Parents' Knowledge, Attitude, and Use of Child Restraints, Shantou, China

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Background: China has not adopted national policies for child safety restraints in cars, although children are increasingly traveling in cars.

Objective: To describe child restraint use, and parents' knowledge of and attitude toward child restraint in Shantou, China.

Methods: An observational study and driver survey on child restraint use was conducted in the Southeast China city of Shantou in 2012. Observational sites included 22 middle schools, 31 primary schools, 24 kindergartens, and 4 hospitals. Drivers were asked about their knowledge of and attitude toward the use of child restraints. In September 2012, multivariate regression was used to evaluate the factors associated with increased child restraint use.

Results: Of 3333 children observed in vehicles, only 22 (0.6%) children were secured in child safety seats or booster seats and 292 (8.7%) children were wearing seatbelts. More than half (n=508, 56.1%) of the infants or toddlers were riding on the laps of adults. Of 1069 drivers who responded to the survey, more than 62% thought it was necessary to use child restraint while traveling in a car. The drivers' higher education status (OR=1.56, 95% CI=1.07, 2.27) and seatbelt use (OR=4.00, 95% CI=2.56, 6.25) were associated with increased child restraint use. Parents (OR=0.55, 95% CI=0.34, 0.88) and male drivers (OR=0.61, 95% CI=0.46, 0.81) had reduced odds of children properly rear-seated.

Conclusions: Child restraint use is very low in China, although the majority of drivers had positive attitudes about child restraint. These findings indicate that child restraint policies and educational approaches are urgently needed in China.
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Introduction

Currently, China is experiencing an extremely rapid increase in motorization. The total number of motor vehicles increased from 3.8 million in 2005 to 13.8 million in 2010.[1,2] Traffic crashes are the overall leading cause of death in China. The mortality rate among children is much higher than other developed countries.[3,4] Each year, about 100,000 people in China are killed in motor vehicle crashes, and children aged 1–20 years accounted for more than 12% of these deaths.[3,5]

Despite China's Road Traffic Safety Law, which went into effect in 2004 and mandated that drivers and front-seat passengers must wear seatbelts, the seat-belt use was very low, ranging from 23% to 67% for drivers and 1% to 50% for front seat passengers.[1,6,7] Further, China currently has no law requiring the use of child restraints, although child restraints have been shown as effective measures to protect children from road traffic injuries.[6–8] The limited research in metropolitan cities like Shanghai found that 93.9% of children under age 7 were unrestrained,[4,9] but these findings may not represent small and medium-sized Chinese cities like Shantou, where traffic safety has not been highly prioritized. The aim of the present study was to describe child restraint use and examine the driver's knowledge of and attitude toward the use of child restraints.

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Methods

Study Design and Participants

An observation of child occupant restraint and a driver survey on the use of child restraints was conducted in the Southeast China city of Shantou. Four types of observation locations were selected to represent children of all ages: immunization clinics of hospitals, where infants and toddlers aged ≤3 years were the primary population; kindergartens, attended by children aged 4–6 years; primary schools, attended by children aged 7–13 years; and middle schools, attended by children aged 14–17. A stratified sample of 82 field sites included 4 immunization clinics, 24 kindergartens, 31 primary schools, and 22 middle schools.

Data Collection and Study Instruments

Ten trained medical graduates conducted observations at the kindergartens and schools when children were being picked up. Observations at hospital clinics took place as cars arrived at the immunization clinic. Two observers were at each location. Following the observation, a short survey about knowledge of, attitudes toward, and reasons for using or not using a child restraint was conducted among drivers. Study data were collected in April and May 2012. The study and consent process were approved by the Medical Ethics Committees of Shantou University Medical College.

Statistical Analysis

Descriptive statistics described child restraint use; types of restraint (e.g., child safety seats, booster seats, and seatbelts); and child seating position. In September 2012, multivariable regression was used to estimate the OR for two outcomes: child restraint use and proper rear seating (defined as sitting in the back seat, not on an adult's lap).

Results

Observations

The final sample of 3333 child passengers included 1691 boys, 1439 girls, and 203 infants who were too young for observers to identify the gender. More than 90% (3001 of 3333) of child passengers observed in the current study were not restrained (Table 1). Only 22 (0.6%) children were in child safety seats or booster seats, including 17 in front-facing child safety seats, two in rear-facing child safety seats, and three in booster seats. For infants, toddlers, and preschool children, more than 95% (n=1954 of 2045) were not placed in child restraints. For school children (n=1288), 36.3% were wearing a seatbelt. More than

Table 1. Observed restraint use and seating positions of child passengers traveling in a car, number and proportion, in Shantou, 2012, *n* (%)

	Age group				
	Immunization clinic (primarily infants and toddlers[a])	Preschool children (primarily ages 4–6)	Primary school children (primarily ages 7–13)	Middle school children (primarily ages 14–17)	Total
Total	906	1139	817	471	3333
Restraint used[b,*]					
Yes	25 (2.7)	76 (6.6)	104 (12.7)	114 (24.9)	319 (9.6)
No	885 (97.7)	1069 (94.4)	703 (86.0)	344 (75.1)	3001 (91.1)
Type of restraint used					
Child safety seat	4 (0.4)	10 (0.87)	5 (0.6)	0	19 (0.6)
Booster	0	3 (0.26)	0	0	3 (0.1)
Seatbelt[c,*]	21 (2.3)	63 (5.6)	99 (12.1)	114 (24.2)	297 (8.7)
Seating position[d,*]					
Front seated	111 (12.3)	282 (24.7)	267 (32.7)	166 (35.2)	826 (24.8)
Rear seated	287 (31.7)	822 (72.2)	522 (63.8)	297 (62.8)	1927 (57.8)
Adult's lap	508 (56.1)	35 (3.1)	9 (1.1)	3 (0.6)	555 (16.7)

[a]The observation was conducted at vaccine clinic in a hospital where only children under the age of 3 are required for the vaccine.
[b]Significant linear relationship between increasing restraint use with increasing age ($p<0.001$) was based on Cochran-Armitage test for trend.
[c]We observed that 21 infants/toddlers and 63 preschool children were restrained by seatbelt. These infant and children were not properly restrained and thus were excluded from the regression analysis.
[d]Less than the total because of missing value (35 missing for children restraint use; 24 missing for seating position)
*Significant difference. χ^2 tests were conducted for proportion differences in use of restraint by age group and gender.

Table 2. Factors associated with child safety traveling in a car

	N (1069)	OR (95% CI)	
		Properly rear seated	Properly restrained
Age (years)			
>7	672	0.85 (0.64, 1.15)	**6.76 (3.96, 11.58)****
≤6	397	ref	ref
Gender			
Girl	516	0.92 (0.69, 1.21)	0.85 (0.59, 1.24)
Boy	553	ref	ref
Relationship with driver			
Parent	935	**0.55 (0.34, 0.88)***	1.13 (0.61, 2.10)
Not parent	134	ref	ref
Driver's gender			
Male	565	**0.61 (0.46, 0.81)****	1.17 (0.81, 1.69)
Female	504	ref	ref
Driver's seatbelt use			
Yes	630	0.97 (0.73, 1.29)	**4.00 (2.56, 6.25)****
No	439	ref	ref
Driver's education			
≥College	483	1.19 (0.90, 1.59)	**1.56 (1.07, 2.27)***
<College	586	ref	ref

Note: Reference group: Not properly rear-seated or not restrained. Boldface indicates significance.
*$0.01<p<0.05$; **$p<0.01$

half (n=508, 56.1%) of infants and toddlers were sitting in an adult's lap. About 25% (n=826, 24.8%) of the children were placed in the front seat. Child restraint use increased significantly with age, mainly because of the increased seatbelt use in older children. In total, there were only 235 (7.1%) children properly restrained (excluding 21 infants and 63 preschool children who were restrained by seatbelt) and 1927 (57.8%) properly rear-seated.

Driver Surveys

Of 3333 observed cars with child passengers, 1069 (32.1%) drivers agreed to respond to the survey. The majority of respondents (n=934, 87.4%) were parents; the rest were relatives or hired professional drivers. More than a quarter of respondents (n=286, 26.5%) reported that they had neither heard of nor seen a child safety seat; 168 (15.7%) had heard of it but had not yet seen it; 559 (52.3%) had seen it; and 56 (5.2%) used it before. About two thirds of the respondents (62.1%) thought that it was necessary to have a child in a safety seat. The main reasons for not using a child safety seat included lack of awareness (69.7%); lack of a mandatory requirement (26.7%); and the price (15.9%). Drivers with an education level of college or higher (OR=1.56, 95% CI=1.07, 2.27) or who were wearing a seatbelt (OR=4.00, 95% CI=2.56, 6.25) were more likely to have their children restrained (Table 2). Parents (OR=0.54, 95% CI=0.34, 0.88) and male drivers (OR=0.61, 95% CI=0.46, 0.81) had lower odds of having children seated in the rear seat than their counterparts.

Discussion

This study combined a child occupant restraint observation with a driver survey in the same population in China and was the first study conducted in one of hundreds of small to medium-sized cities in China. Results of this study revealed very low use of child safety seats and a high proportion of the population who had never seen them, despite a majority who had positive attitudes about their use.

Child restraint use observed in this study was less than 10%, which is much lower than Australia (90%) and the U.S. (86%), and much lower than Beijing (68%), according to a self-reported safety restraint use survey in China.[4,9,10] Child seating position was also not optimal in this study, which is consistent with results from larger cities in China.[2,6] Many Chinese parents had their younger children on their laps, perhaps wrongly believing that holding children on an adult's lap is a better way to protect infants in vehicles.[4] Suboptimal seating position has been associated with serious injury.[11–13] Rear seating is one simple low-cost approach to protect children from serious injury when a child safety seat is not available.[14]

Consistent with a previous study, the present study also found that drivers with a college education or higher were more likely to have restrained children than those with less education,[9] suggesting that better-educated

drivers have more access or comprehension of information on child restraint practices.[15,16] This study also found that restraint use was considerably influenced by the driver's belt use.[17] However, our finding that men were more likely to place children properly in the rear of the vehicle is not consistent with two other studies, which found no association between driver's gender and child restraint.[15,18] Policies requiring child occupant protection and promotion campaigns to educate the public could have considerable impact on child restraint.[19] Additional efforts including provision of reduced-cost seats are also needed to successfully increase child restraint use.[20–23] This study has very important implications for child safety seat interventions because there is a great gap between booming motor vehicle ownership in the city and rare safety interventions in road traffic management.

In conclusion, the extremely low utilization of child safety seats and common suboptimal seating position, coupled with generally supportive attitudes, underscores the need for educational campaigns and mandatory regulation of restraint use in children to be put into practice in China, in order to reduce injury and fatality in child passengers.

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