in urban areas (Figure 2). Fatality rate in rural areas (76%) is about three times higher than those of the urban areas (24%). Injury rate in rural areas (62%) is about one and half times higher than those of the urban areas (38%).

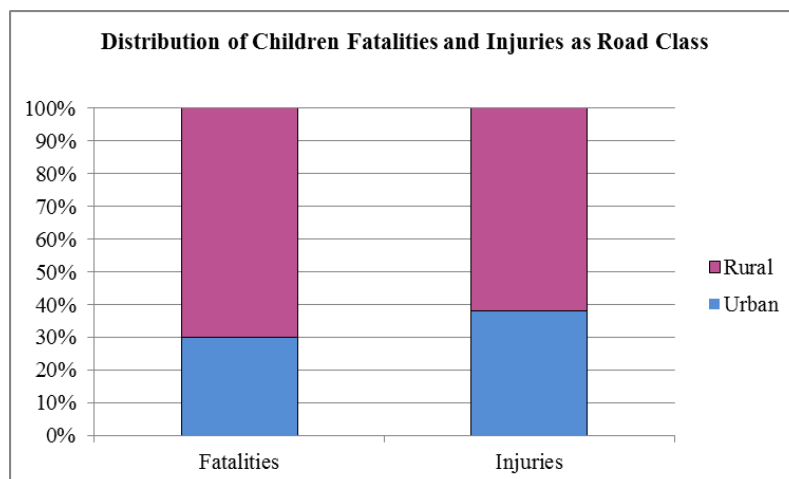


Figure 2: Comparison of Fatalities and Injuries in Urban and Rural Area (1998-2013)

Source: Police reported MAAP Database

The Distribution of Fatalities and Injuries by Road Classes

The distribution of fatalities and injuries involving children by road classes is shown in Figure 3. It can be seen that 37 percent of the children fatalities occurred on the National Highways, which is about one third of the total children fatalities. From Figure 3 it is also seen that the National Highways contributing at least 37% of all children fatalities is two times higher than those Urban Roads (16%) whilst children injury rates are more or less same for both in National Highways and Urban Roads (32%).

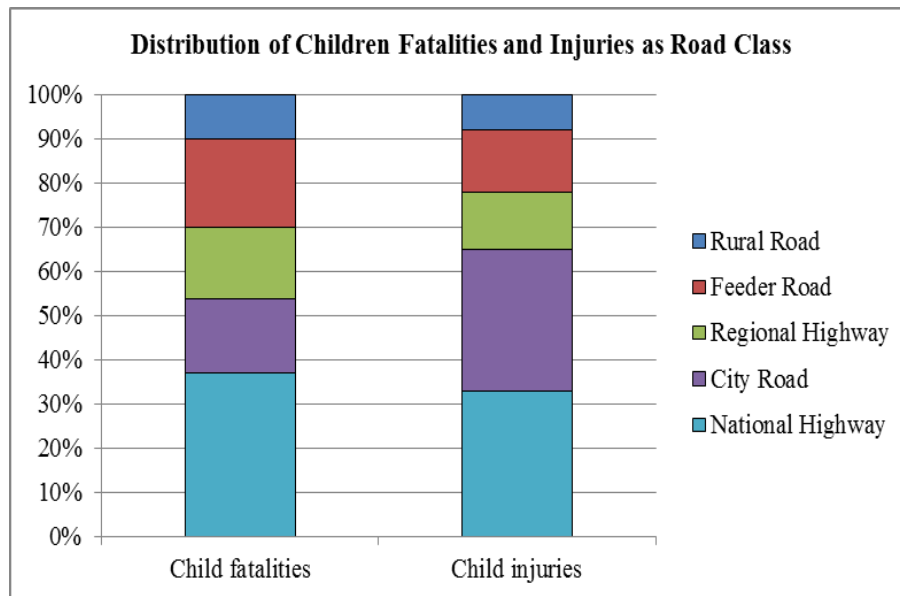


Figure 3: Distribution of Children Fatalities and Injuries as Road Classes (1998-2013)

Source: Police reported MAAP Database

Child Fatality by Age Group:

At present road traffic accidents are most concerning phenomenon in Bangladesh. To prevent road accident, many countermeasures are implemented. But often, these countermeasures do not address any action against children protection issues. It is important to determine which age groups of children who are dominant in accidents. Table 2 presents the distribution of children fatalities and injuries by different age groups. The dominant age group of 6-10 years in fatalities, 39 percent, perhaps reflects their inability to cope with the complexity of traffic. However this needs further investigations. The 11-15 years age group and children upto 5 years also predominate in casualties.

Table 2: Age Wise Distribution of Children Fatalities (1998-2013)

Children Age	Fatalities	%
0-5	747	27%
6-10	1080	39%
11-15	720	26%
16-18	221	8%
Total	2768	100%

Source: Police reported MAAP Database

Hourly Distribution of Child Fatalities

In Figure 4 the time distribution of child and adult fatalities are presented which shows that child casualties peaked during 10-12 noon with the high level of their involvement during the entire day period. The periods with the greatest involvement of children in accidents thus seem to be related with the school activities. The second peak occurs during 16 to 17 afternoons. This seems to be related with children going to the playground. The involvement of adults in hourly accident is far less than the children.

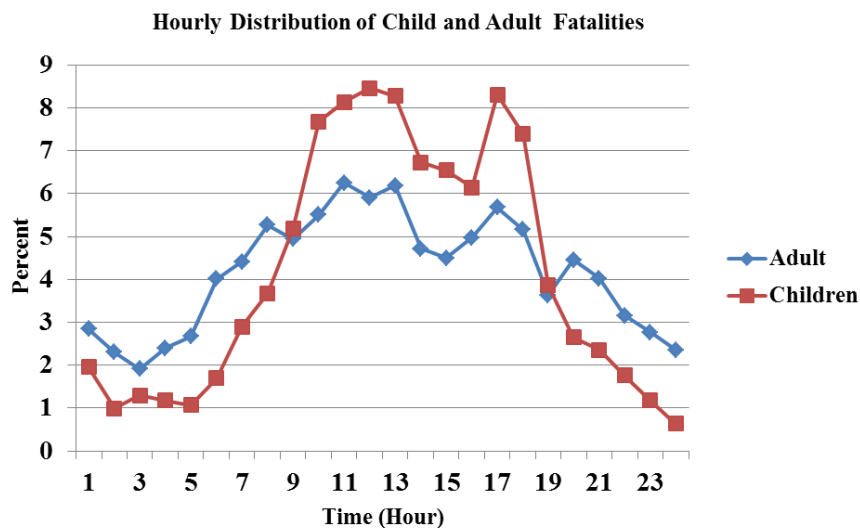


Figure 4: Hourly Distribution of Child and Adult Fatalities (1998-2013)

Source: Police reported MAAP Database

III. The Risk Of Children As Road Users

Pedestrian accidents are one of the most prominent causes of premature injury, handicap and death in the modern world. In children, the problem is so severe that pedestrian accidents are widely regarded as the most serious of all health risks facing children in developing countries. In Asia, Africa, the Caribbean and the Middle East, more than 40 per cent of reported road accident deaths are pedestrians, compared to ‘only’ about 20 percent in Europe and the United States. (IRTAD, TRL) Accidents involving children less than 16 years of age on average contribute to 20 percent of pedestrian fatalities in developing countries making them a major safety problem and cause for concern. (IRTAD, TRL)

For Bangladesh of all the reported road accident deaths about 72% of reported road accident injuries are pedestrians. From figure 5 it is evident that 24% of fatalities, due to road accidents, are passengers. 4% of the child’s death is as a driver. Illegal driving, driving without a license is the reason for such accidents.

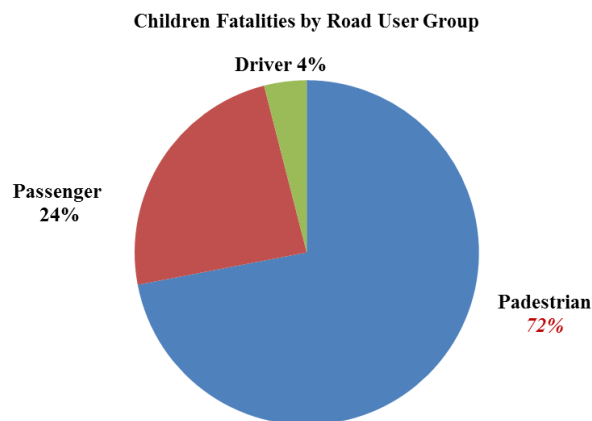


Figure 5: Children Fatalities by Road User Group (1998-2013)

Source: Police reported MAAP Database

Every year a lot of children die in road accidents as pedestrians. Although investigators have categorized pedestrian actions leading to injury into more than 30 types, relatively few actions account for the majority of injuries in children. From figure 6 “Crossing Road” types of injuries, in which the child crosses the road at an intersection or other place, account for more than 50% of the total injuries among children. “At Road Side” types of injuries account for 30% of the total injuries. These two are the major causes of children pedestrian road accidents in Bangladesh. The accident due to playing on or besides roads is about 15%.

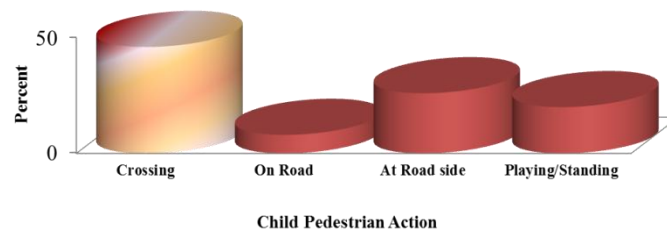


Figure 2: Child Pedestrian Action (1998-2013)

[Source: Police reported MAAP Database]

Children Accident in Urban and Rural Areas

The scenario of children fatality rates in rural areas and urban areas is significantly different. Children in rural areas are more vulnerable to road accident than those in urban areas (Figure 7). Fatality rate in rural areas (70%) is about three times higher than those of the urban areas (30%). Injury rate in rural areas (64%) is more than two times than those of the urban areas (36%).

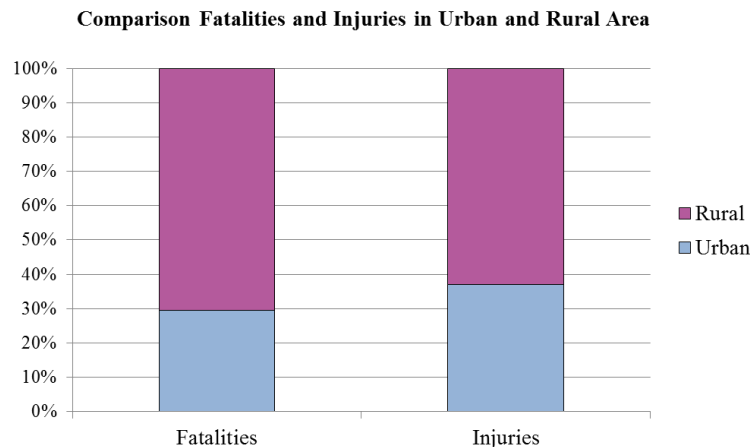


Figure 7: Children Fatalities and Injuries in Urban and Rural Areas (1998-2013)

Source: Police reported MAAP Database

The Vulnerability of Children on Road

The risk to children in traffic is greatly increased with increases in motorization and urbanization. Moreover the traffic environment that we have today is designed by adults, invariably from the point of view of adult behavior. Several factors are outlined below that contribute to the risks to children in developing countries (ADB 1996)

- 1) Both speed and volume of motor vehicles will increase, especially on rehabilitated roads.
- 2) roadside friction will continue as poor land use planning, operational control, and limited road space lead to conflicting uses of road and road margins;
- 3) Road improvements tend to focus on motor vehicle requirements and not on pedestrian needs.
- 4) traffic police can offer only limited help as they are poorly equipped to control motor vehicle traffic and not properly trained to consider pedestrian needs; and
- 5) Most parents are unable to provide road safety training to children as they themselves never received any such training and even if they did, traffic conditions have changed dramatically since their childhood.

Moreover, many children in rural areas use the highway for going to schools. Therefore both vehicles and children use the same facility. This is a major reason for accidents to take place in rural areas. On the other hand, overspeeding of vehicles, careless of drivers, narrow pedestrian footpath, and narrow road without footpath are some reasons for accidents to occur in urban areas.

Child Development and Road Safety Education

Child development refers to the biological, psychological and emotional changes that occur in human beings between birth and the end of adolescence. A child as a pedestrian has to perform certain tasks which require the deployment of several psychological abilities at the same time. *Detecting the presence of traffic*

involves visual search; resistance to distractibility; co-ordination of visual and auditory information; and the perception of crossing locations as safe or dangerous. **Visual timing judgments** require the pedestrian to determine a vehicle's direction and rate of movement. **Co-ordinating information from different directions** where a pedestrian rarely has to deal with traffic approaching from a single direction: thus, timing and other judgments must be made in relation to vehicles approaching from two or more directions. **Co-ordinating perception and action** involves the ability to relate the time *available* for crossing to the time *required* to cross. Depending on age, the ability of children to perceive information is assimilated and developed differently. The theories of Jean Piaget are often considered when trying to explain children's behavior patterns in road traffic that differentiated between the following four levels of development. (Soori, H.2009)

Sensori-motor Stage (up to the age of 2)

During this period, infants are busy discovering relationships between their bodies and the environment. This is the basis for future thinking processes. Studies note that children are at increased risk of pedestrian injuries in driveways and other relatively protected areas during this stage

Pre-operational Stage (approx. 2-6 years)

During this stage, children begin to engage in symbolic play and learn to manipulate symbols. Their own perceptions, feelings, expectations and fears dictate their actions. At this level of development, children are barely able to project themselves into the role of another person.

Concrete operational Stage (approx. 6-12 years)

Piaget determined that children in the concrete operational stage were able to incorporate inductive logic. On the other hand, children at this age have difficulty using deductive logic, which involves using a general principle to predict the outcome of a specific event. They are still not able to cope with abstract concepts (e.g. time or speed) but can deal with concepts which are tangible (e.g. distance to school, size of a car). At this stage 'traffic education' can be attempted but in actual or simulated conditions rather than theoretically in a classroom.

Formal operational Stage (approx. 12 years of age and over)

At this stage children are able to think abstractly. They are in the position to detect, assess and avoid risks. They generally understand the complex rules of traffic and practice them even in an unfamiliar locality. Traffic education can be attempted using films, models or other theoretical instructions (Schieber & Thompson, 1996).

The Current Condition of Road Safety Education in Bangladesh

The current road safety education for children in Bangladesh fails to modify with the child's stage of development. There is no practical training for a child to be an independent pedestrian and no bicycle skill development in the education program. Bangladesh National Curriculum Board introduces road safety education to children of age 8 to 9 years old. Road safety knowledge is imparted in the form of a small story 'Nirapode Cholachol'. 'Amar Bangla Boi' assigned for class three contains this small story on page 94. No practical lesson is provided to children. BRTA Road Safety Cell has developed a material to reduce child road traffic injuries. The materials have been produced for the education of children and adults living in rural areas to raise awareness of the dangers of roads and traffic and to develop safe behavior when using roads. They are intended to be used by teachers and community instructors. Also ARI also published a book about road safety guidelines for children in 2015.

Child Road Safety Improvement Options

The success in improving safety for children on road in Bangladesh could be achieved through combined measures to address the behavior of all road users, to improve the road environment and to design vehicles that better protect both their occupants and those at risk outside the vehicle. Child road safety policy and practice should focus three key areas: education, training and publicity; the road environment; and vehicle standards and safety equipment particularly emphasizing safety of children as pedestrians. (Hoque et al., 2006)

Education, training and publicity

Educational measures need to be modified to the child's stage of development, starting with practical training pedestrians as pedestrians, then bicyclist skill, and increasingly involving higher-level skills to match children's increasing independence as pedestrians, passengers and bicyclists. All road users have a duty to keep children safe, so it is also important to target drivers through training and publicity and to make parents aware of their key role in improving the safety of their children. In particular, parents are important role models for their children and can inculcate safe behavior as pedestrians and passengers. (Hoque et al., 2006)

Safer Infrastructure

Helping children and other road users to adapt their behavior in order to interact safely with traffic in the road environment is only part of what is needed to keep children safe. Traffic engineers, urban designers and planners have a duty to design systems that take account of children's mobility needs, travel behavior and differences in perceptual and reactive capabilities in order to maximize their safety and mobility. Children cannot be expected to comprehend aspects of the built environment and react to stimuli in the same way as adults. (Hoque et al., 2006)

Vehicle Standards and In-Car Safety

The third element to children's road safety is the design of vehicles and safety equipment. Vehicle standards cover both "primary safety" measures that reduce the risk of a crash occurring and "secondary safety" measures that are designed to prevent or minimize injury in a crash. It is these secondary safety measures that are most likely to be specifically designed to increase child safety. Vehicle design should incorporate passive safety systems such as crumple zones, airbags and safety door and window locks. (Hoque et al., 2006)

Regulatory and Engineering Enforcement

Vulnerable road users are much more susceptible to accidents when vehicle speeds are high and can even suffer fatal injuries in accidents with motor vehicles at moderate speeds. Thus the most critical and effective measure which should be immediately adopted in every country is to reduce and control speeds particularly in urban areas. This measure alone will greatly reduce the overall number of road deaths as shown by the experience all over the world (e.g. the number of fatalities was reduced by 32% in urban areas after speed limits of 50 km/h were enacted and strictly enforced in Hungary). (Hoque et al., 2006)

Proposed Education and Training for the Children

Young children do not have the skills to stay safe in traffic. They often can't see past parked cars and they don't have the experience to judge the speed and distance of an oncoming car. Parents and carers should teach children good traffic safety habits early. Also, parents should be awarded for their child's school or pre-school to consider road safety education programs.

Children learn about road safety by watching others. Every parent should always set a good example in front of them. The following tips will help in assisting children to be safe in traffic.

- Children up to five years of age. Always carefully supervise your children in traffic situations:
 - **Hold** your child's hand when you are near cars.
 - **Explain** what you are doing when you cross the road together. This helps your child to understand how you decide when it is safe to cross.
 - **Set** a good example for your child to copy.
 - **Involve** your child in choosing safe places to play.
 - **Ensure** your child always rides on the footpath or a bicycle track with supervision.
 - **Make** sure you get your child in and out of the car on the kerb side.
 - **Insist** that children wear an appropriate and properly adjusted child restraint or seat belt on every car trip.
 - **Ask** your child's pre-school to run a road safety program.
- From five to nine years of age. Supervise your child at all times near traffic:
 - **Talk** about signs and traffic lights. Identify and discuss places where it is safe to cross the road.
 - **Teach** your child how to cross roads using the 'stop, look, listen and think' process - stop at the kerb, look and listen for traffic and then decide whether it is safe to cross. Take the trip to school together along the safest footpaths and use safe crossing places.
 - **Supervise** your child on the way to and from school.
 - **Limit** bike riding to parks, playgrounds or schoolyards and on the footpath with supervision - never on the road without an adult.
 - **Insist** that your child wears an approved helmet when riding a bike.
 - **Insist** that your child wears an appropriate and properly adjusted seat belt or child restraint on every car trip.
 - **Ask** at your child's school what traffic safety programs are being taught.
- From 10 to 13 years of age. Children of this age can cope more safely in traffic on their own, but you can still help:
 - **Check** that your child always 'stops, looks, listens and thinks' when crossing the road.
 - **Tell** your child about road laws in simple terms. Go for rides and walks together.
 - **Plan** safe routes to school and places your child often visits.
 - **Talk** about where the child can safely ride.

- **Insist** that an approved bicycle helmet is worn.
- **Make** sure your child wears colors that are easy to see.
- **Insist** that properly adjusted seat belts are worn on every car trip.
The following points need careful considerations regarding children road safety-
- Young children do not have the skills to be in road traffic on their own.
- An adult should always be with children in traffic situations.
- Children learn road safety habits by watching and copying others, so set a good example.
- Explain traffic movement, road safety and road rules to your child
- Make sure your children wear helmets when riding and are properly secured when travelling in cars.

IV. Conclusion

Children and young people are at significant risk in the traffic situation compared with many other countries of the world. With traffic on roads becoming increasingly busy it is important for all of us to teach children from a young age to be aware of the traffic rules and regulations. Years ago children could ride down the street without a care in the world but time have changed and with more cars, scooters, bikes, motorbikes, buses and heavy vehicles on the road than ever it is imperative we all stay safe. Awareness of the consequences of road traffic injuries is lagging among policymakers and the general public in Bangladesh. What's needed is incorporation of comprehensive road safety programs into national planning in developing countries. This paper has discussed some preliminary findings of child road safety research in Bangladesh. Indeed, children are the prospect of the nation. They will escort the nation tomorrow. Safe and sustained road safety environment must be ensured for the children.

References

- [1]. ADB. (1996). Road Safety Guidelines for the Asian and Pacific Region. Manila: ADB.
- [2]. ALLAN QUIMBY, "Teaching children in developing countries to be safe road users", TRL Limited (International Division), UK
- [3]. BRTA. (2002). Road Safety Education for Children and Adult Pedestrians in Rural Areas . Dhaka: IMCT
- [4]. DaCoTA. (2013, March 14). Children in Road Traffic. Retrieved January 05, 2016, from European Commission Directorate General for Mobility and Transport:www.dacota-project.eu
- [5]. ESTHER MALINI, D. J. VICTOR, "Road safety education for children", Karunya Institute of Technology,Coimbatore&Indian Institute of Technology, Madras
- [6]. Hoque M.M. and Mahmud, S. M. S. 2007.Child Injuries Resulting from Road Traffic Accidents in Bangladesh, 16th International Conference on Safe Communities, Tehran, IR Iran, 11-13 June, 2007, pp-862-863.
- [7]. Hoque M.M., Azad, A.K., Mahmud, M.I. and Mahmud, S. M. S. 2006.The Risk of Children in Road Traffic Accidents in Bangladesh, International Conference Proceedings on "Road Safety in Developing Countries", BUET, Dhaka, 22-24 August, 2006.
- [8]. KEEPING CHILDREN SAFE IN TRAFFIC – ISBN-92-64-10629-4 © OECD 2004
- [9]. OECD, ROAD TRANSPORT RESEARCH, International Road Traffic and Accident Database (IRTAD) (2005). Accident Statistics, OECD/BAST
- [10]. Sayar. I. A. and others, 1997. Improving road safety education in developing countries; Ghana.TRL Report 265. Crowthorne: Transport Research Laboratory.
- [11]. Soori, H.(2009). Report on Risk Factors for Road Traffic Injuries in Children
- [12]. WHO. (2014). Report on Injuries and violence the facts 2014.
- [13]. WHO. (2015). Report on Global Status Report on Road Safety 2015