The motorcycle is the most common vehicle involved in transport-related injuries in many countries in the South East Asia Region. It is also a popular mode transport for children and families in many countries in the Region. Motorcycles, of which the rider has 26 times the risk to die, are the most common vehicles running on the Region’s roads. Many are cheap, small but with high speed and not stable. Children are at greater risk when they ride on motorcycles as passengers. This report unveils the consequences of motorcycle use among children and also consequences after crashes and injuries.

Wide range of recent data sources including official reports, injury surveillance information as well as surveys and scientific publications on motorcycle-related transport injuries in children aged less than 15 years were reviewed and analyzed for the report. The situation, risk factors and risk behaviors of the motorcycle-related injuries in children aged <15 years were elucidated. Based on the evidence, the recommendations for reducing motorcycle-related injuries in children aged <15 years are made for member countries.
Motorcycle-related injuries in children in the South-East Asia Region
Motorcycle-related injuries in children in the South-East Asia Region

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Acronyms

ASEAN  Association of South-East Asia Nations
BHIS  Bangladesh Health and Injury Survey
CSIP  Child Safety Promotion and Injury Prevention Research Centre, Bangkok, Thailand
DPR  Disability, Injury Prevention and Rehabilitation
FARS  Fatality Analysis Reporting System, USA
GBD  Global burden of disease
HMIS  health management information system
ICD  International statistical classification of diseases and related health problems
IHR  Institute of Health Research
IMR  Infant mortality rate
MOH  Ministry of Health
NHTSA  National Highway Traffic Safety Administration, USA
NTPRC  National Transportation Planning and Research Centre, Thiruvananthapuram, Kerala, India
RTI  road traffic injury
SEAR  South-East Asia Region
TASC  The Alliance for Safe Children
VISU  Victorian Injury Surveillance Unit, Australia
WCO  World Health Organization Country Office
WHO  World Health Organization
Acknowledgements

MC related injuries in children

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The contributions of several staff at the WHO Regional Office for South-East Asia and Dr Chamaiparn Santikarn, Regional Adviser – Disability, Injury Prevention and Rehabilitation, and Dr Salim Mahmud Chowdhury, Temporary International Professional (Technical Officer) are gratefully acknowledged.
Executive summary

Background

Road traffic injuries (RTIs) are among the leading causes of injury, disability and death globally. About 262 000 children die due to RTI each year. The most common vehicle involved in transport-related injuries in many countries of the South-East Asia Region (SEAR) is the motorcycle. It is also a popular mode of transport for children and families in many countries. In this context, a review is required to assess the situation and the impact on children to provide recommendations to the Member States for addressing RTI.

Objectives

The objectives of this report are:

- to review the most recent data on the epidemiology of motorcycle-related transport injuries in children in countries of the South-East Asia Region;
- to assess the situation and quantify the magnitude of motorcycle-related injuries in children aged <15 years;
- to identify risk factors; and
- to make recommendations to countries in the Region in addressing motorcycle injuries, especially among children.

Methodology

This report is a result of review and analysis of a variety of data on motorcycle-related transport injuries in children aged less than 15 years. An analysis of the secondary data available in the SEAR, such as official reports, injury surveillance information, as well as survey and scientific publications, was conducted.

Results

Only four out of 11 countries in the WHO South-East Asia Region have information on child injuries (India, Nepal, Sri Lanka and Thailand) and only India and Thailand provided detailed information on the epidemiology of motorcycle-related injuries involving children aged less than 15 years. Motorcycles are the most common
vehicles on the roads. There are around 90 million motorcycles in the Region accounting for 70% of all registered vehicle. Motorcycles are the most commonly involved in transport injuries in children (40–70% of all child vehicle users in transport injuries). Two thirds of motorcycle injuries were among male children (68%). Almost all children who got injured from riding on a motorcycle did not wear a helmet. There is a report that 6% of child motorcycle driver injuries (less than 15 years old) were alcohol-related. The use of motorcycles by children is extremely dangerous to themselves as well as to other road users. Among child motorcycle drivers, 60.1% of motorcycle crashes occurred due to collision (collided into or with other vehicles: all type of vehicles, animal-drawn vehicles, agricultural vehicles, objects or buildings, animals, and pedestrians). The other reason for injury was overturning of the vehicle (38.2%). Among collisions, 34.7% were by or with other motorcycles, followed by pick-up truck/van (30.6%), buildings/things (8.6%). Of these, 37.2% of motorcycle injuries resulted in head and neck injuries and 8.3% were severe brain injuries (coma score: 3–8). Besides injuries and disabilities, there are also psychosocial and behavioural consequences of allowing children to drive motorcycles, including serious or fatal injuries.

**Recommendations**

(1) National police data systems on RTI, and the statistical systems to record deaths and hospital admission data systems, especially on child injuries and deaths should be improved.

(2) Injury surveillance systems should be established and strengthened to analyse and report national data on general population and also specifically for child deaths and injury.

(3) All agencies should implement and effectively enforce laws regarding helmet wearing, driving under the influence of alcohol, and speed limit, and modification of motorcycles after sale.

(4) Police should strictly enforce laws, particularly regarding children driving motorcycles with a valid license, and the capacity of the motorcycle engines in order to protect child drivers and other road-users.

(5) Awareness should be created among all stakeholders regarding dangers of transporting children younger than five years of age on motorcycles, and that at present head protection devices for children below two years of age are not available.
(6) Member States should encourage cooperation among themselves to develop national standards for child motorcycle helmets especially designed for children with extra provisions in standards for conspicuity.

(7) Member States should consider mandatory provision of two helmets (including the possibility of helmets for children) during sale of motorcycles, and placing of warnings about carrying children on motorcycles.

(8) Governments at the national, provincial and municipal levels should consider policies concerning neighbourhood schools and public transport facilities (including free or subsidized) that would obviate the need for transporting children on motorcycles.

(9) Research capacities in the countries of the Region in the area of motorcycle injuries among children should be strengthened, especially with regard to the appropriate age for legal permission to drive motorcycles safely; better helmets, particularly for children under five years of age.

(10) A model for addressing motorcycle injuries in children should be developed and piloted taking into consideration the sociocultural context.
Introduction

Background

Road traffic injuries (RTIs) are among the leading causes of injury, disability and death globally. Each year, 1.24 million people die as a result of RTIs\(^1\). In 2004, road traffic injuries accounted for approximately 262,000 child deaths (0–19 years) globally. It is estimated that nearly 10 million more are injured or disabled every year. Ninety-three per cent of child road traffic injuries deaths occurred in low- and middle-income countries. In 2004, the South-East Asia and African Regions and the low- and middle-income countries of the Western Pacific Region accounted for two thirds of all road traffic deaths among children\(^2\).

Globally, by 2030, RTIs are predicted to be the fifth leading cause of death and the seventh leading cause of disability-adjusted life years lost. The South-East Asia, African and Western Pacific regions of WHO are expected to see the most significant increases in RTIs. The number of road traffic deaths is predicted to increase, by 2020, by approximately 147% in India and 97% in China\(^3\).

The most common vehicle involved in transport-related injuries in many countries in the South-East Asia Region is the motorcycle. Motorcycle-related injuries in the South-East Asia Region account for 50–60% of injuries and deaths from transport-related injuries in children aged < 15 years\(^3,4\). In the United States in 2005, total traffic deaths increased by 2%, while motorcycle rider deaths increased by 80%, compared to 1995\(^5\). In addition, in Australia, the Victorian Injury Surveillance Units (VISU) report on trends in motorcycling deaths and admissions from 1996–2005 revealed that the (0–14 years old) hospital admission rate of child motorcycle riders increased significantly from 12/100,000 in 1996 to 24/100,000 in 2005\(^6\).

Children are transported on motorcycles from an early age, either sitting on the petrol tank or behind the driver in the South-East Asia Region, where motorcycles are used commonly as family vehicles. In 2004, the report on child deaths in Thailand revealed that the number of child deaths due to motorcycles was 14 times that of deaths due to dengue haemorrhagic fever\(^7\). Moreover, it is estimated that head injuries in children (<15 years) from riding motorcycles numbered at least 5200 per year\(^8\).
Objectives

The objectives of this report are as follows:

(1) to review the most recent data on the epidemiology of motorcycle-related transport injuries in children in countries of the South-East Asia Region;

(2) to assess the situation and quantify the magnitude of motorcycle-related injuries in children aged <15 years;

(3) to identify risk factors; and

(4) to make recommendations to countries in the Region for developing injury prevention strategies and feasible interventions.

Methodology

This descriptive report has reviewed and analysed a variety of data sources on motorcycle-related transport injuries in children aged less than 15 years from the 11 countries in the South-East Asia Region, e.g. official reports, injury surveillance information, surveys and scientific publications.

The WHO Regional Office for South-East Asia sent a template for data collection to the Ministry of Health of each of the Member States through the respective WHO country office to provide national data related to motorcycle injuries in children < 15 years.

Operational definitions for the terms used in this document

Road traffic crash – “a collision or incident that may or may not lead to injury, occurring on a public road and involving at least one moving vehicle”.

Road traffic injuries – “fatal or non-fatal injuries incurred as a result of a road traffic crash”.

A motorcycle is defined as all types and all classes of motorized two-wheelers such as family type, chopper, scooter, touring bike, sports bike, cruiser as well as the standard bike which is the largest class of motorcycle.

A motorcycle driver is any person who drives the motorcycle.
A motorcycle passenger is a pillion passenger or any person seated on the motorcycle, but not in control of the motorcycle.

A motorcycle user is a person who rides on a motorcycle either as a motorcycle driver or a motorcycle passenger or pillion rider.

General information on countries in the South-East Asia Region

Geographical area and population

Asia is the world’s largest (44 579 000 sq. km. or 17 212 000 miles²) and most populous continent. It covers 8.6% of the earth’s total surface area (or 29.9% of its land area) and with approximately 4 billion people, contains more than 60% of the world’s current human population (6750 million, World Population 2008). All 11 Member States of the WHO South-East Asia Region are in Asia and cover 6 939 168 km², accounting for 15.6% of Asia’s total surface area²⁰⁰⁰.

The 534 million children aged less than 15 years in the Region account for more than one fourth of all children in the world (28.9%). The proportion of children aged less than 15 years in the WHO South-East Asia Region is between 21.6–39.4%. See Table 1.

Life expectancy at birth

Life expectancy at birth (both sexes combined) in the Region ranges between 60.8 and 73.9 years. Most countries in the Region have lower life expectancy at birth compared to the world population (67.8 years) and some other countries in Asia. However, four countries in the Region, such as Sri Lanka, Thailand, Maldives and Indonesia, have a higher life expectancy than the global average - 73.9, 73.2, 73.1, 68.6 years, respectively. See Table 1 and Figure 1.

Infant mortality rate (IMR) in the Region

The Infant mortality rate (IMR) in countries of the Region decreased from a range of 18 to 83 per 1000 live births in 1998 to 17.6–59.0 per 1000 live births in 2009. In 1998, Sri Lanka had the lowest IMR and Nepal the highest while in 2009, Thailand had the lowest IMR and Bangladesh the highest.
## Table 1: Information from Member States in the South-East Asia Region and selected high-income countries, 2007-2009

<table>
<thead>
<tr>
<th>Countries</th>
<th>Infant mortality rate</th>
<th>Number of Population</th>
<th>Number of Children aged &lt;15 years</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Children aged &lt;15 years</td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>59.0</td>
<td>154 037 902</td>
<td>54 003 001</td>
<td>35.1</td>
</tr>
<tr>
<td>Bhutan*</td>
<td>49.4</td>
<td>672 425</td>
<td>209 959</td>
<td>31.2</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>51.3</td>
<td>22 565 347</td>
<td>4 880 077</td>
<td>21.6</td>
</tr>
<tr>
<td>India</td>
<td>30.2</td>
<td>1 147 995 898</td>
<td>361 406 793</td>
<td>31.5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>30.0</td>
<td>237 512 355</td>
<td>67 518 333</td>
<td>28.4</td>
</tr>
<tr>
<td>Maldives*</td>
<td>29.5</td>
<td>298 968</td>
<td>93 796</td>
<td>34.4</td>
</tr>
<tr>
<td>Myanmar*</td>
<td>47.6</td>
<td>57 370 713</td>
<td>18 527 803</td>
<td>32.3</td>
</tr>
<tr>
<td>Nepal*</td>
<td>47.5</td>
<td>22 736 934</td>
<td>8 948 587</td>
<td>39.4</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>18.6</td>
<td>21 128 773</td>
<td>5 091 599</td>
<td>24.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>17.6</td>
<td>63 121 000</td>
<td>13 635 000</td>
<td>21.6</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>40.7</td>
<td>1 108 777</td>
<td>389 691</td>
<td>35.1</td>
</tr>
<tr>
<td><strong>ALL SEA countries</strong></td>
<td></td>
<td><strong>1 728 549 092</strong></td>
<td><strong>534 704 639</strong></td>
<td>30.9</td>
</tr>
<tr>
<td>Worldc</td>
<td>40.9</td>
<td>6 750 062 000</td>
<td>1 847 488 000</td>
<td>27.4</td>
</tr>
<tr>
<td>Sweden</td>
<td>2.8</td>
<td>9 045 389</td>
<td>1 448 967</td>
<td>16.0</td>
</tr>
<tr>
<td>Australia</td>
<td>4.8</td>
<td>21 007 310</td>
<td>3 941 153</td>
<td>18.8</td>
</tr>
<tr>
<td>Japan</td>
<td>2.8</td>
<td>127 288 416</td>
<td>17 387 068</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Source:

- Infant mortality rate (deaths/1000 live births), CIA-World Fact book 2009
- World Health Statistics 2007
- Census Bureau, Population Division, International Data Base. U.S. and

Population:

**Figure 1: Life expectancy at birth, SEA countries (2014 estimated)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Life Expectancy at Birth (2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>68.09</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>67.39</td>
</tr>
<tr>
<td>Thailand</td>
<td>74.18</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>76.35</td>
</tr>
<tr>
<td>Nepal</td>
<td>67.19</td>
</tr>
<tr>
<td>Myanmar</td>
<td>65.94</td>
</tr>
<tr>
<td>Maldives</td>
<td>75.15</td>
</tr>
<tr>
<td>Indonesia</td>
<td>72.17</td>
</tr>
<tr>
<td>India</td>
<td>67.8</td>
</tr>
<tr>
<td>Democratic Peoples Republic of Korea</td>
<td>69.81</td>
</tr>
<tr>
<td>Bhutan</td>
<td>68.98</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>70.65</td>
</tr>
</tbody>
</table>

*Source: Life-expectancy at birth, The World Fact Book*
Findings

1. Magnitude and burden of child injuries

1.1. Global child injury problem

According to the global burden of disease (GBD) 2004 update, unintentional injuries were the leading cause of death among children above one year of age. RTIs and drowning are significant contributors to causes of death among children and teenagers\(^6\).

RTI is a global problem, especially affecting children aged 5–14 years. This problem contributes to 22% of all causes of child injury deaths among 0–17 years old children. RTIs were the leading cause of death among the age group 15–19 years and the second leading cause among those 5–14 years old. See Figure 2, Table 2.

1.2 Child injury problem in the SEA Region

Two community-based cross-sectional surveys with national representative samples (Bangladesh 2003, Thailand 2003–2004) and Thailand’s Mortality Notification System

Figure 2: Distribution of global child injury deaths by cause, 0–17 years, 2004 (figures in percentage)

“Other unintentional” includes categories such as smothering, asphyxiation, choking, animal and venomous bites, hypothermia as well as natural disasters.

Table 2: Fifteen leading causes of death in children of both sexes, 2004

<table>
<thead>
<tr>
<th>Rank</th>
<th>Under 1 year</th>
<th>1–4 years</th>
<th>5–9 years</th>
<th>10–14 years</th>
<th>15–19 years</th>
<th>Under 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perinatal causes</td>
<td>Lower respiratory infections</td>
<td>Lower respiratory infections</td>
<td>Lower respiratory infections</td>
<td>Road traffic injuries</td>
<td>Perinatal causes</td>
</tr>
<tr>
<td>2</td>
<td>Diarrhoeal diseases</td>
<td>Diarrhoeal diseases</td>
<td>Road Traffic injuries</td>
<td>Road Traffic injuries</td>
<td>Self-inflicted injuries</td>
<td>Lower respiratory infections</td>
</tr>
<tr>
<td>3</td>
<td>Lower respiratory infections</td>
<td>Measles</td>
<td>Malaria</td>
<td>Drowning</td>
<td>Violence</td>
<td>Diarrhoeal diseases</td>
</tr>
<tr>
<td>4</td>
<td>Malaria</td>
<td>Malaria</td>
<td>Diarrhoeal diseases</td>
<td>Malaria</td>
<td>Lower-respiratory infections</td>
<td>Malaria</td>
</tr>
<tr>
<td>5</td>
<td>Congenital anomalies</td>
<td>HIV/AIDS</td>
<td>Meningitis</td>
<td>Meningitis</td>
<td>Drowning</td>
<td>Measles</td>
</tr>
<tr>
<td>6</td>
<td>Pertussis</td>
<td>Congenital anomalies</td>
<td>Drowning</td>
<td>HIV/AIDS</td>
<td>Tuberculosis</td>
<td>Congenital anomalies</td>
</tr>
<tr>
<td>7</td>
<td>HIV/AIDS</td>
<td>Protein-energy malnutrition</td>
<td>Protein-energy malnutrition</td>
<td>Tuberculosis</td>
<td>Fire-related burns</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>8</td>
<td>Tetanus</td>
<td>Drowning</td>
<td>Measles</td>
<td>Diarrhoeal diseases</td>
<td>HIV/AIDS</td>
<td>Road Traffic injuries</td>
</tr>
<tr>
<td>9</td>
<td>Meningitis</td>
<td>Road Traffic injuries</td>
<td>Tuberculosis</td>
<td>Protein-energy malnutrition</td>
<td>Leukaemia</td>
<td>Pertussis</td>
</tr>
<tr>
<td>10</td>
<td>Measles</td>
<td>Meningitis</td>
<td>HIV/AIDS</td>
<td>Self-inflicted injuries</td>
<td>Meningitis</td>
<td>Meningitis</td>
</tr>
<tr>
<td>11</td>
<td>Protein-energy malnutrition</td>
<td>Fire-related burns</td>
<td>Fire-related burns</td>
<td>Leukaemia</td>
<td>Maternal haemorrhage</td>
<td>Drowning</td>
</tr>
<tr>
<td>12</td>
<td>Syphilis</td>
<td>Pertussis</td>
<td>Falls</td>
<td>Fire-related burns</td>
<td>Falls</td>
<td>Protein-energy malnutrition</td>
</tr>
<tr>
<td>13</td>
<td>Endocrine disorders</td>
<td>Tuberculosis</td>
<td>Congenital anomalies</td>
<td>War</td>
<td>Poisonings</td>
<td>Tetanus</td>
</tr>
<tr>
<td>14</td>
<td>Tuberculosis</td>
<td>Upper respiratory infections</td>
<td>Epilepsy</td>
<td>Violence</td>
<td>Abortion</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>15</td>
<td>Upper respiratory infections</td>
<td>Syphilis</td>
<td>Leukaemia</td>
<td>Trypanosomiasis</td>
<td>Epilepsy</td>
<td>Fire-related burns</td>
</tr>
</tbody>
</table>

Motorcycle-related injuries in children in the South-East Asia Region

2006 (death certificates) have confirmed that more children died of injuries than from communicable and noncommunicable diseases. Transport injury has become the leading cause of death in children aged 10–14 years in both countries.

**Bangladesh**

According to the *Bangladesh Health and Injury Survey* (BHIS) 2003, which was the largest community-based survey with a sample size of 171 366 households and 819 429 population (43% of the surveyed population were children aged 0–17 years), injury accounted for 38% of all deaths in children aged 1–17 years. Injury caused 48% of death in 5–9 years old children and 52% among 10–14 year olds. Transport injuries were the leading cause of injury deaths in children aged 10–14 years, with the mortality rate 7.8/100 000 population and obviously higher among 15–17 year old, 23.5/100 000 population. The survey also showed that RTIs are a leading cause of death of parents of children 0–17 years old, accounting for 29% of injury deaths of mothers and 36% of injury deaths of fathers, depriving a child of a care-giver.

**Thailand**

A cross-sectional National Community Survey (in collaboration between the Institute of Health Research (IHR), the Alliance for Safe Children (TASC), the UNICEF Office for Thailand and the Ministry of Public Health was conducted between September 2003 and April 2004 with a sample size of 100 179 households, covering 389 531 persons. The survey showed that injury caused almost two thirds (64%) of all deaths in children aged 1–17 years. Transport injuries were the leading cause of injury deaths in children aged 10–14 years, with a mortality rate of 12/100 000 population and this cause was obviously high among those 15–17 years old, 61/100 000 population.

According to the *Mortality Notification System (death certificates)* in 2006, children aged 0–14 years, injury data was classified by using the ICD-10 mortality tabulation list 3, and it was found that injuries were the leading causes of deaths in children aged 0–14 years, accounting for a mortality rate of 25.2/100 000 population. (See Figure 3.) Among child injuries, drowning was the leading cause of child injury deaths, especially in 1–4 year olds and 5–9 year olds, with mortality rates of 15.9/100 000 population and 14.3/100 000 population respectively while transport injury deaths accounted for 3.8/100 000 population and 3.3/100 000 population in the same age groups. In children aged 10–14 years, transport injury deaths have become the leading cause of injury deaths, with a mortality rate of 7.6/100 000 population (drowning 6.5). In addition, the mortality rate of transport injuries has increased rapidly to 28.8/100 000 population among 15–24 year olds while drowning has decreased to 4.1/100 000 population.
Figure 3: Top 10 causes of death in children aged less than 15 years.

<table>
<thead>
<tr>
<th>Category</th>
<th>Mortality Rate per 100,000 pop</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Drowning</td>
<td>11.5</td>
</tr>
<tr>
<td>- Transport injuries</td>
<td>5.5</td>
</tr>
<tr>
<td>- Assault</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Proportion of severely injured, 2005:
- Transport injuries 39.2%
- Falls 27.6%
- Inanimate forces 16.4%

Injury mortality rates per 100,000 population
- Drowning 11.5
- Transport injuries 5.5
- Assault 0.5

Sources: Death certificates (2006), Bureau of Health Policy and Strategy, Ministry of Public Health, Thailand
National Injury Surveillance System, Bureau of Epidemiology, Ministry of Public Health
Thailand Mortality tabulation list 3, ICD-10 WHO Geneva

According to World Health Statistics 2007, coverage of vital registration of deaths in data systems in nine out of 11 SEA countries of the Region was lower than 25% of all deaths (Bangladesh, Bhutan, India, Indonesia, Myanmar, Nepal, Democratic People’s Republic of Korea, Sri Lanka and Timor-Leste). Coverage in Maldives was 42% (2003) and in Thailand, it was 91% (2002).

According to the fact sheet on child injury prevention in the South-East Asia Region, in December 2008, road traffic injuries and drowning were the leading causes of death among children aged 0–14 years, each contributing 12%, followed by burns and falls contributing 9% and 5% respectively. See Figure 4.

Seven countries in the Region responded to the templates sent by the WHO Regional Office for South-East Asia to their ministries of health. Data provided by the country pertained to the period 2003–2009. Availability of data varies by country. However, all data confirmed that either RTI or transport injury was the important cause of injuries and deaths in all age groups including.

1.3 Leading causes of injuries and deaths among all age groups

Road traffic injury is a leading cause of injuries, ranging from 16.5–46.5% in the seven countries. From the available data, RTIs led as the cause of injuries among all age groups in five countries (India, Myanmar, Nepal, Sri Lanka and Thailand), the second leading cause in Bangladesh and third leading cause in Bhutan. See Table 3.
### Table 3: Five leading causes of injuries in selected countries of the South-East Asia Region (all ages) 2005–2009

<table>
<thead>
<tr>
<th>Country</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Fall 27.9%</td>
<td>Road traffic Injuries 18.2%</td>
<td>Cut injuries 13.4%</td>
<td>Burn Injuries 11.2%</td>
<td>Drowning 3.4%</td>
<td>Others 25.9%</td>
</tr>
<tr>
<td>n=2 077 735</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bhutan</td>
<td>Fall 24.3%</td>
<td>Inanimate forces 22.2%</td>
<td>Road traffic injuries 16.5%</td>
<td>Assaults 9.5%</td>
<td>Intentional self-harm 6.9%</td>
<td>Others 20.9%</td>
</tr>
<tr>
<td>n=3255</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>Road traffic injuries 43.9%</td>
<td>Assaults 24.5%</td>
<td>Falls 10.4%</td>
<td>Poisoning 7.8%</td>
<td>Burns 3.7%</td>
<td>Other 9.7%</td>
</tr>
<tr>
<td>n=32 188</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td>Road traffic injuries 39%</td>
<td>Assaults 25.9%</td>
<td>Burns/Scalds 15.1%</td>
<td>Falls 11%</td>
<td>Others 9%</td>
<td></td>
</tr>
<tr>
<td>n=12 644</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td>Road traffic injuries 45.5%</td>
<td>Falls 22.6%</td>
<td>Blunt forces 14.7%</td>
<td>Work-related* injuries 12.2%</td>
<td>Sport* 5%</td>
<td></td>
</tr>
<tr>
<td>n=980</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Road traffic injuries 28.1%</td>
<td>Falls 22%</td>
<td>Sharp object 12.6%</td>
<td>Burns 8.3%</td>
<td>Others 29%</td>
<td></td>
</tr>
<tr>
<td>n=19 679</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>Transport injuries 46.5%</td>
<td>Falls 17.2%</td>
<td>Inanimate forces 15.6%</td>
<td>Assaults 9.2%</td>
<td>Intentional self-harm 3.9%</td>
<td>Others 7.6%</td>
</tr>
<tr>
<td>n=158 685</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Work-related and sports-related categories are recommended by ICD-10 to be used as sub-classification for environmental events and circumstances as the cause of injury, poisoning and other adverse effects.

Source: Ministries of health of seven countries in the SEA Region:

- India, Development of Feasibility Module for Road Traffic Injury Surveillance, National Transportation Planning and research Centre, NTPRC (21 hospitals, 3 months in 2007).
Three out of seven countries provided data on five leading causes of injury deaths. For all age groups, RTI is the leading cause of injury deaths in Thailand (62.7% of total injury deaths) and the second leading cause of injury deaths in Myanmar (30% of total injury deaths) and Bangladesh (22.7% of all injury deaths).

See Table 4.

**Table 4: Five leading causes of injury deaths, by country (all ages)**

<table>
<thead>
<tr>
<th></th>
<th>Bangladesh n = 75 858</th>
<th>Myanmar n = NA</th>
<th>Thailand n = 7311</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Drowning</td>
<td>25.5</td>
<td>50.5</td>
<td>Transport inj. 60.5</td>
</tr>
<tr>
<td>RTI</td>
<td>22.7</td>
<td>30.1</td>
<td>Falls 10.9</td>
</tr>
<tr>
<td>Fall</td>
<td>15.8</td>
<td>Suicide 7.9</td>
<td>Assaults 9.8</td>
</tr>
<tr>
<td>Suicide</td>
<td>13.5</td>
<td>Assaults 5.8</td>
<td>Intentional self-harm 7.2</td>
</tr>
<tr>
<td>Violence</td>
<td>6.5</td>
<td>Falls 5.7</td>
<td>Drowning 3.8</td>
</tr>
<tr>
<td>Others</td>
<td>16.0</td>
<td>Others 0</td>
<td>Others 7.8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>Total 100</td>
<td>Total 100</td>
</tr>
</tbody>
</table>

Myanmar, Injury Prevention Project, Department of Health Management Information System (HMIS) 2007
Thailand, 28 sentinel hospitals, National Injury Surveillance System, Epidemiology Bureau, Department of Disease Control, Ministry of Public Health (1 January–31 December 2009)

**Figure 4: Percentage distribution of injury deaths in children aged 0–14 years, South-East Asia Region**

1.4 Leading causes of injuries and deaths from injury among children less than 15 years old

Among the seven responding countries in the Region, four have data on child injuries. RTIs in children <15 years ranges from 10.6–37.5% in countries of the Region, and is the first leading cause of injuries in children <15 years in India, Nepal and Thailand and the fourth leading cause in Bangladesh. (See Table 5).

Only two countries in the Region provided information on five leading causes of child injury deaths. RTI is the first leading cause of injury deaths in children <15 years old in Thailand (56.8% of all child deaths) and the second cause of injury deaths in Bangladesh (11.4% of all child injury deaths). (See Table 6.)

Table 5: Five leading causes of injury in children age <15 years in countries in the Region, 2005–2009

<table>
<thead>
<tr>
<th>Country</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh n= 828 175</td>
<td>Falls 29.8%</td>
<td>Burns 19.4%</td>
<td>Cut 13%</td>
<td>Road traffic injuries 10.6%</td>
<td>Drowning 8%</td>
<td>Others 19.2%</td>
</tr>
<tr>
<td>Bhutan</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India n= 2357</td>
<td>Road traffic injuries 35.2%</td>
<td>Falls 27.8%</td>
<td>Burns 7.6%</td>
<td>Poisoning 6%</td>
<td>Assaults 4.2%</td>
<td>Others 19.2%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal n= 224</td>
<td>Road traffic injuries 37.5%</td>
<td>Falls 31.3%</td>
<td>Blunt forces 17.8%</td>
<td>*Work-related 8.9%</td>
<td>*Sport 4.5%</td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand** n= 8867</td>
<td>Transport injuries 37.1%</td>
<td>Falls 27.1%</td>
<td>Inanimate forces 19.3%</td>
<td>Venomous animals and plants 3.9%</td>
<td>Animate forces 3.3%</td>
<td>Others 9.3%</td>
</tr>
</tbody>
</table>

* Work-related and sports-related categories are recommended by ICD-10 to be used as sub-classification for environmental events and circumstances as the cause of injury, poisoning and other adverse effects

Sources: Ministries of health of seven countries in the Region


India: Development of a Feasibility Module for Road Traffic Injury Surveillance, National Transportation Planning and research Center, NTPRC (21 hospitals, 3 months in 2007)

Nepal: Final Report on Situation analysis to strengthen: Establish effective injury Surveillance in six hospitals from two districts Katmandu and Bhaktapur), Dec 2008

Thailand: 28 sentinel hospitals, National Injury Surveillance System, Epidemiology Bureau, Department of Disease Control, Ministry of Public Health (1 January–31 December 2009)
1.5 Injury by type of road users in children <15 years

Four of seven countries have data for the road user types in children less than 15 years. In Thailand, drivers and passengers (vehicle users) constituted the largest proportion (88%) of RTIs among children, followed by Sri Lanka (71.3%), and Nepal (17.8%). In India, more than half of transport injuries among children were pedestrians.

Table 6: Five leading causes of injury deaths (children aged <15 years), 2005–2009

<table>
<thead>
<tr>
<th>Causes</th>
<th>Bangladesh n= 26291</th>
<th>%</th>
<th>Thailand n= 512</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drowning</td>
<td>62.7</td>
<td></td>
<td>Transport accident</td>
<td>56.8</td>
</tr>
<tr>
<td>RTI</td>
<td>11.4</td>
<td></td>
<td>Drowning</td>
<td>23.2</td>
</tr>
<tr>
<td>Falls</td>
<td>6.3</td>
<td></td>
<td>Assaults</td>
<td>4.6</td>
</tr>
<tr>
<td>Suicide</td>
<td>1.9</td>
<td></td>
<td>Falls</td>
<td>4.1</td>
</tr>
<tr>
<td>Violence</td>
<td>0.6</td>
<td></td>
<td>Inanimate forces</td>
<td>4.1</td>
</tr>
<tr>
<td>Others</td>
<td>17.1</td>
<td></td>
<td>Others</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Ministries of health of seven countries in the Region
Thailand, 28 sentinel hospitals, National Injury Surveillance System, Epidemiology Bureau, Department of Disease Control, Ministry of Public Health (1 January–31 December 2009)

Table 7: Transport injuries in children aged <15 years, by road user type

<table>
<thead>
<tr>
<th>Road user type</th>
<th>India</th>
<th>Nepal</th>
<th>Sri Lanka</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Passengers</td>
<td>208</td>
<td>25.1</td>
<td>9</td>
<td>7.0</td>
</tr>
<tr>
<td>Drivers</td>
<td>128</td>
<td>15.5</td>
<td>14</td>
<td>10.9</td>
</tr>
<tr>
<td>Pedestrians</td>
<td>415</td>
<td>50.1</td>
<td>34</td>
<td>26.4</td>
</tr>
<tr>
<td>Unknown</td>
<td>77</td>
<td>9.3</td>
<td>72</td>
<td>55.8</td>
</tr>
<tr>
<td>Total</td>
<td>828</td>
<td>100</td>
<td>129</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: India (two cities data) Development of Feasibility Module for Road Traffic Injury Surveillance, National Transportation Planning and Research Centre, NTPRC, (21 hospitals, three months in 2007)
Nepal: Final Report on Situation analysis to strengthen: Establish effective injury Surveillance in six hospitals from two districts Kathmandu and Bhaktapur), Dec 20087
1.6 Motorcycle-related injuries in children

Four out of 11 countries in the Region (India, Nepal, Sri Lanka and Thailand) have injury data, especially data on motorcycle-related injuries in children aged less than 15 years generated from their injury surveillance systems. However, Nepal and Sri Lanka did not have specific and detailed information on childhood motorcycle injuries. Regarding national injury and health surveys, two countries in the Region have reports on child motorcycle injuries-related transport crashes (Bangladesh Health and Injury Survey in 2003 and Thailand National Survey in 2003–2004).

1.6.1 National health and injury survey in the SEA Region

**Bangladesh:** The Bangladesh Health and Injury Survey (BHIS) in 2003 (January–December) with a sample size of 171 366 households and total surveyed population of 819 429 persons (43% of the surveyed population were children aged 0–17 years) showed that child motorcycle users aged 10–14 years old accounted for about 1.1% of all vehicle-related transport injuries and 10% in the 15–17 years old age group\(^\text{17}\). However, at that time (2003), there were 329 425 registered motorcycles, accounting for 42% of all registered vehicles in Bangladesh\(^\text{27}\) while recently, the number of motorcycles has increased by 15.8% within four years to 525 751 registered motorcycles in 2007. In addition, the proportion of motorcycles has also increased to 49.9% of all vehicles on Bangladesh's roads\(^\text{27}\).

**Thailand:** The latest cross-sectional national community survey on injury was conducted between September 2003 and April 2004 with a sample size of 100 179 households, covering 389 531 persons. The survey showed that motorcycles were involved in 74% of child deaths-related transport injuries in children aged 1–17 years which occurred when children were riding on motorcycles, 85% of transport injury deaths in children aged 10–17 years were of motorcycle riders and drivers. Moreover, in late adolescence, children were killed almost exclusively on or by motorcycles, 92% of transport injury deaths were associated with motorcycles. Among transport injuries (non-fatal), motorcycles caused the largest proportion of transport injuries in children aged 10–14 years and 15–17 years, which accounted for 52% and 88% respectively of all types of road users\(^\text{18}\).

1.6.2 Injury surveillance system in SEAR

According to the injury surveillance system in some countries (India, injury surveillance pilot in two cities, Nepal pilot in three districts, Sri Lanka pilot in four
hospitals and Thailand national surveillance system in 27 provinces, covering 28 hospitals) in 2009, children aged less than 15 years who were injured while using motorcycles accounted for 17.2–61.9% of transport injuries in children (India 17.2%, Nepal 24.6% and Thailand 61.9%).

Among child vehicle users, motorcycle injuries were the most common vehicle-related transport injuries, accounting for 40.4–69.7% of all injured vehicle users in India, Nepal, Sri Lanka, and Thailand with 40.3%, 42.6%, 46.6% and 69.7% injured respectively.

1.6.3 Country-specific information

**India:** According to the “Development of a Feasibility Module for Road Traffic Injury Surveillance”, National Transportation Planning and Research Centre, (two cities, 21 hospitals, three months in 2007); 822 children aged <15 years suffered RTIs, accounting for 35.2% of all causes of injuries in children. (See Table 8). Motorcycle users were the largest proportion of vehicles in RTIs, accounting for 40.4% of all vehicle users, followed by bicycles (31.4%) (Figure 5) However, 50.1% of RTIs in children reported by this study in India were pedestrians and 17.2% were motorcycle users.

**Nepal:** According to the “Situation analysis to strengthen and establish effective injury surveillance system in two districts (Kathmandu and Bhaktapur)” in 2008, data showed that motorcycle drivers and passengers accounted for 46.6% (58/267 cases) of child transport injury cases in children age less than 15 years. (See Figure 6).

**Sri Lanka:** According to the pilot injury surveillance system (six sentinel hospitals, Batticaloa·TH, Colombo South-TH, Galle-TH, Horana·BH, Kaluthara·GH, NHSL) during January–April 2009 it was found that among injured vehicle users in children aged 0–14 years, motorcycles were the second highest number of vehicles used, accounting for 42.6% (29/69 cases) of all vehicle-related transport injuries, almost as high as bicycles, which were the highest number and accounted for 47.8% (33/69 cases) (See Figure 7).

**Thailand:** The National Injury Surveillance System was established in 1995 in five volunteer hospitals (Nakon Rajsima, Nakon Sri Thammarat, Rajburi, Lampang and Rajchavithi) and collected data on all injuries and deaths due to external causes (ICD10 Chapter 20: External causes of morbidity and mortality, code V01-Y36). The system covered accidents and poisoning, intentional self-harm and assault cases (which occurred within seven days) of those seeking medical care at the ERs of the sentinel hospitals. In 2001, the Bureau of Epidemiology (formerly Epidemiology Division) modified the data collection criteria so that the system would collect data
Table 8: Number and proportion of road traffic injuries involving motorcycles in children aged <15 years and in all age groups

<table>
<thead>
<tr>
<th>Countries/ Injured patients</th>
<th>All causes of injuries (No.)</th>
<th>RTI</th>
<th>Injured motorcycle users</th>
<th>Injured motorcycle users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>% RTI of all causes</td>
<td>No.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>India</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All age</td>
<td>32 188</td>
<td>14 125</td>
<td>43.90</td>
<td>5 327</td>
</tr>
<tr>
<td>&lt;15 years *(Col %)</td>
<td>2 357 *(7.3)</td>
<td>822 *(5.8)</td>
<td>35.20</td>
<td>141 *(2.6)</td>
</tr>
<tr>
<td><strong>Nepal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All age</td>
<td>980</td>
<td>446</td>
<td>45.50</td>
<td>216</td>
</tr>
<tr>
<td>&lt;15 years *(Col %)</td>
<td>192 *(19.6)</td>
<td>72 *(16.1)</td>
<td>37.50</td>
<td>19 *(8.9)</td>
</tr>
<tr>
<td><strong>Sri Lanka</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All age</td>
<td>19 679</td>
<td>5 529</td>
<td>28.10</td>
<td>NA</td>
</tr>
<tr>
<td>&lt;15 years *(Col %)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Thailand</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All age</td>
<td>158 685</td>
<td>73 775</td>
<td>46.50</td>
<td>58 27</td>
</tr>
<tr>
<td>&lt;15 years *(Col %)</td>
<td>23 835 *(15)</td>
<td>8 865 *(12)</td>
<td>41.70</td>
<td>7830 *(13.4)</td>
</tr>
</tbody>
</table>

* (Col %) % children of all age groups, ** Sri Lanka (January–April 2009)

Sources:

India: (two cities data), Shah B. Development of Feasibility Module for Road Traffic Injury Surveillance. National Transportation Planning and research Center, NTPRC, (21 hospitals, three months 2007). India, 2007

Nepal: Final report “Situation Analysis to Strengthen and Establish Effective Injury Surveillance System in two districts (Kathmandu and Bhaktapur), Nepal 2007


Figure 5: Number and proportion of vehicles user-related road traffic injuries (passengers and drivers) in children aged under 15 years, India 2007


Figure 6: Number and proportion of vehicles user-related road traffic injuries (passengers and drivers) in children under 15 years, Nepal 2007

Sources: Final report “Situation Analysis to strengthen and establish effective injury surveillance system in two districts (Kathmandu and Bhaktapur), Nepal 2007”
Figure 7: Number and proportion of vehicles user-related road traffic injuries (passengers and drivers) in children under 15 years, Sri Lanka 2009


on only severe injury cases (dead before arrival, dead at ER and admitted/observed cases) in order to reduce the surveillance workload and still be able to determine severe injuries in the country. Currently, 30 sentinel hospitals are participating at the national level (MOPH’s Maharaj hospitals-size of more than 1000 beds and regional hospitals with a capacity of 700–1000+ beds, including two hospitals in Bangkok). The surveillance system data reveal that motorcycles (with motorcycle drivers and pillion passengers) were the most common vehicles involved in transport-related injuries among children aged 0–14 years since 1996. It was reported in 2000 that in 1995, the number of children injured due to driving motorcycles was as high as 70.7–90.7% of all child vehicle users and the number of children who died was as high as 66.7–100% of all types of vehicle users in children aged 0–14 years.28 The reporter titled “Trends and epidemiology of childhood injuries in Thailand, 1998–2001 and transport crashes in children aged 0–14 years in 2002” also cited motorcycles as the most common vehicle involved in transport injuries.29

In 2007, 24 970 children aged <15 years were severely injured in transport crashes reported from 29 sentinel hospitals. Among transport injuries, motorcycle riders (passengers and drivers) were the most common road users in children <15 years (61.9%).26,30 Both the number and proportion of severely injured children riding on motorcycles (motorcycle drivers and passengers) among all severely injured transport users increased from 64.9% of all vehicle users in 2002 to 69.7% in 2007. (See Figure 8).
Age distribution of severely injured child motorcycle passengers and child motorcycle drivers in Thailand is remarkably unique and specific to the Region. In 2009, the youngest age of severely injured child motorcycle passengers was reported to be as young as one month old (46 cases reported). The distribution by age of injured child reached its first peak at the age of 2–4 years. It then decreased and gradually increased again from nine years and rapidly after 11 years to reach the second peak at 14 years (See Figure 9). However, the increase in age distribution actually continues reaching the real peak at 15–16 years old.

For severely injured motorcycle drivers in Thailand in 2009, the youngest was reported to be eight years old. The distribution increased clearly after 10 years and sky-rocketed after 11 years to reach the peak at 16–18 years old See Figure 9. These findings have been reported by Santijiarakul S since 2003.31

Thailand has no law to limit the age of child passengers. The youngest age to be eligible for a motorcycle licence is 15 years, but this is for a motorcycle with an engine capacity of <70 cc only, which is not available any more in the market. However, it is commonly seen that children drive motorcycles to school from the age of nine years.

Motorcycle injury contributes a large number of RTIs of children, i.e., 70.2% of all injured child drivers drove motorcycles, 71.7% of all injured child vehicle passengers were on motorcycles, and, 60.8% of all pedestrians were hit by motorcycles. (See Figure 10).
**Figure 9:** Number of motorcycle user injuries (drivers and passengers) `Thailand 2009`

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>500</td>
</tr>
<tr>
<td>4</td>
<td>1000</td>
</tr>
<tr>
<td>6</td>
<td>1500</td>
</tr>
<tr>
<td>8</td>
<td>2000</td>
</tr>
<tr>
<td>10</td>
<td>2500</td>
</tr>
</tbody>
</table>


**Figure 10:** Transport injury in children aged <15 years, by type of road users, Thailand, 2009

- **Pedestrians were hit by**
  - **Motorcycles 60.8%**
  - Pick-up vehicles 25.4%
  - Sedan vehicles 5.3%
  - Truck vehicles 1.9%
  - Others 6.6%

- **Drivers of**
  - **Motorcycles 71.7%**
  - Bicycles 27.7%
  - Pick-up vehicles 0.2%
  - Others 0.4%

- **Passengers of**
  - **Motorcycles 70.2%**
  - Pick-up vehicles 13.3%
  - Bicycles 8.5%
  - Sedans 2.0%
  - Others 6.1%

Source: Sentinel hospitals, National Injury Surveillance System, Bureau of Epidemiology, Ministry of Public Health, Thailand
1.6.4 Risky behaviours in countries of the SEA Region

1.6.4.1 Motorcycle driven by young motorcyclists without a licence

Data pertaining to injuries or injury reports regarding the minimum age of young motorcycle drivers and other risk behaviours such as not using helmet, and alcohol involvement, are available in two out of 11 countries in the Region.

According to the Road Traffic Injury Surveillance Report (two cities study: 21 hospitals, three months in 2007) from the National Transportation Planning and Research Centre (NTPRC), Thiruvananthapuram, Kerala, India – among 828 children aged <15 years injured in road traffic crashes and there were 108 motorcycle users aged 5–15 years. Among those injured, 15.7% were motorcycle drivers (17/108 cases). However, this report did not present the youngest case from this age group (5–15 years old).22

A study in Yamunanagar, India (where boys as young as eight years ride motorcycles), covering 1760 male school children aged between 10 and 16 years (mean age 12.54, standard deviation (+-)1.24 published in 2007), 15% of subjects self-reported an accident while riding a motorcycle. The number of riders and those crashes were very similar in the sixth- and seventh-standard children, but the figures nearly doubled in the eighth standard. Accident involvement rates were 12%, 16% and 17% in the sixth, seventh and eighth standards, respectively32. (See Table 9).32

The percentage of subjects involved in an accident was higher, in the range 20–25%, in those with >3 years of experience, in those riding >40 km/h, in those riding 5–7 days/week and in those with riding distance >400 km/week, and these were individually significant (with unadjusted odds ratios each of 1.5 or greater). For the riding experience factor, there was also a steady pattern of increase in accident involvement rate (12.6% for <1 year, 18.6% for 2 years and 23.4% for >3 years of experience). A similar trend was observed with the riding distance factor.

Table 9: Number of riders involved in crashes and number free from accident by school class, Yamunanagar, India, 2005

<table>
<thead>
<tr>
<th>Class (Grade)</th>
<th>Number of riders</th>
<th>% involved with accidents in each class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accident-free</td>
<td>Accident-involved</td>
</tr>
<tr>
<td>6</td>
<td>435</td>
<td>57</td>
</tr>
<tr>
<td>7</td>
<td>416</td>
<td>77</td>
</tr>
<tr>
<td>8</td>
<td>644</td>
<td>131</td>
</tr>
</tbody>
</table>

Source: Chandrasekar Rathinam a,1, Nandakumaran Nair b, Ankur Gupta a, Shabnam Joshi a, Sneh Bansal a. Self-reported motorcycle riding behaviour among school children in India. Accident Analysis and Prevention 39 (2007)
For frequency of riding, there was not much difference noted between 1–3 and 3–5 riding days/week. However, a sharp increase (21.6%) in the accident involved rate was observed for those children riding 5–7 days/week, which also remained significant (adjusted odds ratio 1.68) after adjusting for other factors found to be significant in the multivariate analysis.

The following behavioural factors were significantly associated with having been involved in a crash: tailgating, getting angry with other drivers, aggressive behaviour, and encounter with the police and being warned for poor riding. The accident-involved rate associated with reporting ‘yes’ for each of these was above 20% (with unadjusted odds ratio >1.5) and was as high as 39% and 43% for aggressive behaviour and encounter with police, respectively. These two factors also remained significant in the multivariate analysis (adjusted odds ratios of 2.89 and 3.11) along with the warning for poor riding factor (adjusted odds ratio of 1.91).

In the study group, 55% of the children were taught to ride by their parents and 23% by relatives. It implies that parents and society directly or indirectly approve or encourage male children to ride motorcycles. Of the children in this study group, 32.7% (568/1738) were warned for poor riding and the most reported source of warning was the mother, brother or uncle. Although factors show strong association with accident proneness in previous encounters with the police (three times than those who never had an encounter with the police – odds ratio of 3.11; however, police records never show any case registered against the children for under-age riding; they merely warned the children not to ride a motorcycle any more.

Thailand: As early as 1995, the child injury surveillance report of the Ministry of Public Health (four sentinel hospitals, 3440 injured children aged <15 years from transport injuries) revealed that young motorcycle drivers less than 10 years were reported to be injured from RTIs in 1995. The report, “Child injuries in Thailand: Severe injury in children under 15 years old in 2004, and 2005” confirmed that the youngest injured motorcycle driver was seven years old. See Figure 11.

1.6.4.2 Non-use of helmet

India: According to the RTI surveillance report, (21 hospitals, three months in 2007), 95.7% (45/47 cases) of all injured child motorcycle users (less than 15 years old) did not wear helmets at the time of the crash.

Thailand: National injury surveillance reports during the last decade (1995–2007 reported from 29 sentinel hospitals, including two in Bangkok and 27 hospitals in major provinces) have stated that more than 95% of injured child motorcycle riders (drivers and passengers) did not wear helmets. During 1995–2005, the proportion
Motorcycle-related injuries in children in the South-East Asia Region

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of non-helmet use decreased from 99.3% in 1995 to 95% in 2005. Research on a design for manufacturing a motorcycle helmet for children aged 3–15 years was initiated by the Child Safety Promotion and Injury Prevention Research Centre (CSIP). This was important for the national Road Safety Directing Centre, the lead agency in Thailand to promote a policy to support manufacture of child motorcycle helmets and helmet-wearing at the national level from 2004–2005. The ministries of public health, industry, interior, transport and education, have collaborated through the National Road Safety Directing Centre, chaired by the Deputy Prime Minister. Besides the increase in the child motorcycle helmet wearing rate, by the end of 2005, there were six manufacturers for standardized child motorcycle helmets in Thailand. However, the proportion of this risk behaviour increased again in 2006 and 2007, accounting for 95.1%, 96.4% respectively.\textsuperscript{28,29,30,31,32,33,34,35} This may be due to lack of strict enforcement.

According to a CSIP survey reported in 2005, (Faculty of Medicine, Ramathibodi Hospital, Mahidol University) covering over 10 000 students in 14 schools in Bangkok, seven out of 10 children who regularly commuted to school by motorcycle did not wear safety helmets. A recent study found that more than 73% of the students did not wear helmets either when travelling with their parents or by motorcycle tax.\textsuperscript{35}

\textbf{Figure 11: Number of child motorcycle driver-injury-related transport accidents, by age, Thailand, 2009}

![Graph showing number of child motorcycle driver-injury-related transport accidents by age, Thailand, 2009](image)

\textit{Source: 28 Sentinel hospitals, National Injury Surveillance Systems, Bureau of Epidemiology, Ministry of Public Health, Thailand}
1.6.4.3 Alcohol involvement in childhood motorcycle injuries

*Thailand:* According to the 1995 expert of National Injury Surveillance System, Bureau of Epidemiology, MOPH, 5.6% of all motorcycle drivers aged <15 years, injured in transport crashes were under the influence of alcohol. The proportion of alcohol involvement in motorcycle injuries in those aged 7–14 years increased during 2004–2005, accounting for 7.4% and 6.7% of the crashes respectively. Becoming slightly lower in 2006, at 6.3%. In addition, the proportion of alcohol involvement in the injured child motorcycle drivers increased by each year of age from 15 to 17 years (15 years – 20.6%, 16 years – 29.7%, and 17 years – 38.7%) of all motorcycle driver injuries in the same age.

1.6.5 Mechanism of motorcycle injuries

*Thailand:* According to the National Injury Surveillance System report in 2007, most motorcycle injuries occurred due to collision by or with other vehicles, animal-drawn vehicle, agricultural vehicle, objects or building, animals, pedestrians, accounting for 58.5% of all severely injured motorcycle users, followed by crashes without collision 36.9%. “The Situation and Trends of Severe injury Report 2005: Severe injury in children under 15 years old” reported that among child motorcycle drivers, 60.1% of motorcycle crashes occurred by collision (collided by or with other vehicles: all types of vehicles, animal-drawn vehicles, agricultural vehicles, objects or buildings, animals, pedestrians) overturned vehicles (38.2%). Of these, 34.7% collided by or with other motorcycles, followed by collision with pick-up truck/van (30.6%), building/things (8.6%).

1.6.6 Consequences of children driving or riding as passengers on motorcycles

1.6.6.1 Psychosocial and behavioural aspects

A qualitative research study report by Chammansuk. P, who spent three years with more than 50 teenagers (13–18 years old) that were members of a motorcycle racing gang in an eastern province in Thailand, has revealed some facts about how riding a motorcycle on their own to school by children has become the normal in the Thai rural context. It has become a custom that the parent buys a motorcycle for children to drive to school, some of their own volition, some by persuasion of the children. These were due, in a large part, by the situation in the provinces outside the capital cities, where children have to travel long distances from home to secondary school, but without adequate public transportation, or if available, the monthly cost of using the public transport is equal to or slightly higher than purchasing a motorcycle under
Motorcycle-related injuries in children in the South-East Asia Region

an instalment plan. Parents prefer to own a motorcycle after paying a monthly instalment for a year. According to Chammansuk’s report, after the children owned a motorcycle, they began to come home late, as the motorcycle provided them with more freedom to go anywhere they liked. Modifying the motorcycle after sale (which is illegal) was usually followed by racing, gambling, and failure in studies, premature sex, crime and forming a gang.

“The motorcycle is the beginning (of problems) as it opens their world. Kids start to go out and their social network is extended. Then they stop studying and that is followed by other problems,” according to Chammansuk’s report.

“I used to be a good boy when I was a child, until Grade 7,” Panadda quotes a 14-year-old gang member as saying. “Actually, the motorcycle has made me misbehave. My life has changed. I have more friends. It is a pleasure to be among friends and the motorcycle is the means to allow me to have more friends.”

According to the report, the gang’s day begins around noon, when they wake up, and ends around three or four o’clock the next morning. Every day, they wake up and go out to meet friends, hang out and chat about the night before. In the late afternoon, when the weather cools down, they begin to buzz around the neighbourhood. Some who have girlfriends will pick up the girls and engage in sexual activity. The group then meets again around 19:00 or 20:00 to buzz around town. When they are tired, they stop, hang out and chat. Then about 23:00 to midnight, they go to the disco or a pub. After the bars close, they ride around again. The day ends at around four in the morning. While for the kids, the motorcycle affords freedom and excitement, the research report presented that the vehicle is actually the gateway to many problems such as drugs, street violence and crime as well as free, unprotected sex. Psychologically, it is the motorcycle that has freed them. While adults see the motorcycle as a risk that needs to be controlled and suppressed, the young motorcyclist sees it as another being that they can spend 24 hours with. Changing from a person who is poor and does poorly in school, the kid suddenly becomes attractive when he has his motorcycle beside him. People his age, and especially girls, begin to pay attention to this status symbol. To the boys, motorcycles are, endowed with values, meanings and utilities more than their transport function. As for the boys who did badly at school and at home, the motorcycle is the only thing that allows them to have social space.

Motorcycle dealers make it easy for kids to begin with owning a bike. Youths need only 900 baht for a down payment. A monthly instalment of a few thousand bahts is never a problem, since the teens are willing to have their motorcycles
seized by the shops whenever they run out of money. If that happens, they just save up another 900 baht for a new bike. “The motorcycle shops love this cycle.”

Road traffic injuries among young motorcyclists are indicative of a larger social problem that has more to do with rampant consumerism than problems the kids suffer from. Measures for reducing death and injuries – either through safe-driving campaigns or arrests – could never solve the problems these adolescents face or the ones they create. Actually, there is a chain of problems. If we can understand the whole problem clearly, we’ll see a new way to solve it. Otherwise, it will just keep looping, according to the report. It also discussed that while we give attention to use on alcohol or cigarettes, we never talk about motorcycle sales. While the authorities have been strict about forcing people to wear a helmet, they never talk about the motorcycle shops or easy payment system. The motorcycle is the cause leading the kids to other problems. It is a big thing that people overlook. It links with social violence and crime.36

1.6.6.2 Consequences of motorcycle crashes

According to the National Injury Surveillance System reports of 2003 and 2007 body regions are classified by the International Injury Severity Scoring (ISS) system and injury severity by using abbreviated injury scales, 1985 developed by the Association for Advancement of Automotive Medicine (AIS-85). Among child motorcycle injuries, 37.3% (1829/4919 cases) of children had head injuries, of these, 8.3% were with severe brain injury (coma score: 3–8).14 Almost one fourth (24.4%) of child motorcycle drivers and passengers with severe injury were graded as serious (AIS score 3) and virtually non-survivable (AIS score 6).26

- **Date and time of occurrence in children**
  Motorcycle injuries occurred most commonly during weekends (38.0%), and during 16:00–19:59 (40.3%), 12:00–15:59 (23%), and 08:00–11:59 (17.4%).31

- **Injured patients (children)**
  Motorcycle injuries were more common in males (68% from India, Road Traffic Injury Surveillance and Thailand, MOPH Injury Surveillance System).22, 30
2. Motorcycles

2.1 Number of motorcycles

Motorcycles contributed to the largest number and proportion of all types of registered vehicles on the road of the South-East Asia Region. According to recent data, about 90 million motorcycles are registered in nine out of 11 SEA countries (no data available from Democratic People’s Republic of Korea and Timor-Leste), which is approximately 69.5% of all types of registered vehicles in this Region (129 219 587 registered vehicles) These numbers were 23 million higher than the number of WHO’s estimate in 2006 that there were approximately 67 million registered motorcycle in the countries of SEAR by the year 2004–2009. See Table 10.

From data covering nine countries in the Region, the proportion of registered motorcycles was 18.8–81.8% of all registered vehicles. In eight out of nine countries in the Region, motorcycles have contributed to the biggest portion of all registered vehicles with the range from 50.3–81.8%. Bhutan has the lowest proportion of motorcycles among all registered vehicles, while Nepal has the highest proportion of motorcycles, followed by Maldives, Indonesia, India and Myanmar with 79.9%, 75.2%, 71.4% and 63.8% respectively. The proportion of motorcycles was high during the last decade in India (68.8–71.4%), Sri Lanka (47.8–50.3%) and Thailand (67.9–65.3%) respectively (Figures 12–14). However, Thailand has the largest number of registered motorcycles per number of children, 1205/1000 children aged <15 years, whereas the range of other countries is (0.3–335)/1000 children. (See Table 10).

2.2 Growth of motorcycles in the SEAR

During the last decade, according to reports from countries in the Region, the number of registered motorcycles has increased substantially. Particularly in India, from 1991 to 2004, the number of registered motorcycles increased from 21 374 000 to 72 718 000 motorcycles which is equal to a 340% increase. Also in Thailand, from 1990 to 2006, the number of registered motorcycles showed a 336% increase (7 117 298 to 23 958 454) and in Sri Lanka from 1990 to 2006, motorcycles increased by 363% (391 732 to 1 422 140). Motorcycles in this Region have continued to increase rapidly every year. (See Figures 12–14).
Table 10: Cumulative number of registered vehicles and number of motorcycles per population and child population, South-East Asia Region, during 2004–2009

<table>
<thead>
<tr>
<th>Countries in the Region</th>
<th>Registered vehicles (Number)</th>
<th>Registered motorcycles (Number)</th>
<th>Motorcycles (% of all vehicle)</th>
<th>Motorcycles (per 1000 population)</th>
<th>Motorcycles (per 1000 children)</th>
<th>All vehicles (per 1000 children)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>1 054 057</td>
<td>525 751</td>
<td>49.9</td>
<td>3.4</td>
<td>9.7</td>
<td>19.5</td>
</tr>
<tr>
<td>Bhutan</td>
<td>41 262</td>
<td>7 740</td>
<td>18.8</td>
<td>11.5</td>
<td>36.9</td>
<td>196.5</td>
</tr>
<tr>
<td>India</td>
<td>72 718 000</td>
<td>51 922 000</td>
<td>71.4</td>
<td>45.2</td>
<td>143.7</td>
<td>201.2</td>
</tr>
<tr>
<td>Indonesia*</td>
<td>24 995 000</td>
<td>18 796 000</td>
<td>75.2</td>
<td>0.1</td>
<td>0.3</td>
<td>278.4</td>
</tr>
<tr>
<td>Maldives</td>
<td>39 338</td>
<td>31 414</td>
<td>79.9</td>
<td>105.1</td>
<td>334.9</td>
<td>419.4</td>
</tr>
<tr>
<td>Myanmar</td>
<td>1 032 842</td>
<td>658 997</td>
<td>63.8</td>
<td>11.5</td>
<td>35.6</td>
<td>55.7</td>
</tr>
<tr>
<td>Nepal</td>
<td>88 735</td>
<td>72 568</td>
<td>81.8</td>
<td>3.2</td>
<td>8.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Sri Lanka **</td>
<td>2 827 000</td>
<td>1 422 140</td>
<td>50.3</td>
<td>67.3</td>
<td>279.3</td>
<td>555.2</td>
</tr>
<tr>
<td>Thailand</td>
<td>26 417 353</td>
<td>16 425 262</td>
<td>62.2</td>
<td>260.2</td>
<td>1 204.6</td>
<td>1 937.5</td>
</tr>
<tr>
<td>Democratic Republic of Korea</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>All nine countries</td>
<td>129 213 587</td>
<td>89 861 872</td>
<td>69.5</td>
<td>52.7</td>
<td>169.7</td>
<td>244.1</td>
</tr>
</tbody>
</table>

Source:
- Bangladesh Road Transport Authority 2007
- Road Safety and Transport Authority, Bhutan, Feb 2009,
- Santikarn C. CS CDC-ICMR Rider protection, Aug 28, 2007 (Ppt. presentation)
- Road traffic injury prevention in India (2004–2005)
- Centre for Community Health and Disease Control, Ministry of Health and Family, Maldives, 2007
- Myanmar Police Force 2008
- Department of Vehicle and Transport management, Nepal, 2007
- Department of Motor Traffic, Sri Lanka, 2006
- ** ESCAP, Toward a Ministerial Declaration on Road Safety in Asia and the Pacific, Network: regional experiences and lessons for financing highway infrastructure and improving road safety, 8–10 May 2006, Bangkok, Study reports of the ASEAN Road Safety Program, and ADB project [http://www.unescap.org/]
- Policy and Planning, Ministry of Transport, Thailand, 2008

Population data source:
Figure 12: Proportion of registered vehicles, India, 1996–2004
(72 718 000 registered vehicles in 2004)

Source: Ministry of Road Transport, India

Figure 13: Proportion of registered vehicles, Sri Lanka 1990–2006
(2 827 902 registered vehicles in 2006)

Source: Department of Motor Traffic, Sri Lanka
Figure 14: Proportion of registered vehicles, Thailand, 1989–2008

Source: Department of Land Transportation, Ministry of Transport, Thailand

Figure 15: Cumulative number of registered motorcycles, India, 1996–2004

Source: Ministry of Road Transport, India
**Figure 16:** Cumulative number of registered vehicles, Thailand, 1989–2008

![Cumulative number of registered vehicles, Thailand, 1989–2008](image)

Source: Department of Land Transportation, Ministry of Transport, Thailand 2008

**Figure 17:** Cumulative number of registered motorcycles, Sri Lanka, 1990–2006

![Cumulative number of registered motorcycles, Sri Lanka, 1990–2006](image)

Source: Department of Motor Traffic, Sri Lanka
Major findings

(1) Data - There are four countries in SEAR with some sources of information on child injuries (India, Nepal, Sri Lanka, and Thailand). Only India (two cities data) and Thailand (national injury surveillance data) could provide analysed information pertaining to 2009 on epidemiology of motorcycle-related injuries in children aged less than 15 years.

(2) Vehicles – Motorcycles, are the most common vehicles running on the Region’s roads. Many are cheap, small but with high speed. A motorcycle rider has 26 times the risk to die. Motorcycles accounted for 70% of all registered vehicles in SEAR (80% in Maldives, 75% in Indonesia, and 71% in India.

(3) Vulnerable users and risk –

- Motorcycles were also the most common vehicles involved in transport injuries in children (40–70% of all vehicle users in transport injuries). Two thirds of child motorcycle injuries were among males (68%).

- Almost all children injured from riding on motorcycles did not wear helmets. In India and Thailand, 96% of those injured in motorcycle crashes in 2007 were not wearing helmets.

- 6% of injuries suffered by child motorcycle drivers were alcohol-related. The use of motorcycles by children is extremely dangerous to themselves and also to other road users.

- Among child motorcycle drivers, 60% of motorcycle crashes occurred due to collision (collision by or with other vehicles: all types of vehicles, animal-drawn vehicle, and agricultural vehicle, objects or building, animals, pedestrians). Of these collisions, 35% collisions were by or with other motorcycles, followed by pick-ups truck/vans (31%), buildings/things (9%). Another reason of injury was overturning of the vehicle (38%). 37% of motorcycle crashes resulted in head and neck injuries and 8% resulted in severe brain injury (coma score: 3–8).

- According to national injury surveillance reports from Thailand, since 2005, transport injury cases of children <15 years old involved mostly motorcycles, whether as passengers, drivers or as pedestrians hit by a motorcycle.
– Children <15 years were taught or allowed by parents or relatives to drive a motorcycle, inspite of encounters with the police (especially for those accident-prone). No cases were generally registered against them and the children were merely warned not to ride motorcycles any more.

– Children were warned against driving by the mother, brother, uncle, but could still ride a motorcycle; there being no prohibition from driving.

(4) Consequences of motorcycle driving, or riding as passengers

– There are psychosocial consequences of allowing children to drive a motorcycle and also consequences after crashes and injuries. Both aspects can be serious enough to ruin the life and future of the children. The burden of the consequences of the problem on society is obvious. The marketing process in some countries facilitates children to own a motorcycle.

(5) Lack of, or the high cost of public transportation in many countries in the Region, especially schoolgoing children, has made many hundreds of thousands of under-age children drive their own or parents’ motorcycle to school, and also gradually in their business. Moreover, this behaviour is further promoted by aggressive advertising and marketing by the motorcycle manufacturers.
Conclusion

1. Lack of detailed information on child RTI death and vehicle-related

Most countries in the Region do not have national representative injury information on children; death certificates in most countries cover < 25% of all death and there is lack of detailed information on child and specific age and type of vehicle-related transport injury. Preventive intervention specifically to motorcycle related injuries are not adequate in the develop countries due to difference in priority on motorcycles.

Many people in countries of the Region use their motorcycles as a family vehicle which needs to be closely monitored and interventions designed specifically. This may not be easily transferred from the developed countries due to the large differences in the number of motorcycles and the efficiency of the road safety system.

2. The problem of motorcycle-related injuries in children is growing

According to available information, the distribution of children severely injured in motorcycle-related crashes increases by age from 10 years to be the highest at the age of 17–18 years. In addition, a distribution by age of head injuries from motorcycle related-transport injuries shows the increase by age to be exactly the same as those in severely injured children from motorcycle-related-transport crashes\textsuperscript{37,38}. Motorcycle use by children aged <15 years is extremely dangerous. This problem is not only found in low- and middle-income countries (including countries in Africa and the Middle East) but also in high-income countries, such as US, Australia and Canada, even though the number of registered motorcycles is only 2–3% of all registered vehicles. They are seriously concerned about child motorcycle injuries. Injured children aged below five years who rode on a motorcycle as pillion riders are reported from the retrospective chart reviews of all admissions of children aged <15 years from 1998–2005 in Orange Base Hospital, New Zealand. A report shows that the youngest of motorcycle injuries was only two years old (passenger), 91.5% were motorcycle drivers. However, 49% of injuries occurred in their farm, 25% in the home area and 4.1% on roads\textsuperscript{39}. In Canada, the Cincinnati Children’s Hospital Medical Centre study (1995–2001), showed that children (aged <16 years.) often ride motorbikes on public roads (35.5%) and, most of the time, without wearing helmets (53.9%), leading to significantly increased severity of injury\textsuperscript{40}. The
A retrospective analysis of paediatric motorcycle injuries in those aged ≤16 years (1 July 2000–30 June 2004) from statewide emergency department database, found that the incidence of motorcycle-related injuries is increasing in children. Even though most injuries of children are off-road injuries, they expressed the urgent need for coordinated legislative changes and educational efforts to decrease motorcycle injuries in children.

In low-income countries, motorcycles are used by the family as a multi-purpose vehicle, as well as students’ vehicles. Motorcycles that are everywhere in most South-East Asian countries are with an engine capacity of 100–150 cc, cheaper and smaller than other types of motorcycles. In Thailand, family motorcycles are the most common types of motorcycles used by Thai people including children <15 years, 78% in 2005 and 56% in 2006. Moreover, young children on motorcycles (drivers and passengers) are found in every country in the Region, especially in rural areas. They drive their cheaper and smaller motorcycles at high speed, designed to share the roads with fast-moving cars and trucks, in mixed-traffic without driving licences and ignore the use of helmets (96%). They get injured more than children in high-income countries, but the main problem is lack of data on child motorcycle injuries in nine out of 11 countries in the Region. Lack of data and research on this issue has hampered the process to advocate for a specific policy to protect children from motorcycle injuries in the Region.

3. The growing problem of motorcycle related injuries and deaths is associated with the growing motorcycle sales volume

Leonard J., Paulozzi LJ. Of the Division of Unintentional Injury Prevention, National Centre for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, United States of America has found that motorcycles sold in the United States during 2000–2003 were associated with motorcycle deaths in 2003. Two possible explanations for the association between high sales volumes and mortality rates are: (a) increased exposure from more extensive use of motorcycles when they are new; and (b) inexperience with motorcycle riding or with specific motorcycles. Moreover, this study suggests that the deaths of growing numbers of motorcyclists are a consequence of the financial success of the motorcycle industry. According to 2005 data from the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), total traffic deaths in the United States in the last ten years have increased by 2%, while motorcycle rider deaths were up by 80% as compared to 1995.

Motorcycle-related problems among children in countries of the Region may be unexpected, but the increase in motorcycle use in the countries was not unplanned.
According to the motorcycle production record of one of the leading companies in motorcycle commercial production in the world, Thailand was the first country in ASEAN and South Asia to have motorcycles followed by other ASEAN countries in 1967; followed by 1969 in Malaysia, 1971 in Indonesia, 1973 in Philippines, 1985 in India, 1992 in China and 1997 in Viet Nam. An epidemic of child motorcycle injuries has already been reported in Thailand. In the absence of an appropriate response, it may spread to the surrounding countries sooner or later.

4. A connection between the rider, riding style and type of motorcycle

According to NHTSA, per vehicle mile travelled in 2004, motorcyclists were 35 times more likely than passenger of car occupants to die in a traffic crash and eight times more likely to be injured. and as per the data from the Naval Safety Centre, a motorcyclist was 20 times more likely to be injured on a motorcycle than in a car. Often, there is a connection between the rider, riding style and type of motorcycle. The young service member may be attracted to a motorcycle’s price vs. the high level of performance (The Decision to Ride -- Accepting the Risk, Naval Safety Centre).

5. The issue of risk tax on motorcycle sales and ownership should be considered

While the motorcycle industry enjoys financial success in motorcycle sales, governments in the SEAR are facing more motorcycle-related problems, especially motorcycle racing gangs and injuries among motorcycle riders. The issue of risk tax on motorcycle sales and ownership should be considered by governments in developing countries in order to strengthen the concerned systems related to motorcycle use data, vehicle safety monitoring, and road design for motorcycle safety etc.

6. The association between increased years of driving and a decrease in motorcycle crash risk in adults cannot be applied to children and adolescents.

The study in Yamunanagar, India, shows that with more motorcycle riding experience in children, there was a tendency for higher rates of crashes to occur. It was also seen in the study that a higher crash rate is associated with higher frequency in riding days and longer riding distances. This is in line with what Lin et al. (2003) found from motorcycle crashes among junior college students in Taiwan that the risk of motorcycle crash increased with the increase in the number of riding days and with average riding distance.
Riding at higher speed is common in young age and is seen as a major cause for accident\textsuperscript{46,47,48,49} and the Yamunanagar study supports this view. Even though the data in most countries was small, not representing the country and not able to show trends, however, these can be used as sentinel events to detect the potential public health problem. It is known that a new health problem detected in one country may, after some time, become a health problem in other countries in this era of globalization. In Thailand, motorcycle riders’ injuries were reported as the highest proportion of transport crash victims among all ages as early as 1995. At present, other countries in the Region are reporting similarly. The pattern in child motorcycle-related injuries and deaths in Thailand, the social context which urged the children to drive motorcycle in Thailand and India, the psychosocial and behavioural consequences of children after driving/owning motorcycles and the biomedical consequences (injuries and disabilities) may again be seen in other countries in the Region; if nothing is done specifically to prevent and respond to this problem.
Recommendations

(1) Police RTI data system at national level, death statistics system and hospital admission data system, especially on causes of child injuries and deaths should be improved.

(2) The injury surveillance systems should be established and strengthened to generate national RTI data and also child RTI deaths and injury.

(3) All agencies should effectively implement and enforce laws regarding helmet wearing, driving under the influence of alcohol, speed control, and modification of motorcycles after sale. Assistance to law/enforcement for road safety should be provided by all sections of society.

(4) Police should strictly enforce rules preventing children from driving motorcycles on licence ownership and the capacity of the motorcycle engine allowed, in order to protect the child drivers and other road users.

(5) Awareness should be created among all stakeholders regarding the dangers of transporting children younger than five years on motorcycles, and that children below two years are at the highest risk, because at present, head protection devices for children below two years are not available.

(6) Member States should strengthen cooperation among themselves to develop national standards for child motorcycle helmets including standards for conspicuity.

(7) Member States should consider the mandatory provision of two helmets (including the availability of standard helmets for children) along with sale of motorcycles, and placing of warnings on motorcycles regarding carriage of children below five years old, as they are at higher risk than adults. This issue of risk tax on motorcycle sales and ownership should be considered in countries when there is very high incidence of motorcycle related injuries and deaths.
(8) Governments at the national, provincial and municipal levels should consider policies concerning neighbourhood schools and adequate public transport facilities (including free or subsidized for children) that would obviate the need for transporting children on motorcycles;

(9) Research capacity in countries of SEAR in the area of motorcycle injuries among children, should be strengthened, especially with regard to the appropriate age for legal permission to drive motorcycle safely; as well as use of better helmets, particularly for children under five years of age;

(10) A model for addressing motorcycle injuries in children should be developed and piloted taking into consideration the sociocultural context.
References


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Motorcycle-related injuries in children in the South-East Asia Region


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The motorcycle is the most common vehicle involved in transport-related injuries in many countries in the South East Asia Region. It is also a popular mode transport for children and families in many countries in the Region. Motorcycles, of which the rider has 26 times the risk to die, are the most common vehicles running on the Region’s roads. Many are cheap, small but with high speed and not stable. Children are at greater risk when they ride on motorcycles as passengers. This report unveils the consequences of motorcycle use among children and also consequences after crashes and injuries.

Wide range of recent data sources including official reports, injury surveillance information as well as surveys and scientific publications on motorcycle-related transport injuries in children aged less than 15 years were reviewed and analyzed for the report. The situation, risk factors and risk behaviors of the motorcycle-related injuries in children aged <15 years were elucidated. Based on the evidence, the recommendations for reducing motorcycle-related injuries in children aged <15 years are made for member countries.