

DOES GENDER MAKE A DIFFERENCE? SEATBELT USE AND THE RISK OF SEVERE INJURIES AMONG DRIVERS HOSPITALIZED IN LEVEL-1 TRAUMA CENTERS



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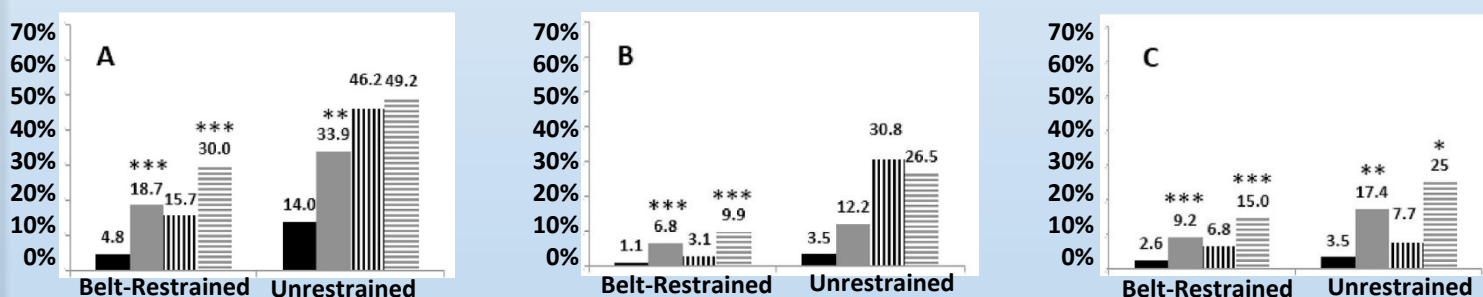
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BACKGROUND: A considerable proportion of hospitalized trauma patients are due to motor vehicle crashes. While the safety implications of seatbelt use in reducing severe injuries and fatalities are well established, and while it is argued that females are underrepresented in safety vehicle tests, it is unclear whether seatbelts have equally benefitted drivers of either gender. Previous studies have not, to the best of our knowledge, tested moderation effect of seatbelt use on the association between gender and crash-related injury.

METHODS: We performed a retrospective cohort study using data drawn from the National Trauma Registry database, 2008–2018, to determine the role of car driver's gender as a predictor of injury outcome following a road traffic crash resulting in hospitalization. Modified Poisson regression models were applied controlling for age, ethnicity, seatbelt use, impact type, road type, and year of hospitalization. Effect modification of the gender-injury outcome associations was tested for belt-restraint status using multiplicative interaction terms.

RESULTS: There was no evidence for a modification effect of the gender-seatbelt and injury associations, indicating that males are at greater risk for injury, independent of seatbelt use. The relative risk (RR) for a male driver to sustain severe injuries was approximately two-fold the injury risk of female drivers (RR = 1.9, 95%CI: 1.6–2.1). The corresponding RRs for severe head and torso injuries were 2.5 (95%CI: 2.0–3.2) and 1.8 (95%CI: 1.5–2.2), respectively.

Figure 1. Severe injuries by gender, belt-restraint status, and road type



Stratified analyses showing the proportions (%) of severe injuries (ISS ≥ 16) [A], severe (AIS > 3) head injuries [B] and severe (AIS > 3) torso injuries [C] by gender (females are represented in black and males in gray), belt-restraint status (belt-restrained/unrestrained) and road type (urban represented as solid bars, interurban as striped). *p ≤ 0.05 **p < 0.01 ***p < 0.0001 between females and males within the same group (comparing across). Abbreviations: ISS, Injury Severity Score; AIS, Abbreviated Injury Scale.

Table 1. The Association between gender^a and injury outcome and effect modification of belt-restraint status

Model	ISS ≥ 16 RR (95% CI)	HEAD AIS > 3 RR (95% CI)	TORSO AIS > 3 RR (95% CI)
Model I	2.7 (2.4-3.0)	3.3 (2.6-4.1)	2.7 (2.3-3.2)
Model II	1.9 (1.6-2.1) ^{b*}	2.5 (2.0-3.2) ^{b**}	1.8 (1.5-2.2) ^{b***}
Model IIIa			
Belt-restrained ^c	2.1 (1.8-2.5)	3.8 (2.8-5.3)	2.1 (1.7-2.7)
Unrestrained ^d	1.3 (0.9-2.1)	1.5 (0.8-2.9)	2.2 (1.0-4.8)
Model IIIb			
Males ^e	1.8 (1.5-2.2)	2.4 (1.8-3.3)	1.8 (1.4-2.5)
Females ^f	2.8 (1.9-4.3)	6.2 (3.2-12.0)	1.8 (0.8-3.9)

Abbreviations: ISS, Injury Severity Score; AIS, Abbreviated Injury Scale; RR, relative risk; CI, confidence interval. **Model I:** Adjusted for belt-restraint status (yes/no/unknown). **Model II:** Fully adjusted model (Model I plus age, ethnicity, road type, type of impact and year of hospitalization). **Model IIIa:** Fully adjusted interaction (Model II plus the interactive term). **Model IIIb:** Fully adjusted reciprocal interaction (Model II plus the interactive term). ^a Reference group: females. ^b RR without the interactive term in the model. ^c Males vs. females among belt-restrained. ^d Males vs. females among unrestrained. ^e Unrestrained vs. belt-restrained among males. ^f Unrestrained vs. belt-restrained among females. *Concordance-index (c-index)=0.767; **c-index=0.767; ***c-index=0.750

CONCLUSIONS: The results suggest that seatbelts provide equal injury protection for drivers of both genders; yet, males are at a greater risk to sustain severe injuries regardless of seatbelt use. This finding points to the possibility that risk-taking behaviors contribute to gender specific disparities and should be the focus of targeted interventions by health professionals and policymakers.