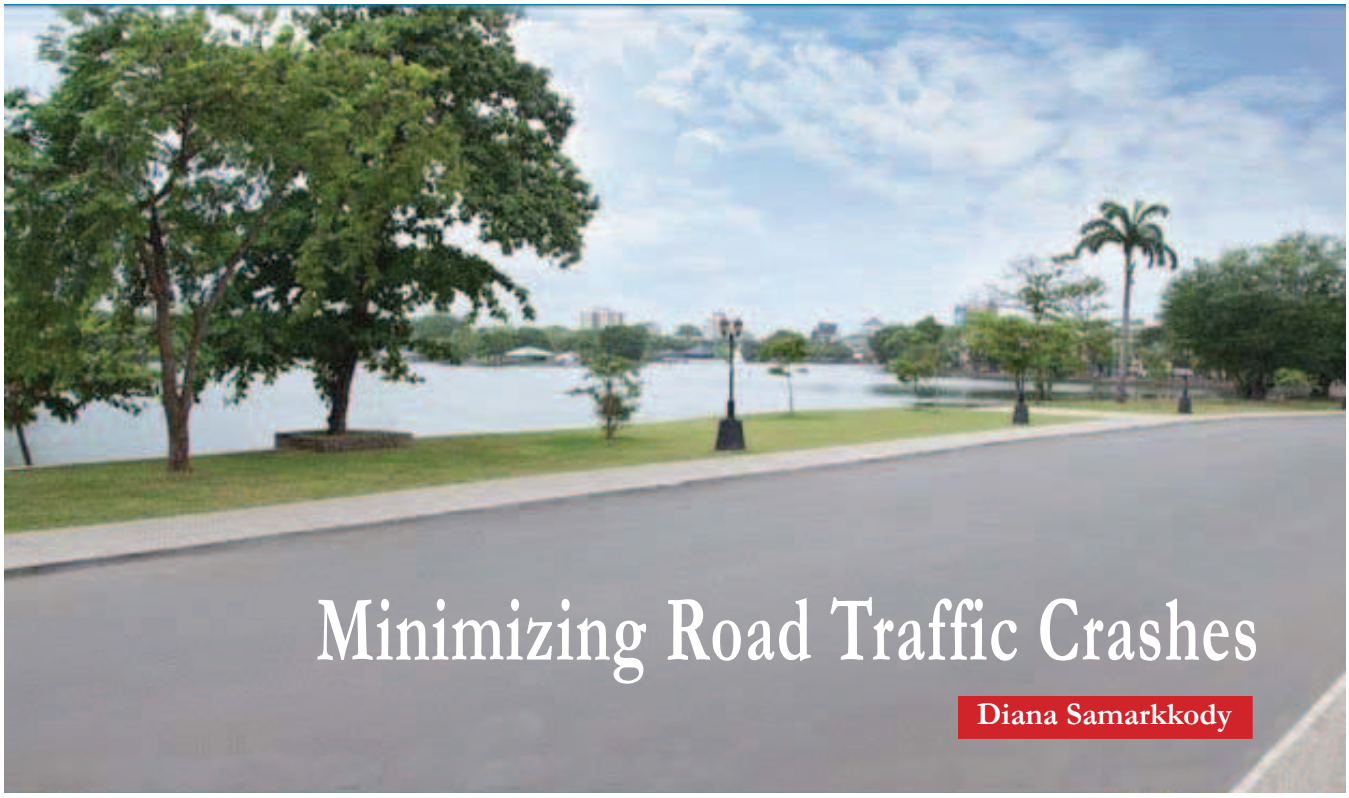

Minimizing Road Traffic Crashes

Diana Samarkkody

It was the end of last day of the term. Kumara, who was in grade7, came with his friends to cross the busy street outside his school to get to the bus stop. Their view was partially blocked by an unauthorized construction on the walk way. They were also in cheerful mood and didn't look carefully before rushing to cross. Kumara didn't see the speeding motorcyclist until it hit him.

Kumara's life was cut short and the motorcyclist, who was not wearing a helmet, suffered severe head injuries.

What is Road Traffic Crash?

Road Traffic Crash is an incident that occurs when a moving vehicle collide with another vehicle, persons or property. Road Traffic Injury is the physical damage as a result of sudden exchange of energy from the moving vehicle to the body during a Road Traffic Crash. One road traffic crash may kill and injure several people as well as damage property.

What is the burden of Road traffic crashes?

Road traffic injuries are a major public health problem in Sri Lanka. According to the Department of Police data, the total number of road traffic crashes in 2010 was 35,496 killing 2,483 people. This gives an average of seven persons dying each day from traffic crashes. In addition to these deaths, 6,021 people had incurred serious injuries leading to permanent disability. Moreover 14,698 "damage only" accidents were reported in the same year. Majority of those killed and injured are young males, between the ages 15-44 years, who could have contributed to the development programs of the country.

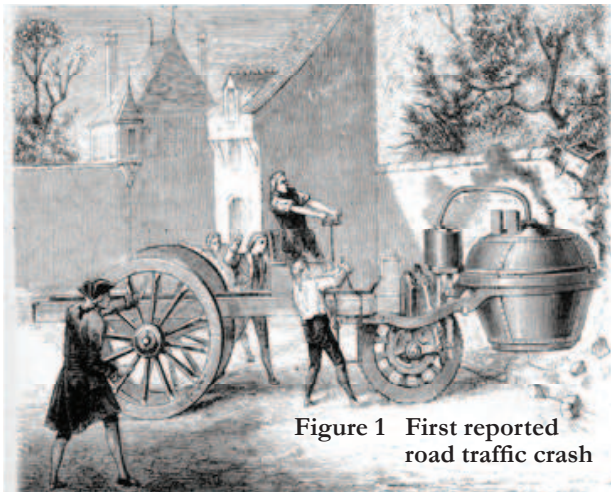

Figure 1 First reported road traffic crash

Trend in road traffic crashes over the years

As can be seen in table 1, during the last three years (2008-2010) the number of

road traffic crashes and fatalities have increased by 1.6 fold and 1.5 fold respectively. The number of registered motor vehicles and length of roads also have increased in a similar manner.

Table 1 Trends in road traffic crashes, fatalities, motor vehicles and length of roads in Sri Lanka

	2008	2009	2010	**Increase**
Road crashes	30426	33721	35496	1.16
Deaths due to RTC	2157	2225	2484	1.15
Motor vehicles (10,000)	3 390 993	3 595 068	3 954 311	1.16
Roads (10,000 km)	11 696.9	11 696.9	12 487.92	1.06

Risk factors for road accidents

Road accidents occur as a result of complex interactions between the road user, environment and vehicle.

Several risk factors operate on these three components before, during, and after a crash resulting in a road traffic injury or death. It is important to identify the risk factors that contribute to road traffic crashes in order to identify interventions that can reduce the occurrence of crashes.

William Haddon , an engineer, widely considered as the father of modern injury epidemiology developed a framework to describe risk factors operating before the crash, during the crash and after the crash, in relation to the road user, the vehicle, and the environment (Table 2). This is named as the Haddon matrix, and which helps in identifying all factors associated with a crash.

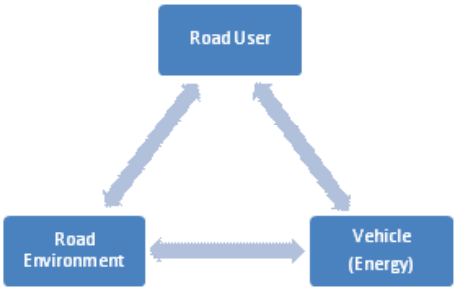

Figure 2 Mechanism of road crashes

Pedestrians, drivers, passengers, riders and pillion passengers are the road users. Among them, the pedestrians, cyclists and motor cyclists are the most vulnerable roads users as they are at higher risk of meeting with a road traffic crash due to following reasons.

- Readily exposed to the traffic environment
- Appear unpredictably in the traffic environment
- Unstable and may fall on the traffic environment

Speeding, overtaking at inappropriate places, turning without signals are the main risk factors for crashes related to road users. Inexperienced driving, driver fatigue, carelessness, negligence and non compliance

Table 2 Risk factors for road traffic crashes (Haddon Matrix)

Phase	**FACTORS**		
	Road User	**Vehicle (Energy)**	**Road Environment**
Pre Crash	Lack of supervision Lack of knowledge Alcohol Mobile phone use Speeding	Lack of roadworthiness of vehicles Overloading	Poor road design, No enforcement of law No safety barriers No speed limits
Crash	Not using protective equipments (Restraints, helmet)	No protective devices, poor design to withstand crashes	Road side objects
Post Crash	Lack of resilience	Difficult to access to victim	No first aid at scene, no emergency transport system

with road rules by road users are also contributing to crashes.

Not using or improper use of protective equipments such as seat belts and helmet are the risk factors that operate during a crash, which give rise to an unfavourable outcome following a crash. Lack of pre-hospital trauma care and emergency transport systems also contribute to a high number of deaths and long term disability following a road traffic crash.

Poorly designed roads that are without pedestrian foot walks, narrow shoulders, inadequate lighting and road markings, unavailability of road signs and traffic signals, are some of the risk factors related to the road environment. High traffic volume, with no separate lanes for different road users, presence of inappropriate construction work on sidewalks, and absence of play areas for children also contribute to road crashes. Unfavorable weather conditions and darkness of the environment are other environment related risk factors for increasing road crashes.

Running vehicles with mechanical defects such as ineffective brakes and lighting systems, and vehicles without protective mechanisms such as seat belts and airbags also contribute to road traffic crashes.

How to prevent road crashes

Prevention of road crashes is the process that involves management of the road user, the vehicle, and the environmental attributes in such a way as to minimize the number of road traffic crashes.

Prevention of road crashes can be described in relation to the three phases, pre crash, crash and post crash, to address the risk factors identified according to the Haddon Matrix.

For the pre-crash phase, countermeasures that prevent the crash from occurring are implemented. This is called primary prevention of road crashes. Setting of speed limits, educating public on road safety are some of the primary prevention measures.

The crash phase or secondary prevention is associated with countermeasures that prevent injury from occurring or reducing its severity if it does occur. Following a crash we can take measures. All preventive activities during post crash phase, to avoid death and limit long term disabilities, are tertiary preventive measures.

The interventions to prevent road traffic crashes and injuries can be categorized into three categories based on the practical approach they employ.

Disciplinary driving - minimizes road accidents

Education programs

This approach aims to change the attitudes, beliefs and behaviour of the community. (For example, media campaigns, public awareness campaigns etc. on road safety).

Environment modification programs

This approach aims to make the road and the vehicles safer, to prevent a crash event. (For example creating foot paths).

Enforcement of law

This approach aims at the enforcement of safety legislations to support the implementation of behavioural and environmental change, to reduce occurrence of crash and injury (For example laws on wearing helmets, regulations about safe building and roads).

It is essential to implement components from each of these categories to minimize road traffic crashes and their unfavourable consequences.

Diana Samarakkody
(MBBS, MSc. MD)
Consultant Community Physician,
Injury Prevention Division,
Non Communicable Disease Unit,
Ministry of Health

Southern Expressway .....

Access to Southern Expressway from Matara

- Vehicles approaching from Matara on A002 road should take the right turn 3.2 km before Galle, passing 121st km post and travel 5.2 km to reach the Interchange at Pinnaduwa.

Access to Southern Expressway from Galle

- Vehicles approaching from Galle on A002 road should pass the Galle Town area and the 120th km post, take the left turn, travel 5.2 km to reach the Interchange at Pinnaduwa.