

# ALCOHOL AND ROAD TRAFFIC INJURIES IN SOUTH ASIA: CHALLENGES FOR PREVENTION

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## ABSTRACT

Among the one million people killed on the roads during 2000, nearly 75% died in developing countries of the world, about half of them in Asia. A selective examination of RTIs in the region indicate that they constitute the second or third leading cause of death in the 5-44 years age group.

The increase in direct and indirect health risk associated with alcohol usage has been well-documented in recent years. Alcohol is a major risk factor for RTIs as it impairs judgment and increases the possibility of involvement in other high risk behaviours (e.g., speeding, violating traffic rules, etc.). Precise information on the involvement of alcohol in RTIs and deaths is clearly not available from South Asian countries.

With the recognition that road safety needs to focus on reducing drinking and driving, many high-income countries have formulated and implemented a number of coordinated, integrated and sustainable programmes based on scientific research. Considering the gravity of the situation, ongoing efforts to reduce the problem and lessons learnt from high-income countries, it is important to change strategies and mechanisms to reduce drink driving in South Asia.

**KEY WORDS:** *Alcohol. Risk factor. Impact on road safety. Enforcement.*

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## INTRODUCTION

The South-Asia region comprising of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka is characterized by great diversity evident in terms of size, demographic and socioeconomic characteristics. The region is densely populated with nearly 25% of the world's population in around 5% of the global land area. The region has a population of 1.4 billion and is undergoing rapid sociodemographic and epidemiological transition.<sup>1</sup> The unprecedented motorization, industrialization, urbanization and media revolution combined with demographic transition and health transition has brought road traffic injuries (RTIs) to the forefront of the health care delivery system.

## THE CHANGING SCENARIO

Among the one million people killed on roads during 2000, nearly 75% occurred in developing countries of the world with nearly half of them occurring in Asia. A selective examination of RTIs in the region indicate that they account for the second or third leading cause of death in the 5-44 years age group.<sup>2</sup> All countries of the region have experienced an increase in road traffic injuries and deaths during the last two decades. From 1,597 road accident deaths in 1994, the number has increased to 3,314 in 1999 in Bangladesh. The fatality rate is 70 per 10,000 vehicles—25 times higher than for any developed country.<sup>3</sup> In India nearly 80,000 people were killed and 272,000 injured according to official figures in 2000.<sup>4</sup> In Nepal, RTIs are a major cause of concern with more than 900 people getting killed on roads.<sup>5</sup> Sri Lanka has witnessed rapid motorization with a consequent increase in RTIs to nearly 4,000 deaths a year.<sup>6</sup> Data from Pakistan reveal that there was a 14-fold increase in total number of vehicle crashed and

deaths increased by nearly 16 times (302 to 5,280) during 1956-9

In the absence of reliable health information, the precise number of those injured and disabled is not clearly known for many countries. Deaths are only the tip of the iceberg with many more hospitalized and disabled. For every reported death, it is estimated that nearly 30-50 are hospitalized and about 50-100 would receive care in emergency rooms of various hospitals.<sup>9</sup> The majority of those injured and killed are males aged 5-44 years, thus resulting in significant socioeconomic losses to the society. A substantial number of those killed, injured and disabled are pedestrians, riders and pillions of motorized two wheelers, bicyclists (collectively referred to as vulnerable road users) in South Asian countries.<sup>10</sup> It is estimated that the economic loss due to RTIs is around US\$ 230 billion per annum globally with the cost in developing countries around US\$ 36 billion.<sup>2</sup>

According to the global burden of disease study by the WHO and World Bank, alcohol is a major risk factor for traumatic outcomes that kill or disable individuals at a relatively young age. Alcohol was implicated in nearly 1.8 million deaths globally, accounting for 3.2% of total deaths, 2.5% of the total years of life lost, 6% of total years of life disabled and 4% of the total Disease Adjusted Life years. Alcohol was the eighth leading risk factor for deteriorating health status of population.<sup>11</sup> In close association with the changing scenario of rapid motorization, there has also been a major upsurge in alcohol production, advertising, distribution and consumption. Some of the factors contributing to the increasing availability and abuse of alcohol are liberalized economic policies of countries with regard to production, distribution and promotion, aggressive marketing by alcohol companies, changing social values and lifestyles, increasing

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income levels and the emergence of a 'pub culture' in many South Asian cities. The adult per capita consumption of alcohol in India has increased from 0.4 litres of absolute alcohol in 1970 to 1 litre by 1997 and 20-50% of the population consume alcohol in one form or another.<sup>12</sup> In Nepal, the adult per capita consumption of beer and spirits was estimated to be 2.5 litres of pure alcohol by 1997. In Sri Lanka, nearly 20-32% of adults are regular and current alcohol users. In Maldives, alcohol consumption is more than 2 litres of pure alcohol per year per adult. Even though alcohol consumption is not promoted due to religious practices in some Muslim populated countries like Pakistan and Bangladesh, anecdotal media reports indicate the changing shift from non-usage to increasing usage. In addition, illicit production and illegal import of alcohol continues unabated in all countries, the precise figures of which are unknown.

## ALCOHOL AND RTIs - THE DEADLY MIX

The increase in direct and indirect health risk associated with alcohol usage has been well-documented in recent years. Drink driving, also referred to as 'driving under the influence' (DUI) or 'driving while impaired' (DWI) is widely considered to be dangerous, hazardous and antisocial. The maximum allowable blood alcohol concentration (BAC) level when driving a motor vehicle is seen as a tool for both enforcement and prevention of RTIs. The BAC level represents the amount of ethanol (alcohol) in a given amount of blood, noted as weight by volume and typically expressed as grams of ethanol per 100 ml of blood or mg of ethanol per 100 ml of blood. The legally enforced BAC levels vary from country to country ranging from a level of zero (or no detectable alcohol) to 100 mg/100 ml with majority of the countries adopting a level of around 50 mg/100 ml.<sup>13</sup> Drivers whose BAC level exceed the legal limit are found to be impaired, posing risks for themselves and for others on road.

Alcohol is a major risk factor for RTIs as it impairs judgment and increases the possibility of involvement in other high risk

behaviours (eg., speeding, violating traffic rules, etc.). It also affects vision and poses difficulties in identifying risks and dangerous situations in the road environment; imbalances appropriate coordination for maneuvering the vehicle; diminishes reflexes and affects psychomotor performance and delays reaction time to light and hearing.<sup>14,15</sup> It is also accompanied by physiological changes such as increased fragility of bones and greater vulnerability to severe injury and resulting recovery.<sup>16</sup>

## BURDEN OF THE PROBLEM

Sindelar (2004) in a recent review of available literature from high-income countries observed that nearly 5% - 50% of patients in emergency department registration to trauma admissions were linked to consumption of alcohol.<sup>17</sup> A clear association between alcohol and injury has been proven beyond doubt, and this is especially true for road traffic injury within six hours of alcohol consumption.<sup>18,19</sup>

Precise information on the involvement of alcohol in RTIs and deaths is clearly not available from South Asian countries. Odero (1997) noted in a recent review of epidemiological studies of RTIs in developing countries that nearly 1/5 to 1/3 of crashes occur at night and the majority of them were the result of alcohol consumption, in combination with poor visibility, greater traffic density and limited health care facilities.<sup>20</sup> Studies in South Asia indicate that nearly 30-40% of crashes occur at night and significant number of them are due to alcohol consumption.<sup>21</sup> Tables I and II provide a brief summary of findings on the links between RTIs and alcohol consumption in South Asian countries.

- 1 In Sri Lanka, the number of people vehicle riders identified to be under alcohol influence has increased from 1,494 in 1984 to 5,667 in 1999. Information from police records indicate that more than 10% of drivers were under the influence of alcohol. The Ministry of Transport and Highways is now aware that the problem is growing and has identified drunken driving as a priority issue.<sup>22</sup>
- 1 Jha et al. in a hospital based study of 870 RTI admissions in Nepal found that the highest number of RTIs occurred

**Table I:** Prevalence of alcohol related RTIs in South Asia – Hospital based studies.

S.No.	Author	Place	Sample size	Remarks
1.	Mishra et al. (1984)	New Delhi, India	300 hospital subjects.	29% under alcohol influence.
2.	Gururaj et al. (1993)	Bangalore, India	1,725 brain injured persons due to road traffic injury registered in one hospital.	40% of total crashes at night time and 15% under alcohol influence. 24% of two wheeler occupants, 6% pedestrians, 10% bicyclists and 4% of heavy motor vehicle drivers under alcohol influence.
3.	Jha N. et al. (1998)	Dharai, Nepal	870 RTI subjects.	17% under alcohol influence.
4.	Gururaj G. et al. (2000)	Bangalore, India	3,051 road traffic injured persons from 23 hospitals of Bangalore.	11% of RTIs and 29% of night time crashes linked to alcohol.
5.	Gururaj G. et al. (2004)	Bangalore, India	3,979 brain injured persons due to a road traffic injury registered in one hospital.	40% night time crashes and 22% of subjects under alcohol influence. Two wheeler occupants (51%) and pedestrians (19%) represented in greater numbers. Deaths, disability and severity higher in alcohol positive subjects.
6.	Narayanan <sup>51</sup> (2000)	Tamil Nadu, India	50 patients admitted in ER due to RTI.	12% of crashes admitted were under the influence of alcohol.
7.	De Silva M. et al. <sup>52</sup> (2001)	Colombo, Sri Lanka	54 hospitalized crashes.	Alcohol related to 67.4% of fatal crashes.
8.	Gururaj and Benegal (2002)	Bangalore, India	1,605 road traffic injury subjects registered in 12 hospitals of the city,	29% of night time crashes directly related to alcohol consumption. Two wheeler riders (53%), pedestrians (23%) and 3 wheeler drivers (6%) represented in greater numbers.
9.	Benegal and Gururaj <sup>53</sup> (2002)	Bangalore, India	Injured persons registered in one public hospital.	37% of injuries attributable to alcohol.

**Table II:** Prevalence of impaired driving due to alcohol in South Asia – Police and roadside surveys.

S. No.	Author	Place	Data sources & sample size	Method	Remarks
1.	Rathnayake, 1998	Sri Lanka	1,370 drivers in Police records.	Suspicious checks.	10% drivers under alcohol influence.
2.	Mohan and Bawa, 1985	New Delhi, India	Police records.	Suspicious checks.	Significant proportion under alcohol influence but no exact figures.
3.	Gururaj and Benegal, 2002	Bangalore, India	3,333 drivers in roadside surveys.	Suspicious checks confirmed by breathalyzer tests.	89% of those checked were positive for alcohol
4.	Gururaj and Benegal, 2002	Bangalore, India	1,866 drivers in roadside surveys.	Random roadside testing and breathalyzer administration.	41% of randomly stopped drivers positive for alcohol. Two wheeler drivers, drivers of four wheeler vehicles (10%) and bus passengers (12%) were in greater numbers.
5.	Batra and Bedi, 2000	India	Review article	-	40% of truck and matador drivers, 60% car drivers, 65% two wheeler drivers and 5% pedestrians under the influence of alcohol.

during weekends with nearly 17% of the cases occurring because the driver was under the influence of alcohol. These included 28% of motorized two-wheeler drivers, 5% of truck drivers and majority of the bicyclists.<sup>5</sup>

1 Few studies undertaken in India have revealed the growing association of alcohol and road traffic injuries. Mohan and Bawa [1985] in an analysis of police records noticed that 32% of pedestrian fatalities, 40% of motorized two-wheeler occupant deaths and 30% of bicyclists deaths occurred during 6 pm to 6 am and alcohol intoxication was a major factor in majority of these crashes.<sup>23</sup> A study of the casualty departments of a New Delhi hospital revealed that 7% of RTI patients had consumed alcohol.<sup>24</sup>; another study showed that 29% of two-wheeler victims had been under the influence of alcohol.<sup>25</sup> Similarly, Sahdev et al. (1994) in an autopsy study of RTIs noticed that alcohol intoxication was not clearly documented in medical records.<sup>26</sup> Bathra and Bedi (2003) have reported that 40% of truck and matador drivers, 60% of car drivers and 65% of two-wheeler drivers were under the influence of alcohol at night.<sup>27</sup>

1 A series of studies undertaken in the past 10 years at the WHO Collaborating Centre for Injury Prevention and Safety Promotion and the National Institute of Mental Health and Neuro Sciences in Bangalore have revealed that nighttime crashes account for nearly 30-40% of total RTIs. Alcohol consumption (based on self reports with a certified medical diagnosis) was documented in 15-25% of these injuries.<sup>28-34</sup> In all these studies, two-wheeler drivers (20-40%), pedestrians (5-10%), bicyclists (5-10%) and motor vehicle drivers (15-20%) were involved in greater numbers and were under the influence of alcohol. The risk of mortality increased by 2.2 times among those under the influence of alcohol.<sup>28</sup> With regard to intoxication levels as measured by breathalyzers in emergency rooms, 12%, 40%, 33% and 10% were intoxicated at mild, moderate, severe and very severe levels according to WHO standards. In a recent study undertaken on RTIs and TBIs, it has been observed that severe brain injuries, extent of body injuries, mortality rates, disabilities and duration of hospital stay has been higher in the alcohol group compared with the non-alcohol group.<sup>34</sup> In roadside surveys carried out in Bangalore, nearly 80% drivers suspected by the police as being intoxicated and 35% of randomly checked drivers were under the influence of alcohol. The amount of alcohol consumption based on breathalyzer revealed that 40%, 27%

and 10% were in moderate, severe and very severe levels of intoxication as specified by WHO standards.<sup>33</sup>

The majority of BAC positive RTI patients in hospital and those detected by police reported the consumption of spirits with high alcohol content at parties or with friends 3-4 hours prior to occurrence of the injury. Furthermore, 98% of individuals in roadside surveys who tested positive for alcohol declared themselves to be fit to drive, confident to drive and unaware of the dangers they posed and the health consequences of their actions. Interestingly, 97% of surveyed population knew that it was not legal to drink and drive and 99% of the respondents were also aware that drinking and driving was dangerous, but 99% of them were not aware of the health and legal consequences of driving under the influence of alcohol. All respondents reported that they would not be involved in a vehicle crash even after drinking.<sup>33</sup>

## PREVENTION POLICIES

With the recognition that road safety needs to focus on reducing drinking and driving, many high-income countries have formulated and implemented a number of coordinated, integrated and sustainable programmes based on scientific research.<sup>35,36,37</sup> The first law banning drinking and driving was introduced in Norway in 1936 set a legal limit of 50mg/100ml; many countries have since then followed suit and introduced similar legislation, however, many are only considered to be moderately successful.<sup>38</sup> Legal limits have changed in many countries over a period of time and it is observed that a small decrease in BAC levels can lead to substantial decrease in deaths and injuries.<sup>36</sup> Such broad coordinated efforts have resulted in reducing alcohol-related crashes between 1979 – 1993 from 57 to 38% in USA, and 44 to 31% in Australia. In the last decade alone, alcohol-related crashes have declined by nearly 50% in UK, 28% in Netherlands, 28% in Canada, 32% in Australia, 37% in Germany and 26% in the USA.<sup>35-37, 39, 40</sup>

A meta analysis of 125 studies by Terry et al.<sup>40</sup> on drink driving control policies revealed that administrative license suspension; implied consent; breathalyzer tests; mandatory jail sentence; compulsory community service; severe penalties; selective and regular police enforcement patrols; sobriety check points and other strategies have successfully tackled the problem. Even innovative technological solutions such as alcohol ignition interlocks are proving to be effective, although, they are still expensive.<sup>42</sup> Programmes such as designated driver schemes and graduated driver licensing

systems involving lower BAC limits for younger and learner drivers have shown greater success in many high-income countries. The problem has been addressed at different levels with policies aimed at the alcohol industry, action to control the sale, distribution and availability in society, increasing legal ages of drinking, controlling human behaviour, legal and enforcement measures, increasing awareness on responsible and restrictive drinking and, condemnation of excessive drinking behaviours by society at large. Recent analysis by Lowenfels and Wynn with data from 19 countries reveal that a 1% reduction in per capita alcohol consumption is associated with a 1% reduction in vehicular deaths.<sup>36</sup> Multi-sectoral approaches based on scientific monitoring and evaluation with strict legislation, greater enforcement combined with the use of media campaigns have led to greater awareness and are considered critical for success in these countries.

## ONGOING INITIATIVES IN SOUTH ASIA

Up until now, no South Asian country has developed or implemented a rational policy aimed at curbing or controlling the production, distribution, promotion and consumption of alcohol. South Asian countries currently rely heavily on modifying individual behaviour by increasing public awareness through slogans, posters, display boards and media campaigns. These efforts are carried out in isolation and do not rely on supplementary strategies with regard to the content, tone and language used. If not combined with legislative action and enforcement realities these campaigns (don't drink and drive; driving is dangerous; one for the road is deadly, etc.) are ineffective.<sup>43,44,45</sup> The success of these campaigns will largely be determined by the degree of literacy, values and awareness of the law of the people targeted by the messages, as well as by levels of enforcement, policies of government and counter campaigns by the alcohol industry. Furthermore, it is well-established that changing knowledge does not necessarily result in desired changes in behaviour and action. Education programmes and campaigns are often non-systematic with minimal scientific input, poorly focused, use inadequate communication methods and have not been evaluated systematically in any country of the region.

South Asian countries have yet to recognize the gravity of the situation and no systematic efforts have been put into place to address the problem. Every country in the region has a Motor Vehicle Act with a section on alcohol and drugs. However, the increasing number of RTI deaths and injuries demonstrate that legal provisions are not being implemented, and the little enforcement that takes place is non-random in its geographical coverage, non-visible, not uniform, there are low penalties when offenders are caught, and are subjected to a number of political and economic influences. Law enforcement agencies also lack the technology, information systems, dedicated teams needed to apply the law effectively and the current practice of booking cases in a cursory manner only adds to the problem. Conversely, people are unaware of—and have scant respect — for existing laws and have no fear of being prosecuted.

- | The Indian Motor Vehicle Act of 1939 with subsequent amendments upto 2001 has a section on reducing drinking and driving. The current legal limit is 30 mg / 100 ml and

anybody above the limit can be booked by police and imposed a fine by a court.<sup>46</sup> However, considerable problems are seen with regard to the implementation by concerned sectors combined with the lack of mechanisms for implementation and people's respect for such laws. A number of NGOs in India are trying to develop an awareness of alcohol-related problems by means of specific campaigns but these are unlikely to be successful in reducing RTIs.

- | The revised 1980 Motor Vehicles Act of Sri Lanka under sections 151, 216 and 217 state that drinking and driving is a dangerous act. The enforcement of these laws are left to police agencies, the implementation of which has been far from satisfactory.<sup>22,47</sup>

Any education or enforcement programme on reducing driving under the influence of alcohol should deter people from drinking and driving. A review of the efforts of concerned agencies to implement drink drive laws shows that:<sup>13</sup>

- | Police and transport personnel specifically trained or charged with the implementation of drink drive laws do not exist in any country in the region.
- | Enforcement is not associated with a visible, uniform manner of applying the law with clearly defined penalties.
- | Enforcement is not carried out in a visible manner and the penalties are such that they do not serve as a deterrent.
- | Coordination problems between legal and enforcement teams make it difficult to enforce drink drive laws.
- | Enforcement is seen as a means to generate a revenue for the concerned departments and not as a deterrent.
- | Enforcement agencies do not have the technological know-how with regard to the use and maintenance, repair and calibration of equipment such as breathalyzers. Neither do they have access to basic equipment such as vehicles, stationery and check point equipments, etc.
- | Blood alcohol levels are not estimated regularly in emergency rooms across many of the hospitals. Such data could add a wealth of information to ongoing enforcement activities.
- | Even those convicted of driving under the influence do not pay penalties due to interference by political or economic actors thereby undermining the enforcement of the law.
- | People injured in a vehicle crash do not receive compensation if they were found to be under the influence of alcohol and drugs. Consequently, much of the information on alcohol is underreported in medical and police records.
- | Due to the absence of scientific investigation and analysis of RTIs, information on alcohol-related problems is not available at national or regional levels to clearly define, target and enforce existing laws.
- | The current absence of rational alcohol policies means that only minimal consideration is paid to strategies seeking to restrict the sale of alcohol, limit the time it can be bought, establish permit control on alcohol outlets, as well as other broader issues related to the production, distribution, sale

and advertising of alcohol.

## DIRECTIONS FOR FUTURE WORK

Considering the gravity of the situation, ongoing efforts to reduce the problem and lessons learnt from high-income countries, it is important to change strategies and mechanisms to reduce drink driving in South Asia. Some of the approaches likely to yield results include the following:

- 1 National information systems should be strengthened with appropriate knowledge, skills, techniques and resources to include information on driving under the influence of alcohol as an important element in road safety information systems within police and health sectors.
- 1 Independent studies by medical institutions should be undertaken periodically to examine the problem by both qualitative and quantitative research methods in different countries.
- 1 Health screening for alcohol problems should be undertaken in hospital emergency rooms among all persons with a RTI. Breathalyzers should be available in every emergency department for regular usage and documentation.
- 1 Physicians in emergency rooms should be trained to detect alcohol involvement in RTIs and use of breathalyzers should be promoted. The violators should be penalized with moderately high penalties and combined with other methods of reducing drinking and driving.
- 1 Policy-makers often ask the question "how much is too much?" Revisions to amendments in motor vehicle acts need to be according to the effects of alcohol on skills and abilities required for safe driving and the likely effects of introducing legal limits.<sup>48, 49</sup>
- 1 The health, social and economic impacts of alcohol and traffic injuries have not been systematically examined in the south Asian region. Research providing such information will be a powerful tool to influence the public and persuade policy-makers to develop interventions.
- 1 The existing sections of the motor vehicles act existing in the legislation of different countries of the region, which deal with drinking and driving, should be widely publicized through multimedia channels.
- 1 Current enforcement mechanisms could be reinforced by ensuring: (i) the availability of trained police and dedicated teams; (ii) the use of breathalyzers in a scientific manner; (iii) the introduction of random checks; (iv) an increase in current penalty levels; and to (v) the strict enforcement and implementation of laws in a random (geographically), visible, uniform and regular (periodically) manner.
- 1 Public education programmes must be specific and target-oriented, informing about drink driving in a language commonly understood by people. They should seek to inform the public on the health and legal consequences and should be based on local drinking practices. Education should be combined with enforcement and isolated efforts may not be totally helpful.
- 1 A rational alcohol prevention policy should be developed

in regional countries with a primary focus on reducing drinking and driving. This should take into account the broader social, economic and political realities with regard to production, distribution, and availability of alcohol. Promising interventions should be implemented based on the appropriateness for the local context and lessons learnt from high-income countries.

In conclusion, drink driving is a major problem in South Asia and other developing regions of the world. The problem is unrecognized and hidden due to lack of good quality research data from many countries. Strict enforcement supplemented with education is one of the most powerful tools to tackle the problem in low-and middle-income countries and needs serious consideration. Many other measures like increasing the legal drinking age, restricting the availability of alcohol by limiting timings, and controlling the unabated promotion of alcohol seems promising, but needs implementation. Many broader issues also need closer examination to develop and implement rational alcohol policies. Member countries need to realize that the losses from deaths and injuries on roads due to alcohol is a serious problem, resulting in loss of precious lives. Reducing drink driving should also be integrated with other road safety interventions (like promoting helmet usage; speed control mechanisms; improving public transport systems; improving visibility of vehicles; improving crash worthiness of vehicles; strengthening pre-hospital and emergency care, etc.) to obtain noticeable results in low- and middle-income countries.<sup>50</sup>

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