Analysis of traffic injury severity in a mega city of a developing country

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Introduction

• Research on the identification of factors affecting traffic injury severity:
  ▪ much has been conducted in the developed world
  ▪ little is known about developing countries

• Developing countries:
  ▪ two-thirds of global injuries (Fatmi et al., 2007)
  ▪ 85% of the deaths from traffic injuries; and
  ▪ 90% of annual disability adjusted life years lost by road traffic injury (World Health Organisation, 2004).
Research objectives

• Two objectives:
  ▪ first, to identify factors that influence traffic injury severity in a developing country; and
  ▪ second, to compare with factors identified in the literature from developed country.
Case study: developing country

- **Bangladesh** was chosen
  - highest fatality rate (100 deaths/10,000 motor vehicles) (UNESCAP, 2007)
  - India (25.3), Sri Lanka (16), Malaysia (5.5), USA (2.1), and UK (1.4) (Ahsan, 2012)
  - fatalities increased 3.5 times to 3000 deaths/yr
  - vehicle 2-10/1000 person (India 12, Sri Lanka 25, UK 426, USA 765)
Case study: Bangladesh

• Dhaka, the capital of Bangladesh:
  ▪ 14 million people
  ▪ Non-motorised modes dominate (e.g. walk 20%, rickshaw 40%, bus 30%, car 5%) (Ministry of Environment and Forest and Ministry of Communication, 2010).
Data

- **Source:** Dhaka Metropolitan Police
- **Accident reporting form**
- **2714 collisions ’07 - ’11**
- **12 variables**
Method

• Outcome variable ‘injury severity’ was measured as ordered category with 4 levels
• Categorical explanatory variables
• An ordered Probit regression model was estimated
### Results

| Explanatory factors | Coef. | z    | P>|z| |
|---------------------|-------|------|-----|
| Number of vehicles: single (ref: multi) | 1.48  | 27.30| 0.00|
| Traffic control: only police (ref: uncontrolled) | -0.31 | -5.20| 0.00|
| Intersection type: 4 way (ref: not in an intersection) | -0.13 | -1.61| 0.10|
| Intersection type: roundabout (ref: not in an intersection) | -0.41 | -1.76| 0.08|
| Traffic flow direction: two way (ref: one way) | -0.16 | -1.87| 0.06|
| Presence of road divider: no (ref: yes) | 0.41  | 4.13 | 0.00|
| Time of day/light condition: night (ref: day) | 0.20  | 3.36 | 0.00|
| Time of day/light condition: dawn/dusk (ref: day) | 0.42  | 4.74 | 0.00|
| Road class: city and feeder road (ref: highway) | -0.40 | -6.87| 0.00|

/cut1 0.89
/cut2 1.13
/cut3 1.81

Log likelihood = -2032.71  Pseudo R² = 0.19  N = 2714
### Discussion and conclusion

<table>
<thead>
<tr>
<th>Factors</th>
<th>Severity impact This research</th>
<th>Severity impact Developed countries</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles involved: one</td>
<td>Increased</td>
<td>Increased</td>
<td>Miles-Doan (1996)</td>
</tr>
<tr>
<td>Traffic control</td>
<td>Mixed</td>
<td>Mixed</td>
<td>Pitt et al. (1990); Lee and Abdel-Aty (2005)</td>
</tr>
<tr>
<td>4-way intersection</td>
<td>Decreased</td>
<td>No effect</td>
<td>Quddus et al. (2002)</td>
</tr>
<tr>
<td>Roundabouts</td>
<td>Decreased</td>
<td>Increased</td>
<td>Boufous et al. (2008)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreased</td>
<td>Gray et al. (2008)</td>
</tr>
<tr>
<td>One way</td>
<td>Increased</td>
<td>Decreased</td>
<td>Sze and Wong (2007)</td>
</tr>
<tr>
<td>Highways</td>
<td>Increased</td>
<td>Increased</td>
<td>Miles-Doan (1996); Sze and Wong (2007)</td>
</tr>
<tr>
<td>Darker period of time</td>
<td>Increased</td>
<td>Increased</td>
<td>Kim et al. (2007); Klop and Khattak (1999)</td>
</tr>
<tr>
<td>Presence of road divider</td>
<td>Decreased</td>
<td>Decreased</td>
<td>Quddus et al. (2002)</td>
</tr>
</tbody>
</table>


Thank You

Question?