



Child Restraint Fitting Stations reduce incorrect restraint use among child occupants

Julie Brown^{a,*}, Caroline F. Finch^b, Julie Hatfield^c, Lynne E. Bilston^a

^a Neuroscience Research Australia and University of New South Wales, Australia

^b Monash Injury Research Institute, Monash University, Australia

^c Injury Risk Management Research Centre, University of New South Wales, Australia

ARTICLE INFO

Article history:

Received 24 August 2010

Received in revised form

14 December 2010

Accepted 15 December 2010

Keywords:

Child restraint

Child safety seat

Misuse

Incorrect use

Correct use

Evaluation

ABSTRACT

This study evaluated the effectiveness of the NSW Restraint Fitting Station Network in preventing incorrect use of rearward facing and forward facing child restraints.

The way children used restraints was observed randomly as they arrived at observation sites during a cross-sectional ecological study across New South Wales, Australia. Trained researchers examined restraint system installation once the child left the vehicle. A structured interview was also conducted with the driver. Logistic regression was used to examine the association between parental report of ever having the restraint checked at a Restraint Fitting Station and whether or not the restraint was used correctly, while controlling for potential confounders and accounting for the complex sample design. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated.

The results demonstrated that children of respondents who did not use Restraint Fitting Stations were 1.8 times more likely to be incorrectly using their restraints (95% CI 1.1–2.8) than children of Restraint Fitting Station users. Regardless of whether or not a Restraint Fitting Station had been used, there was a trend towards a greater likelihood of incorrect restraint use as the length of restraint ownership increased (OR 1.3 95% CI 1.0–1.7).

These results are important for developing strategies aimed at reducing child occupant casualties by reducing the rate of incorrect restraint use, and support programs encouraging the use of Restraint Fitting Stations and similar services as a countermeasure to incorrect use.

© 2010 Elsevier Ltd. All rights reserved.

1. Introduction

The incorrect use of child restraints by young motor vehicle occupants is a widespread problem that results in reduced crash protection (Arbogast et al., 2004; Bilston et al., 2007; Brown and Bilston, 2007; Bulger et al., 2008; Du et al., 2008; Lesire et al., 2007; Valent and McGwin, 2002). Removing barriers to optimum crash protection is necessary to facilitate reductions in child passenger casualties. Traffic crashes are the most common cause of death and injury among children in all developed countries (UNICEF, 2001) and child passengers account for a significant proportion of the problem (WHO, 2008).

In New South Wales (NSW), Australia incorrect use occurs as frequently as inappropriate restraint selection (Brown et al., 2010a) and potentially carries a higher risk of injury in crashes than simply using the wrong sort of restraint for the size of the child (Brown

and Bilston, 2007; Du et al., 2008). Dedicated child restraint systems can be more complex to use than adult seat belts because these restraints must be actively installed in the vehicle and there are usually more steps necessary to properly secure the child in these restraints than in an adult seat belt (Brown et al., 2010a,b). For example, when using a convertible restraint designed for children from birth to 4 years, the parent/carer must first install the restraint in the correct orientation, using the appropriate belt path for that orientation. They must ensure the webbing used to anchor the restraint is adequately tensioned and any features incorporated in the restraint to assist this must be used (and used correctly). In all Australian restraints and many North American restraints they must also ensure that the top tether is correctly attached and tensioned. They then need to place the child within the restraint, ensuring that the shoulder straps of the internal harness are at the correct height relative to the child shoulders, and that the harness webbing is free from twists and adequately tensioned. Failure in any of these steps reduces the protection the restraint will provide in a crash. As more children are encouraged to move into size-appropriate child restraint systems due to educational efforts

* Corresponding author. Tel.: +61 2 9399 1032; fax: +61 2 9399 1022.

E-mail addresses: j.brown@neura.edu.au, j.brown@powmri.edu.au (J. Brown).

Table 1

Forms of restraint use errors deemed to have a moderate to serious effect on crash protection (NB 'very loose' refers to >25 mm of webbing slack, and 'very twisted' refers to >2 twists in webbing).

- Anchorage point problems including loose anchor bolts, top tether attached to luggage tie down and top tether attached to anchor point in different seating position
- Gated buckle/locking clip problems including no gated buckle used or used incorrectly
- Harness problems including very loose and/or very twisted harness, non use or partial use of harness, incorrect shoulder height adjustments, and grossly incorrect threading of harness through seat
- Seat belt problems including very twisted and/or very slack belts, belts not routed correctly, belts not engaged
- Top tether problems including very slack and/or very twisted tethers, non-use of tether, incorrect attachment/routing of tether to restraint
- Non-approved restraint
- Stabiliser bar not used
- Restraint installed in wrong orientation

and legislative requirements, it is imperative that more efforts are made to reduce incorrect use to ensure reductions in child casualty numbers. To this end, there is a need to build an evidence base for strategies and programs that might be effective in reducing incorrect restraint use.

Currently used strategies to combat incorrect use in a number of jurisdictions in developed countries include restraint fitting check days or child safety seat checkpoints where parents/carers can visit a specific location on a specific day and have an expert resolve any errors they have made and/or provide expert advice on restraining their children. In NSW, Australia a Restraint Fitting Station Network has been operating since the 1980s. These commercially operated businesses are overseen by a single government road safety organization and were established to assist parents and carers to correctly install and use child restraint systems. Restraint Fitting Stations also operate in other Australian states but do not all operate under the same governance system used in NSW. In the United States, the National Highway and Traffic Safety Administration provides free restraint inspections at Child Safety Seat Inspection Stations. While it is believed that programs like restraint fitting check days and Restraint Fitting, or Child Safety Seat Inspection Station networks should help reduce incorrect child restraint use, there have been few attempts to assess their effectiveness. One of the major barriers towards conducting a robust assessment of their effectiveness has been accessing appropriate control groups and studies that use clientele only from these programs result in an inherently biased (i.e. self-selected) sample. Nonetheless, the use of more ecologically-orientated study designs to evaluate intervention effectiveness is becoming increasingly common in injury prevention (West et al., 2008; Finch, 2009).

In this analysis, we use observational data collected from a cluster-randomized sample of restraint use to test the hypothesis that children of parents who used the Restraint Fitting Station Network are more likely to be correctly using restraints than children with parents who did not.

2. Methods

2.1. Sample and survey method

The overall study design was an observational, ecological study. Data from a multistage stratified, clustered random sample selected throughout 2008 and representing the population of children in NSW, Australia was used. The sampling plan was such that children were randomly chosen as they arrived at baby/child health clinics, pre-schools/day care centres, and primary schools; for more detail see Brown et al. (2010a). Trained researchers made initial *in situ* observations of the child within the restraint system as the vehicle arrived at the observation site and then undertook a detailed examination of the restraint system installation when the child left the vehicle. A structured interview was also conducted with the driver.

This included demographic information including their educational level, household income and language spoken at home, and questions related to the child restraint being used and the use of the NSW Restraint Fitting Station Network.

The subgroup of all children using rearward or forward facing child restraints with no missing data for the variables of interest was used in this analysis. Therefore, cases where the driver did not know whether or not a Restraint Fitting Station had been used, or did not supply an answer to this question were omitted. Among the other variables of interest, missing data was largely limited to the income variable and there was no significant difference in responses related to Restraint Fitting Station use between those cases where this information was supplied and those where it was not.

2.2. Data coding and analysis

All data analysis was performed using SAS version 9.2 (SAS Institute, 2008). Sample weights were constructed using standard weighting procedures as outlined by Lohr (1999) and Korn and Graubard (1999). Post-stratification weighting for age distribution among survey regions based on population data was used to account for the 37% non-participation rate. The SAS SURVEYLOGISTIC procedure was used to examine the association between parental report of ever having the restraint checked at a Restraint Fitting Station and whether or not moderate/serious forms of incorrect child restraint use were present. Incorrect use refers to incorrect installation and/or use of a restraint system that would be likely to increase the threat of injury and/or degrade crash protection. It does not include use of a restraint that is inappropriate for the child's size. Moderate/serious forms of incorrect use were deemed to be those that increase injury risk and/or degrade crash protection (see Table 1). More detail of the incorrect use rating assessment can be found elsewhere (Brown et al., 2010a,b).

To account for any inconsistencies in the demographic profiles of those using and not using the Restraint Fitting Station Network, educational level, household income and language spoken at home were treated as confounding variables in the model. Duration of ownership of the restraint (in years) was also forced into the model to account for the potential effect of the time elapsed between the use of the fitting station and the observation, as was age of child (in years). Whether or not the restraint was designed to be used in a single mode only (e.g. used only as a rearward or forward facing restraint as opposed to those designed to be used as both rearward and forward facing restraints) has previously been observed to be associated with correctness of restraint (Brown et al., 2010b). Restraints designed for dual modes of use were called convertible restraints and coded as 'yes' convertible, or 'no' not a convertible. This variable was also forced into the model. Other potentially confounding variables such as whether or not the restraint was most recently fitted by a trained installer

Download English Version:

<https://daneshyari.com/en/article/10371429>

Download Persian Version:

<https://daneshyari.com/article/10371429>

[Daneshyari.com](https://daneshyari.com)