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Evaluation of a child passenger safety class in increasing parental knowledge

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ABSTRACT

Background: Child passenger restraint systems have been found to greatly reduce the risk of injury and death among child passengers. However, nearly half of the children who died in 2009 as a result of motor vehicle crashes were completely unrestrained. Our global hypothesis is that parents and other caregivers failed to restrain children due to a lack of child passenger seat education and practice. In this report, we postulate that a car seat class will improve the basic understanding of child passenger safety. The objective of the study was to evaluate the effectiveness of a car seat class in increasing parental knowledge about child passenger safety.
Methods: Car seat classes were held at a Level 1 pediatric trauma center every other Tuesday for ten months. The curriculum consisted of: child passenger safety laws discussion, a 21-min video on the use of child safety seats followed by a 15-min discussion about the video, 15 min of discussing the different types of car seats, and hands-on training on how to properly install and use child restraints. Free car seats were provided to eligible parents. The pre-test was administered at the beginning of class and the post-test at the end of the class. McNemar's test and a paired *t*-test were used to compare pre- and post-test scores. Test scores were also stratified by language spoken.
Results: Forty-four classes were held and a total of 491 parents/caregivers attended the classes. An increase in knowledge was found for all survey questions. Mean knowledge score for the post-test was 3.10 points higher compared to the mean knowledge score from the pre-test. Mean difference in knowledge scores for English-speaking participants were higher than Spanish-speaking participants.
Conclusion: Lack of knowledge and low risk perception have frequently been cited as barriers for the use of child passenger restraints. Our intervention attempted to eliminate these barriers. We found that this intervention was effective at increasing parental knowledge about child passenger safety. The results of this study may be used to design and implement future interventions in multicultural settings.

1. Introduction

Motor vehicle crashes (MVCs) are the leading cause of death in children 1 year and older in the United States (CDC, 2012). In 2009, more than 1500 children younger than 16 years died in motor vehicle crashes, with approximately half of them completely unrestrained (NHTSA, 2012). Numerous studies have provided evidence on the effectiveness of child passenger restraints in reducing the risk of injury and death (Arbogast et al., 2004; Elliott et al., 2006; Zaloshnja et al., 2007; Arbogast et al., 2009). Studies found that the use of child safety seats reduces the risk of injury by 71–82% (Arbogast et al., 2004, Zaloshnja et al., 2007) and the risk of death by 28% when compared to children of similar ages with only seat belts (Elliott et al., 2006). Booster seats have been found to reduce the risk of injury among children of the ages 4–8 years by 45% when compared to children who only wore seatbelts (Arbogast et al., 2009). More than 80% of parents attempt to use child passenger safety systems for their children; however, fewer than 20% of parents do so correctly to offer their children adequate protection (Biagioli, 2002). Furthermore, in 2005, costs associated with motor vehicle-related fatal and non-fatal injuries in children ages 0–14 years were over $3.6 billion (Naumann et al., 2010).

Given the high burden of fatal and non-fatal injury in children resulting from MVCs, effective interventions for protecting young children need to be identified and implemented. The objective of this study was to evaluate the effectiveness of a car seat safety

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Table 1
Difference in knowledge before and after class.

Questions	Pre-test $N = 491$	Post-test $N = 491$	p-Value
1. According to current California law, children should ride in a car seat or booster seat until what age?	280 (58)	390 (81)	<0.0001
2. What is the BEST way to know that your child is ready to use ONLY a vehicle seat belt?	188 (39)	394 (82)	<0.0001
3. When does a car seat expire?	96 (20)	430 (89)	<0.0001
4. A correctly installed car seat should not move *side to side* or *front to back* more than how many inches?	173 (36)	385 (80)	<0.0001
5. What is the correct position of the retainer clip?	284 (59)	401 (83)	<0.0001
6. By law, how old should a passenger be to sit in the front seat?	232 (49)	335 (70)	<0.0001
7. What accessories are safe for your child's car seat?	290 (60)	344 (72)	<0.0001
8. When should you turn your child from *rear-facing* to *forward-facing?*	106 (22)	214 (45)	<0.0001
9. Where should the shoulder straps on your child when *rear-facing*?	69 (14)	197 (41)	<0.0001
10. Where should the shoulder straps be on your child when *forward-facing*?	81 (17)	211 (44)	<0.0001

class in increasing knowledge of child passenger safety. The lack of knowledge about child passenger safety has been cited as a barrier for child restraint use (Lee et al., 2003; Ebel et al., 2006; Erkoboni et al., 2010). Thus, we believe that educating parents is an important factor for increasing use. We used multiple educational techniques, including a video, a slide presentation, group discussion, and hands-on seat installation demonstration and practice with a vehicle seat simulator. We postulate that this comprehensive class curriculum will lead to an increase in parental knowledge about child passenger safety.

2. Methods

2.1. Study recruitment and population

Flyers containing information about the car seat safety class were handed out at health education booths in the lobby of a Level 1 pediatric trauma center and during community outreach events. Flyers were provided to families in the pediatric hospital and during community events by social workers, injury prevention staff, or community affairs staff. If parents were interested in participating in the class, they called in and registered. Eligible participants had to be parents or caregivers and able to speak English or Spanish. In addition, to qualify for a free car seat, the parent/caregiver had to show proof of receiving public assistance. Women who were less than eight months pregnant were not able to receive a free car seat for their unborn child.

2.2. Study design

Participants were administered a test about car seat safety before the start of the class and then again once the class was completed. The survey was a multiple choice test consisting of 10 questions. Subjects were assigned a unique identifier in order to match the pre- and post-test results for each participant.

2.3. Study implementation

We conducted the classes at a Level 1 pediatric trauma center. Each class lasted approximately 2 h and was held every other Tuesday. In addition, there were 1–2 offsite locations per month, in locations such as Volunteers of America centers, women's centers, and schools. Each class adhered to a curriculum that consisted of: a discussion of current laws on child passenger safety in California; a 21-min video followed by a 15-min discussion about the video; 15 min of discussing the different types of car seats; and hands-on training on how to properly use and install a child restraint using a vehicle seat simulator. The classes were taught by certified child passenger safety technicians (CPSTs). Free car seats were provided to eligible parents. Classes were offered in English and Spanish.

2.4. Statistical analysis

Data were entered into an Excel database and were imported into SAS ver. 9.2 (SAS Institute, Inc., Cary, NC). McNemar's test was performed to compare the frequencies of correct answers between the pre- and post-test. A paired t-test was also performed to compare the mean scores of the pre- and post-tests. Mean test scores were stratified by primary language spoken and compared using an independent t-test. p-Values were two-sided. A p-value of <0.05 was considered significant.

3. Results

At the end of the 10-month study period, 44 classes had been conducted (21 English, 23 Spanish). English classes had an average of nine participants per class and Spanish classes had an average of 13 participants per class. A total of 491 parents/caregivers attended the car seat classes. Over 90% of the population was Hispanic, with 62% opting to take the class in Spanish. Table 1 shows the change in knowledge for each survey question. There was an increase in knowledge for all ten of the survey questions. The mean knowledge score was 3.10 points higher following the car seat class compared with knowledge before the car seat class ($p < 0.0001$). Mean test score was higher among English-speaking participants compared to Spanish-speaking participants in both the pre-test (mean difference = 0.87, $p < 0.0001$) and post-test (mean difference = 1.09, $p < 0.0001$) [Table 2].

4. Discussion

This study evaluates the effectiveness of a car seat safety class in improving knowledge of child passenger safety among parents and caregivers. The results of the current study demonstrate an increase in knowledge post-intervention. Similar hospital-based education and seat distribution interventions also found an increase in knowledge post-intervention (Weiss-Laxer et al., 2009; Shenoi et al., 2010). However, our study is unique in that it offers a more comprehensive class curriculum, utilizing multiple educational tools, such as a slide presentation, a video, a group discussion, brochures and hand-outs, and hands-on installation demonstration and practice.

Previous investigators found that an educational video can increase the use and knowledge of child passenger safety seats (Will et al., 2009; Erkoboni et al., 2010; Shenoi et al., 2010). One study found a significant difference in child passenger safety knowledge between the video intervention group and the control group; however, the difference was marginal (0.30 point increase in mean scores) (Shenoi et al., 2010). Our results demonstrated a higher difference in mean scores (2.52 point increase) between the pre- and post-tests. They showed their videos in a hospital waiting room area, which is a passive method of using an educational video (Shenoi et al., 2010). Our video was shown in a class specific for