Causation

Restraint use and rear seating were associated with fewer serious injuries and deaths for children in motor vehicle crashes


QUESTION: Are restraint use and rear seating position associated with lower risks of serious injuries or death for children in motor vehicle crashes?

Design
Cohort study.

Setting
Utah, USA.

Participants
5751 children < 15 years of age who were passengers in a motor vehicle crash resulting in property damage over US$750 and fatality, admission to hospital, injuries with broken bones, or significant bleeding to any automobile occupant. Children travelling in passenger cars, light trucks, and vans were included. Children were between the ages of birth and 4 years (n = 2016), 5 and 11 years (n = 2231), and 12 and 14 years (n = 1504).

Assessment of risk factors
For the years 1992–6, motor vehicle crash records from a statewide database, including data on age, restraint use, type of crash, and front or rear seating in the vehicle, were linked by probabilistic methods to hospital discharge records. Restraint use was classified as optimal (a safety seat for ages 0–4 y or a lap and shoulder belt for ages 5–14 y), suboptimal (a lap belt, shoulder belt, or both for ages 0–4 y or a lap or shoulder belt alone for ages 5–14 y), or none (no restraint).

Main outcome measures
Serious injury or death and hospital costs.

Main results
2383 (41%) of the children were seriously injured, 134 (2.3%) were admitted to hospital, and 53 (0.9%) were killed in motor vehicle crashes. 2441 (42%) of the children were front seat passengers and 3310 (58%) were rear seat passengers. 2168 (38%) of the children were optimally restrained. After adjusting for age and seating position, unrestrained children had a higher risk of a serious injury or death than those who were optimally restrained (odds ratio [OR] 2.7, 95% CI 2.4 to 3.1); no difference existed between those who were optimally and suboptimally restrained (p = 0.94). After adjusting for age and restraint use, children who were front seat passengers had a higher risk of serious injury or death than those who were rear seat passengers (OR 1.7, CI 1.6 to 2.0). Compared with children who were front seat passengers, those who were rear seat passengers had a lower risk of serious injury or death in frontal impact crashes (OR 0.73, CI 0.60 to 0.90) and in non-frontal impact crashes (OR 0.57, CI 0.51 to 0.64). Among children admitted to hospital, those in the front seat had higher mean hospital charges than those in the rear seat (US$284 v $195, p = 0.02).

Conclusions
Children who were rear seat passengers in motor vehicle crashes had a lower risk of serious injury or death and had lower inhospital charges than those who were front seat passengers. Use of restraint was also associated with a lower risk of serious injury or death.

COMMENTARY
This study by Berg et al addresses an important issue for nurses who work with young families in hospital or community settings. The findings reinforce the need for child restraint devices and highlight the increased risks of serious injury and death among front seat passengers compared with rear seat passengers. Although the authors devised a coding scheme for restraint use, limitations of the data precluded use of a more sophisticated measure of misuse.

Only 38% of children were optimally restrained. Rates of non-restraint use were highest in the older age group (12–14 y) and rates of suboptimal use were highest in the youngest age group (0–4 y). The patterns of restraint use among the study population in Utah are consistent with a lack of child restraint use legislation and enforcement measures. In settings where such legislation exists, rates of child restraint use are much higher (eg, rates of use are > 85% in Ontario, Canada). However, even when legislation exists, the misuse of child restraint devices is common. Patterns of misuse and factors influencing major types of misuse (eg, failure to use a tether strap or to thread the seat belt through the restraint device) are worthy of investigation in different settings. This type of information would provide a basis for planning key messages in media campaigns.

This study highlights the need to target different audiences in tackling child restraint use (eg, parents and guardians, children, daycare workers, and teachers). Messages about child restraint use need to be reinforced at critical stages in a child’s life, including infancy when the device is placed in a rear-facing position and later, when children reach a weight of 25 pounds and the device is placed in a forward-facing position. Given the increasing number of cars with air bags, it is imperative to advise parents and guardians to place all young children in rear rather than front seats.

Nurses play a key part as advocates for legislation requiring optimal restraint use and for establishing sustained enforcement measures. However, intersectoral action is needed. For example, manufacturers of restraint devices should design products that are easy to install, and local car dealers should ensure the routine installation of bolts to secure forward-facing tether straps in all new cars.

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