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[Traffic Inj Prev](#). 2015;16(1):90-4. doi: 10.1080/15389588.2014.885649. Epub 2014 Aug 7.

Safety of the Japanese K-car in a real-world low-severity frontal collision

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PMID: 24499113 DOI: [10.1080/15389588.2014.885649](#)

Abstract

Objective: Kei-cars (K-cars), which are a tiny 660 cc mini-car class 3.4 m long or less, 1.48 m wide or less, and 2.00 m high or less, have become popular in Japan. To evaluate the safety of K-car drivers in frontal collisions, we retrospectively compared the severity of injuries suffered by drivers between K-cars and standard vehicles involved in frontal collisions in which at least one injury occurred.

Materials and methods: From in-depth data provided by the Institute for Traffic Accident Research and Data Analysis from 1993 to 2010, records for 1379 drivers aged 36.8 ± 15.6 years were collected for analysis.

Results: Of the 1379 drivers, 1115 subjects were in standard vehicles and 264 were in K-cars. The mean delta V of the struck vehicle was 28.6 ± 15.6 km/h. After classifying the subjects according to seat belt use and air bag deployment, the background of the drivers and delta V, the injury severity scores (ISSs) and Abbreviated Injury Scale (AIS) scores were compared for all body regions. Under similar conditions, no significant differences in severity of injuries of the drivers were found between K-cars and standard vehicles.

Conclusions: Although we are generally concerned that drivers of small vehicles suffer more severe injuries, our results suggest that, for real-world accidents, K-cars provide similar safety for drivers involved in frontal collisions as standard vehicles in low delta V impact conditions.

Keywords: Kei-cars; driver; frontal collision; injury severity; small vehicles.

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