A consumer-centric approach to designing information supplied with child restraints reduces errors in use: Laboratory results and field study protocol

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Abstract

The greatest challenge to optimal crash protection of children in cars is the long standing problem of errors in use of child restraints (CRS). We have worked with industry to address this problem through better design of information supplied with CRS. This paper presents results from a controlled laboratory-based trial evaluating these materials. Of those exposed to existing materials, 5% used the CRS without error, however of those exposed to the new materials, 28% achieved 100% correct use (p<0.001). To evaluate the effectiveness under real-world conditions, we are now conducting a field-based cluster randomised controlled trial (cRCT).

Background

Despite observation data that indicate continuing high rates of incorrect use of CRS by Australian children (Brown, Hatfield, Du, Finch, & Bilston, 2010; Keay et al 2013; Koppel, Charlton, & Rudin-Brown, 2013) and estimates that children who incorrectly use restraints are at 3-fold risk of injury in a crash (Du et al, 2010) there are few known effective countermeasures to this problem.

To use a CRS correctly, parents/carers need to understand how to correctly install the restraint in their vehicle and how to correctly secure their child in the restraint. Parents frequently report relying on materials supplied with restraints as a primary source for this information (Fong, 2017). Continuing high rates of errors, however, suggest current approaches to developing these materials may not be ensuring key information is adeqautely communicated. In other contexts, a consumer-driven approach to developing usage directions for medication has greatly improved correctness of use((Sless & Wiseman, 1997). As reported previously, we have used this consumer-driven method to develop new product information to accompany CRS at the point of sale (Hall et al, 2016). The effectiveness of this infomration in reducing errors in use was tested in a laboratory-based controlled trial and we now plan to confirm this effectiveness in the real-world using a gold-standard cRCT.

Laboratory-based trial method

A controlled laboratory study was conducted with 36 experienced and naive CRS users. Participants had to be over 18 years and conversant in English. Randomisation software was used to assign participants to control (n=18) and intervention (n=18) groups. Participants were asked to installed a convertible CRS in the forward-facing mode, and secure a child-size mannequin within the restraint. Control participants were provided with the existing instructions for that restraint. The intervention group were given the new materials, consisting of an A3 instruction sheet, swing tag labels and access to on-line videos via quick response (QR) codes affixed to the materials. Correct use was assessed using a 20-item pro-forma. One-way Analysis of Variance (ANOVA) was used to compare differences between groups on overall correct use and percentage correct use.

Laboratory- based trial results

Figure 1 illustrates the difference between the two groups on the proportion with no errors (p<0.001) and on the proportion who had no serious errors (p<0.001). On average, the intervention group (M= 89.08) achieved 11.7% higher percent correct than the controls (M= 77.38, p=0.048).
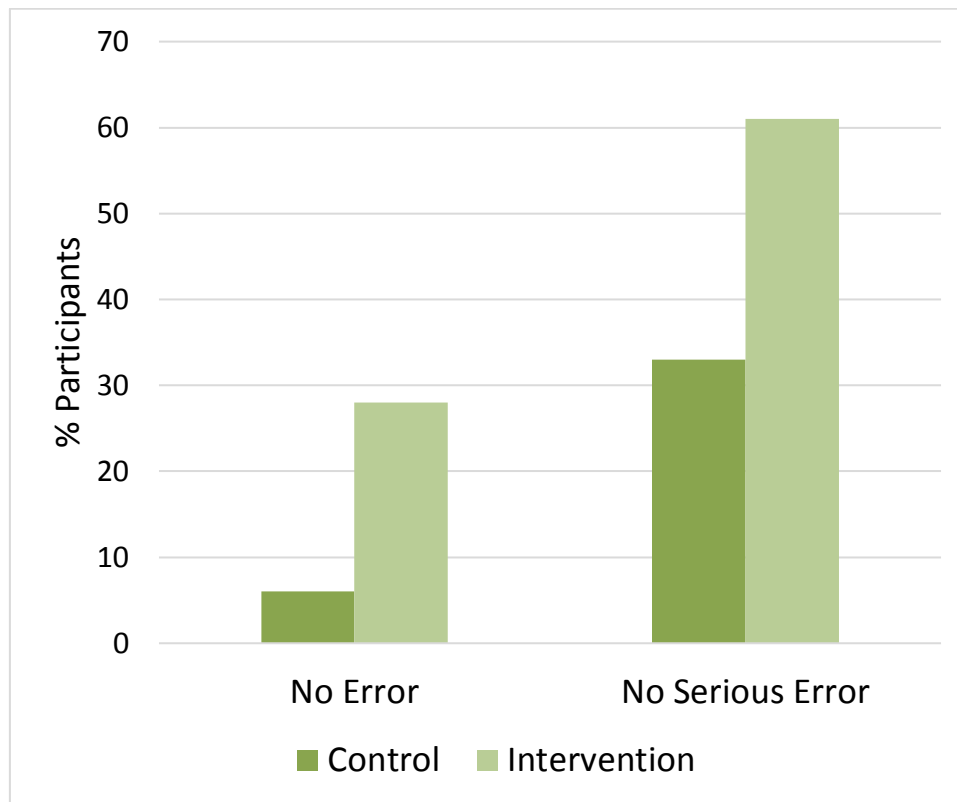
Figure 1. Reduction in errors in intervention group compared to control group

Field-based cluster randomised controlled trial protocol

To confirm effectiveness under real-world conditions a cRCT is underway. Retail stores (n=22) in greater Sydney have been randomised into intervention sites (n=11) and control sites (n=11). Participants (n=836) will enter the study on purchase of a restraint. Outcome measures are errors in installation as observed during a six-month follow-up home assessment, and adjustment checks made by the parent when the child is placed into the restraint (observed using naturalistic methods). Correct use and adjustment checks will be compared between control and intervention groups using logistic regression. This study will be completed in 2020.

Conclusions

The consumer-centric approach to developing instructional materials appears to be an effective measure to reduce errors in use. This needs to be confirmed under real-world conditions and a cRCT is underway.

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