Identification of Determinant Factors for Car Accident Levels Occurred in Mekelle City, Tigray, Ethiopia: Ordered Logistic Regression Model Approach.

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DOI:
10.21203/rs.2.19228/v1

SUBJECT AREAS
Health Policy

KEYWORDS
Car accident, Ordered Logistic Regression, Injury Level
Abstract
Background: The car accident injury level is known to be a result of a complex interaction of factors to drivers’ behavior, vehicle characteristics and environmental condition. Therefore it is obvious that identifying the contribution of the factors to the accident injury is very critical. The objective of study was to perform descriptive analysis to see the characteristics of car accident, to assess the prevalence and determinants of road safety practices in Mekelle City, Tigray, Ethiopia.
Methods: A random sample of data was extracted from traffic police office from September 2014 - July 2017. An ordered logistic regression model was used to examine factors that worsen the car accident level.
Result: A total sample of 385 car accidents were considered in the study of which 56.7% were fatal, 28.6% serious and 14.7% slight injury. The model estimation result showed that, being experienced drivers (Coef. = 0.686; p-value<= 0.050) were found to increase the level of injury. On the other hand, being private vehicle (Coef. = -1.160; p-value<= 0.010), the type of accident of vehicle with pedestrian (Coef. = -2.852; p-value<= 0.010), being heavy truck (Coef. = -0.656; p-value<= 0.050), being a cross country buss (Coef. = -0.889; p-value<= 0.050) and being owner of vehicle is the driver himself (Coef. = -0.690, p-value <= 0.050) were found to decrease the level of car accident injury severity. Therefore, it is better to create continued awareness to those who are experienced drivers, who carelessly follow the traffic rules. Special attention is required to government owned vehicle drivers, as they were found to increase the level of car accident injury through different short term trainings.

Full-text
Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.
However, the manuscript can be downloaded and accessed as a PDF.

Tables

Table1: Distribution of vehicles’ accident injury level from September 2014 – August 2017
| Variable               | Categories      | Fatal Injury (56.7%) | Serious Injury (28.6%) | Slight Injury (14.7%) | Total (100%) |
|------------------------|-----------------|----------------------|------------------------|-----------------------|--------------|
| Driver’s age           | <25 years       | 16(17.58%)           | 42(46.15%)             | 33(36.26%)            | 91(100%)     |
|                        | 25-45 years     | 35(13.67%)           | 55(21.48%)             | 166(64.84%)           | 256(100%)    |
|                        | 46-65 Years     | 4(12.90%)            | 11(35.48%)             | 16(51.61%)            | 31(100%)     |
|                        | 65+             | 2(28.57%)            | 1(14.28%)              | 4(57.14)              | 7(100%)      |
| Driver’s Experience    | <5 years        | 36(16.14%)           | 72(32.29%)             | 115(51.57%)           | 223(100%)    |
|                        | 50-10 years     | 8(10.53%)            | 16(21.05%)             | 52(68.42%)            | 76(100%)     |
|                        | >10 years       | 12(14.63%)           | 21(25.61%)             | 49(59.67%)            | 82(100%)     |
| ownership              | Employed        | 45(13.68%)           | 82(24.92%)             | 202(61.40%)           | 329(100%)    |
|                        | Own(self)       | 11(21.15%)           | 27(51.92)              | 14(26.92)             | 52(100%)     |
| Vehicle Type           | Automobile      | 16(10.88%)           | 35(23.81%)             | 96(65.31%)            | 147(100%)    |
|                        | Heavy Tracks    | 13(16.25)            | 15(18.75%)             | 52(65.00%)            | 80(100%)     |
|                        | Taxi            | 2(5.56%)             | 17(47.22%)             | 17(47.22%)            | 36(100%)     |
|                        | Bajaj           | 11(24.44)            | 21(46.67%)             | 13(28.89%)            | 45(100%)     |
|                        | Bus             | 9(16.98%)            | 12(22.64%)             | 32(60.38%)            | 53(100%)     |
| Ownership type         | Government      | 2(3.33%)             | 11(18.33%)             | 47(78.33)             | 60(100%)     |
|                        | private         | 54(16.62%)           | 98(30.53%)             | 169(52.65)            | 321(100%)    |
| Road partition         | One way         | 9(10.00%)            | 27(30.00%)             | 54(60.00%)            | 90(100%)     |
|                        | Two way         | 47(16.15%)           | 82(28.18%)             | 162(55.67%)           | 291(100%)    |
| Road Condition         | Dry             | 55(14.55%)           | 108(28.57%)            | 215(56.88%)           | 378(100%)    |
|                        | Wet             | 2(28.57%)            | 3(48.86%)              | 2(28.57%)             | 7(100%)      |
| Light                  | Day             | 42(14.29%)           | 76(25.86%)             | 176(59.86%)           | 294(100%)    |
|                        | Night           | 14(16.09%)           | 33(37.93%)             | 44(44.83%)            | 91(100%)     |
| Accident               | Vehicle-Vehicle | 11(5.67%)            | 36(18.56%)             | 147(75.77%)           | 194(100%)    |
|                        | Vehicle-Other   | 6(9.09%)             | 6(9.09%)               | 54(81.82%)            | 66(100%)     |
|                        | Vehicle-Pedestrian | 39(32.77%)         | 67(56.30%)             | 13(10.92%)            | 119(100%)    |

Note: ***=significant at 1% level of significance

Table 2: Factors affecting Car Accident Injury Level: Ordered Logistic Regression result.
| Variables                   | Category               | Coefficient | Odds ratio | Stand. error | z-value |
|-----------------------------|------------------------|-------------|------------|--------------|---------|
| Driver's Age                | <25 years (ref)        |             |            |              |         |
|                             | 25-45 years            | .437        | 1.548      | .318         | 1.37    |
|                             | 46-65 Years            | -.104       | .901       | .530         | -0.20   |
|                             | 65+                    | 11.555      | 104329.3   | 714.387      | 0.02    |
| Driver's Experience         | <5 years (ref)         |             |            |              |         |
|                             | 5-10 years             | .686        | 1.986      | .349         | 1.97    |
|                             | >10 years              | .249        | 1.283      | .357         | 0.70    |
| Vehicle service             | Vehicle service        | -.001       | .999       | .002         | -0.61   |
| Ownership type              | Governmental (ref)     |             |            |              |         |
|                             | Private                | -1.160      | .313       | .420         | -2.76   |
| Light condition             | Day (ref)              |             |            |              |         |
|                             | Night                  | .145        | 1.556      | .305         | 0.48    |
| Accident type               | Vehicle-Vehicle (ref)  |             |            |              |         |
|                             | Vehicle-Other          | .408        | 1.503      | .413         | 0.99    |
|                             | Vehicle-pedestrian     | -2.852      | .058       | .317         | -8.98   |
| Vehicle Type                | Automobile (ref)       |             |            |              |         |
|                             | Heavy track            | -.656       | .519       | .346         | -1.89   |
|                             | Taxi                   | .303        | 1.354      | .439         | 0.69    |
|                             | Bajaj                  | -.115       | .892       | .420         | -0.27   |
|                             | Cross country bus      | -.889       | .411       | .396         | -2.24   |
| Vehicle owner               | My employer (ref)      |             |            |              |         |
|                             | My self                | -.690       | .502       | .373         | -1.85   |
| Model Summary               | Number of obs.         | 344         |            |              |         |
|                             | Log likelihood         | -244.113    |            |              |         |
|                             | LR chi2(15)            | 162.82      |            |              |         |
|                             | Prob > chi2            | 0.0000      |            |              |         |
|                             | Pseudo R2              | 0.2501      |            |              |         |

Note: ***=significant at 1%, **=significant at 5%

Supplementary Files

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