Road Accidents Involving Drivers Employed with an Agricultural Complex in the Town of Vinkovci

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Introduction

The Organization of Employment "Poljoprivreda" of the Agricultural Complex "Vinkovci" employs also drivers. In 1987 it had 116 professional drivers responsible for a total of 380 motor vehicles.

This survey encompasses a three-year period (1984-1986). During this period the surveyed drivers had been involved in a total of 40 road accidents, and had been responsible for 15 road accidents.

This study will try to evaluate the plausibility of the given hypothesis according to which there exists a statistically significant difference between drivers with completed secondary school education and drivers with incomplete or complete primary school education with regard to their responsibility for road accidents they have reportedly been involved in.

Types of road accidents are shown in Table 1.

**Table 1. Types of surveyed road accidents**

<table>
<thead>
<tr>
<th>Type of accident</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vehicle collisions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- opposite direction</td>
<td>3</td>
<td>6.7</td>
</tr>
<tr>
<td>- side collision</td>
<td>4</td>
<td>12.3</td>
</tr>
<tr>
<td>- same direction</td>
<td>10</td>
<td>23.6</td>
</tr>
<tr>
<td>- parallel driving</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>2. Collision with a parked vehicle</td>
<td>9</td>
<td>21.3</td>
</tr>
<tr>
<td>3. Collision with a me object on the road</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>4. Sliding-off the road</td>
<td>5</td>
<td>13.5</td>
</tr>
<tr>
<td>5. Other</td>
<td>6</td>
<td>15.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

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The presented road accidents had been due to the following driver mistakes:
- high speed, in discord with the road conditions and vehicle volumes (32 per cent of reported cases);
- failure to give right of way (11 per cent of reported cases);
- failure to observe safety requirements when passing-by other vehicles (10.5 per cent of reported cases);
- failure to observe safety requirements when overtaking another vehicle (8 per cent of reported cases);
- poorly carried out turn maneuvers (8 per cent of reported cases);
- poorly carried out maneuvers when joining in traffic circulating on a lane (5 per cent of reported cases).

Following the given hypothesis, we shall inquire into the accident involvement of the chosen driver population exclusively with regard to the completed education. The statistical method of testing the difference in the proportion of accident involvement reported in the surveyed educated/noneducated drivers has been applied. A total number of 116 drivers will be surveyed, divided into two groups: \( N_1 = 72 \) drivers, with incomplete or complete primary school education and \( N_2 = 44 \) drivers, with secondary school education. Thirteen drivers from the first group and two drivers from the second group had been involved in road accidents in the observed period.

Since the \( N_1 \) and \( N_2 \) are relatively small numbers (less than 100), the method of testing the difference between small independent samples, combining the proportions of both driver groups, will be applied.

\[
N_1 = 72 \text{ drivers, } \quad p_1 = 13/72 = 0.1805 \\
N_2 = 44 \text{ drivers, } \quad p_2 = 3/44 = 0.0454
\]

Overall proportion, \((0.1805 \times 72) + (0.0454 \times 44)\)

\[
p = \frac{(0.1805 \times 72) + (0.0454 \times 44)}{116} = 0.129
\]

\[
q = 1 - p = 1 - 0.129 = 0.871
\]

Standard error = \( \sqrt{p_1 - p_2} \)

\[
\sqrt{p_1 - p_2} = 0.129 \times 0.871 \times (1 + 1) = 0.064\]

\[
\frac{72}{44}
\]

Difference in proportions \( p_1 - p_2 = 0.1805 - 0.0454 = 0.135 \)

\[
t = \frac{0.135}{0.064} = 2.11 \text{ with } P \quad 0.05 \text{ (the probability of error being less than 5 per cent)}
\]

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The computed difference between the tested proportions of accident involvement of the two surveyed driver groups (t being over 1.96) is considered to be statistically significant at the risk level of 5 per cent.

Table 2 shows the proportion of drivers responsible for accidents in all surveyed drivers with regard to completed education.

**Table 2.**

<table>
<thead>
<tr>
<th>Education</th>
<th>accident involvement number</th>
<th>proportion in all surveyed drivers number</th>
</tr>
</thead>
<tbody>
<tr>
<td>no education</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>incomplete primary school</td>
<td>2</td>
<td>14.3%</td>
</tr>
<tr>
<td>primary school</td>
<td>11</td>
<td>78.6%</td>
</tr>
<tr>
<td>secondary school</td>
<td>2</td>
<td>7.1%</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>116</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Secretariat of Internal Affairs of the Town of Vinkovci and Insurance Company »Croatia«, Vinkovci (2,3)

Evidence presented in Table 2 also supports the given hypothesis, disclosing a higher incidence of accident involvement in drivers with incomplete primary school or primary school compared with their proportion in all surveyed drivers.

The available evidence of the surveyed road accidents did not supply sufficient information about all factors contributing to accidents and affecting road safety. It can however be assumed that the generally recognized factors (such as distribution of accidents by hours of the day, days of the week, etc., age-dependent factors, driving experience and length of service) also had a prominent role in the surveyed accidents.

The accident causation analysis for the observed three-year period in the chosen driver population has pointed to the most frequent causes:
- major driver mistakes (negligence) - reported in 56 per cent of the surveyed cases;
- poor driving performance - 22 per cent of the surveyed cases;
- improperly placed freight - 8 per cent of the surveyed cases;
- defect in vehicle controls - 4 per cent of the surveyed cases.

The influence of the human factors in accident occurrence is clearly considerable.

This study has additionally proved that education also contributes to some extent to accident involvement, which calls for further research that will consider this aspect as well.

**Conclusion**
1. The accident causation analyses have demonstrated that education of road users directly influences their behaviour in traffic, since a large portion of road accidents are reportedly due to improper road user behaviour and negligence.

2. This survey has shown that drivers with completed secondary school education are responsible for a smaller number of road accidents compared with drivers who have only completed primary school education.

Literature: