

Explanatory Variables for Crash Injury Risk Analysis

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Abstract : An extensive number of studies have been conducted to determine the factors which influence crash injury risk (CIR); however, uncertainties inherent to selected variables have been neglected. A review of existing literature is required to not only obtain an overview of the variables and measures but also ascertain the implications when comparing studies without a systematic view of variable taxonomy. Therefore, the aim of this literature review is to examine and report on peer-reviewed studies in the field of crash analysis and to understand the implications of broad variations in variable selection in CIR analysis. The objective of this study is to demonstrate the variance in variable selection and classification when modeling injury risk involving occupants of light vehicles by presenting an analytical review of the literature. Based on data collected from 64 journal publications reported over the past 21 years, the analytical review discusses the variables selected by each study across an organized list of predictors for CIR analysis and provides a better understanding of the contribution of accident and vehicle factors to injuries acquired by occupants of light vehicles. A cross-comparison analysis demonstrates that almost half the studies (48%) did not consider vehicle design specifications (e.g., vehicle weight), whereas, for those that did, the vehicle age/model year was the most selected explanatory variable used by 41% of the literature studies. For those studies that included speed risk factor in their analyses, the majority (64%) used the legal speed limit data as a 'proxy' of vehicle speed at the moment of a crash, imposing limitations for CIR analysis and modeling. Despite the proven efficiency of airbags in minimizing injury impact following a crash, only 22% of studies included airbag deployment data. A major contribution of this study is to highlight the uncertainty linked to explanatory variable selection and identify opportunities for improvements when performing future studies in the field of road injuries.

Keywords : crash, exploratory, injury, risk, variables, vehicle

Conference Title : ICTS 2021 : International Conference on Transportation and Safety

Conference Location : London, United Kingdom

Conference Dates : October 21-22, 2021