

RESEARCH ARTICLE

# A rapid market survey on the availability of car seats in Qatar: Implications for child passenger safety

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## ABSTRACT

**Introduction:** Despite the high income level in Arabian Gulf countries, people in the region need to improve their use of child restraint systems (CRSs) to reduce the incidence of preventable injuries to child automobile passengers. Anecdotal reports have attributed the resistance to using CRSs to the expense and unavailability of the systems, prompting car seat giveaway programs. Previous studies have not assessed the adoption of CRS. This study reports the results of a rapid market survey (RMS) to understand the availability, characteristics, and affordability of CRSs in Qatar and recommend future child restraint policies and legislation.

**Methods:** The RMS identified all retail outlets that sell CRSs in Qatar and collected standard data on each restraint system: brand, model number, age/weight limits, compliance with standards, availability, and language of the owner's manual. A previously utilized metric for child safety devices was used to measure affordability.

**Results:** The RMS showed a sufficient number (83) and variety (five types) of car seat models at 15 retail outlets, selling at a wide price range of \$14 – \$1,399. All the car seats complied with the European standard. Only 2% showed a manufacturing or expiry date. A user manual was available for 71% of the seats and in different languages, but only 28% appeared in Arabic. The median CRS price was equivalent to the wages for less than one day of work.

**Conclusion:** The RMS demonstrates the availability, variety, and affordability of CRSs in Qatar. Unavailability and expense cannot be cited as barriers to use CRS, and the market is prepared for legislation requiring car seats for children in Qatar. Areas for improvement include requiring user manuals for all seats, especially in Arabic; requiring that all car seats

comply with globally accepted safety standards, especially for expiry/manufacturing dates, given the harsh local climate; and encouraging further varieties of CRSs in the local market.

Keywords: injury prevention, child safety, road safety, accessibility, car seat, Qatar, market survey

## INTRODUCTION

Road traffic injuries (RTIs) are a leading cause of childhood deaths and disabilities in high-income countries (HICs), but 93% of global road accidents involving children are found in low- and middle-income countries (LMICs).<sup>1</sup> This statistic is not just confined to deaths, as it has been predicted that by 2020 that RTIs will be the third major cause of disability worldwide.<sup>2</sup> In response, global efforts to improve road safety have been galvanized by the declaration of the UN Decade of Action for Road Safety, with the goal to halve road traffic fatalities by 2020. The inclusion of a specific target on road safety (SDG 3.6) in the 2030 Agenda for Sustainable Development has also contributed to global and local road safety efforts for children.<sup>3</sup>

The six countries of the Gulf Cooperation Council (GCC)—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates—are petroleum-based economies classified as HICs due to their per capita GDP. However, they are also rapidly developing economies with a critical need for infrastructure development, significant expatriate worker populations from LMICs, and a high RTI burden that extends to children.<sup>4</sup> These countries are essentially HIC road environments populated by expatriates, the majority from LMICs.

Studies conducted in Qatar, the UAE, and Saudi Arabia reveal that RTIs are the most common cause of death in children (from birth to age 18). On average, over 103 RTI-related deaths occur in children and youth every year in the UAE<sup>5</sup>, whereas in Qatar, 2934 (71.3%) deaths in children (aged < 18 years) were caused by RTIs from 1993 to 2007<sup>2</sup>. Further, 9% of injured patients admitted to the national Level I trauma centers in Qatar were children with RTIs<sup>6</sup>.

Child restraint systems (CRSs) are one of the most effective means to reduce RTIs in children. The World Health Organization (WHO) has declared that the main risk factor for young children in vehicles suffering an RTI is the lack of or improper use of a

restraint<sup>7</sup>. Previous studies on the effectiveness of CRSs have shown that if child occupants are properly restrained, their fatality risk is reduced by 28% and serious injury risk is reduced by 82%<sup>1</sup>. The optimal use of CRSs reduces the fatality risk among infants (aged < 1 year) and toddlers (aged 1–4 years) involved in vehicle accidents by 71% and 54%, respectively<sup>8</sup>. Elliot et al., reported that children (aged 2–6 years) with an appropriate CRS experienced a 21% reduction in mortality risk when compared to those using adult seat belts<sup>9</sup>.

Despite the high income level of GCC countries, the incidence of potentially preventable injuries in child car passengers remains high due to various reasons. For example, Grivna et al., reported that the proportion of head injuries among children and youth vehicle occupants in UAE (55%) was double than that of countries with a higher rate of restraint use (such as Australia at 26.8%)<sup>5</sup>. In a survey conducted in Kuwait by Raman et al., only 25.8% of parents with children (aged ≥ 1 year) reported using a rear-facing CRS; only 36.4% parents were able to recognize this type of seat; and over 30% of parents believed that children were safest in an adult's arms<sup>10</sup>. In another study from Saudi Arabia, of 679 children who were observed for restraint use, most were unrestrained; child restraint use was only 3% in the front seat and 14% in the second row<sup>11</sup>. A study in Qatar demonstrated that the usage rate of CRSs for infants and toddlers was 0%<sup>12</sup> and 1.2% among children (aged 0–18 years old) admitted to the national trauma center for RTIs<sup>13</sup>. At the time of publication, it is not mandatory for children in Qatar to be restrained while in a vehicle, and the only law that exists prohibits children under the age of 10 years from riding in the front seat<sup>14</sup>.

According to the WHO Global Status Report on Road Safety of 2015, 53 countries, representing 1.2 billion people, have a child restraint law that meets best practices.<sup>15</sup> In the Eastern Mediterranean Region, the WHO reports that only two countries have a national law requiring child restraint use, Saudi Arabia and Gaza.<sup>16</sup> Unlike seat belts, CRSs must be purchased and are not automatically fitted into vehicles. Challenges to acquiring them could be a reason for low compliance, meaning that accessibility and affordability are potential obstacles to achieving higher CRS utilization rates.

This study assesses the local retail CRS market and describes the availability, characteristics, and

affordability of child restraints in Qatar. Moreover, this study will provide evidence that can be used to make recommendations for future CRS policies and legislation and assist in increasing awareness about the accessibility and affordability of CRSs in Qatar. It will also add value to the global pool of data on child restraints, especially in the Middle East.

## METHODS

This study is a cross-sectional, observational, rapid market survey (RMS) conducted from May 19, 2015 to July 26, 2015 in Doha, Qatar. It was conducted as part of a larger 'Young Kids in Safe Seats (Y-KISS)' project, grant [NPRP 7-1681-3-429] funded by the Qatar Foundation, designed to measure current CRS knowledge, attitudes, and practices (KAP) and test two potential interventions to improve their use in Qatar.

A list of malls and supermarkets in Doha was obtained from the Doha Tourism Authority<sup>17</sup> to locate all the retail outlets and shops that sell CRSs in Qatar. These retail outlet types were categorized as child-focused shops, shops selling only automobile-related products, and general shops or supermarkets that sell CRSs. The researchers scheduled visits to the locations to document the types of CRSs available in each shop. Standard data on each restraint system including brand, model number, type (rear facing only, convertible, combination, forward facing, and booster), date of manufacture/expiry, age and weight/height limits, compliance with EU standards, cost, and languages of the owner's manual were collected.

A team of two surveyors, both of whom were U.S. National Highway Safety Authority (NHTSA) certified child passenger safety technicians, collected the data using a standard form.

The researchers took photographs of each car seat and collected the appropriate safety information on correct use from the manufacturer. The available CRSs were classified by type according to the U.S. NHTSA classification<sup>18</sup> and compared with the standards provided by the European Academy of Pediatrics. For example, an orange ECE R44 approval label guarantees that a car seat complies with the basic safety requirements set out in the European safety standard ECE R44<sup>19</sup>.

Descriptive analyses were reported as frequencies and percentages for categorical variables. The central tendencies of the continuous variables were

described using means with standard deviations for variables with normal distribution (as assessed by the Shapiro–Wilk test). Categorical variables were compared using a chi-squared test or Z-test of proportions, as appropriate. A p value of less than 0.05 (two-sided) was considered statistically significant. All statistical analyses were conducted utilizing the SPSS (IBM SPSS Statistics, version 22.0).

No statistically significant differences were noted among the groups as regards to the mean cost, availability of manuals, and manuals in Arabic, using rear-facing seats as the reference group.

The price range of the child restraints was also documented, and the cost in Qatari riyals (QAR) was converted into U.S. dollars as of June 2015.<sup>20</sup>

According to the Ministry of Interior regulations, "expatriates earning an average income of 10,000 QAR a month or more can sponsor families," i.e., their children can live with them in Qatar; subsequently, QAR 600 or approximately \$164.40 per day was set as the minimum daily wage for a child's parents/guardians<sup>21</sup>. Affordability was assessed using this minimal daily wage and expressed as the number (or fraction of) working days needed to purchase a CRS based on the method previously reported by Hendrie et al., in 2004.<sup>22</sup>

Ethical approval for this study [NPRP 7-1681-3-429] was issued by the Institutional Review Board of the Medical Research Centre of the Hamad Medical Corporation and the Traffic Department, Ministry of Interior, Doha, Qatar.

## RESULTS

A total of 19 potential CRS retail outlets were identified and surveyed, yielding 83 models of CRSs in 15 outlets in Doha. The outlets, types, and availability of different types of CRSs are listed in Table 1. The most common outlet type was the child-focused shop (60%). Across all of the outlets, combination seats were the most commonly available (87%), whereas booster seats were the least (33%). The child-focused shops, which cater exclusively to products for younger children, had the best CRSs selection. The survey showed that almost all types of CRSs (rear facing only, booster, combination, convertible, and forward facing only) were available. Almost all of the CRS outlets (13 of 15) were located within the capital city of Doha, where 85% of Qatar's residents live. There was one outlet in each of the secondary cities of Al Wakra and Al Khor (Figure 1).

**Table 1. Outlet, type of outlet, CRS type, and number of models available in retail outlets.**

Retail Outlet No.	Outlet Type	Rear Facing	Forward Facing	Convertible	Combination	Booster
1	S	0	5	0	0	1
2	CFS	4	0	2	1	1
3	CFS	6	3	1	3	1
4	G	0	1	0	1	0
5	CFS	0	1	2	1	0
6	CFS	2	1	1	1	1
7	CFS	1	1	1	1	0
8	G	0	0	0	1	0
9	G	1	0	0	2	0
10	CFS	8	1	0	4	0
11	G	1	3	0	1	2
12	CFS	2	0	0	1	0
13	CFS	1	0	0	0	0
14	S	0	1	0	1	1
15	CFS	1	1	0	6	0
Availability		10/15 (67%)	10/15 (67%)	5/15 (33%)	13/15 (87%)	6/15 (40%)

S: supermarket; CFS: child-focused shop; G: general shop.

The most commonly available CRS in Qatar was the rear-facing (RF) seat (34.9%), whereas the booster seat (9.6%) was the least available. All of the car seats conformed to the guidelines of ECE. Only two (2.4%) of the car seats displayed a manufacturing or expiry date. Almost two-thirds of the CRS (63%) had manuals in a variety of different languages (English, French, and Arabic), with the highest proportion of RF seats having manuals (76%) and the combination seats having the least (25%). Overall, only 28% of the CRSs had manuals in Arabic; this ranged from 12% for booster seats to 47% for forward-facing seats (Table 2). Only 2% of the CRSs surveyed were marked with a manufacturing and/or an expiry date.

A wide price range of \$14 – \$1399 (QAR 51 – 5106), a mean value of \$189 and median of \$126 were reported for all types of CRSs. The most affordable CRS was the booster seat (wages of 0.28 working days) and the most expensive was the convertible (wages of 2.2 working days).

## DISCUSSION

This RMS study demonstrates that CRSs are readily available in Qatar in a variety of locations, models, and

prices. All models were compliant with globally recognized standards and their acquisition costs were equivalent to 2 – 18 hours of work at the prescribed minimum wage scale for expatriate parents or local families. This study provides evidence that geographic and economic inaccessibility can neither be a rationale for nonutilization of this basic safety device for child passengers in Qatar nor should be a reason to delay the creation, implementation, and enforcement of child restraint laws in Qatar.

This RMS describes the national market and availability of CRSs in Doha, Qatar. It incorporates a previously applied methodology for child safety device affordability into an affordability equation specific to the context.<sup>22</sup> All possible CRS retail outlets in the State of Qatar were surveyed; the distribution of the outlets in the capital city of Doha and its suburban districts is equivalent to the national population distribution. More than 85% of Qatar's population resides within 50 km of the surveyed outlets.<sup>23</sup>

This study's findings are especially useful in the context of child passenger safety in Qatar. A roadside observational survey conducted in 2015 outside



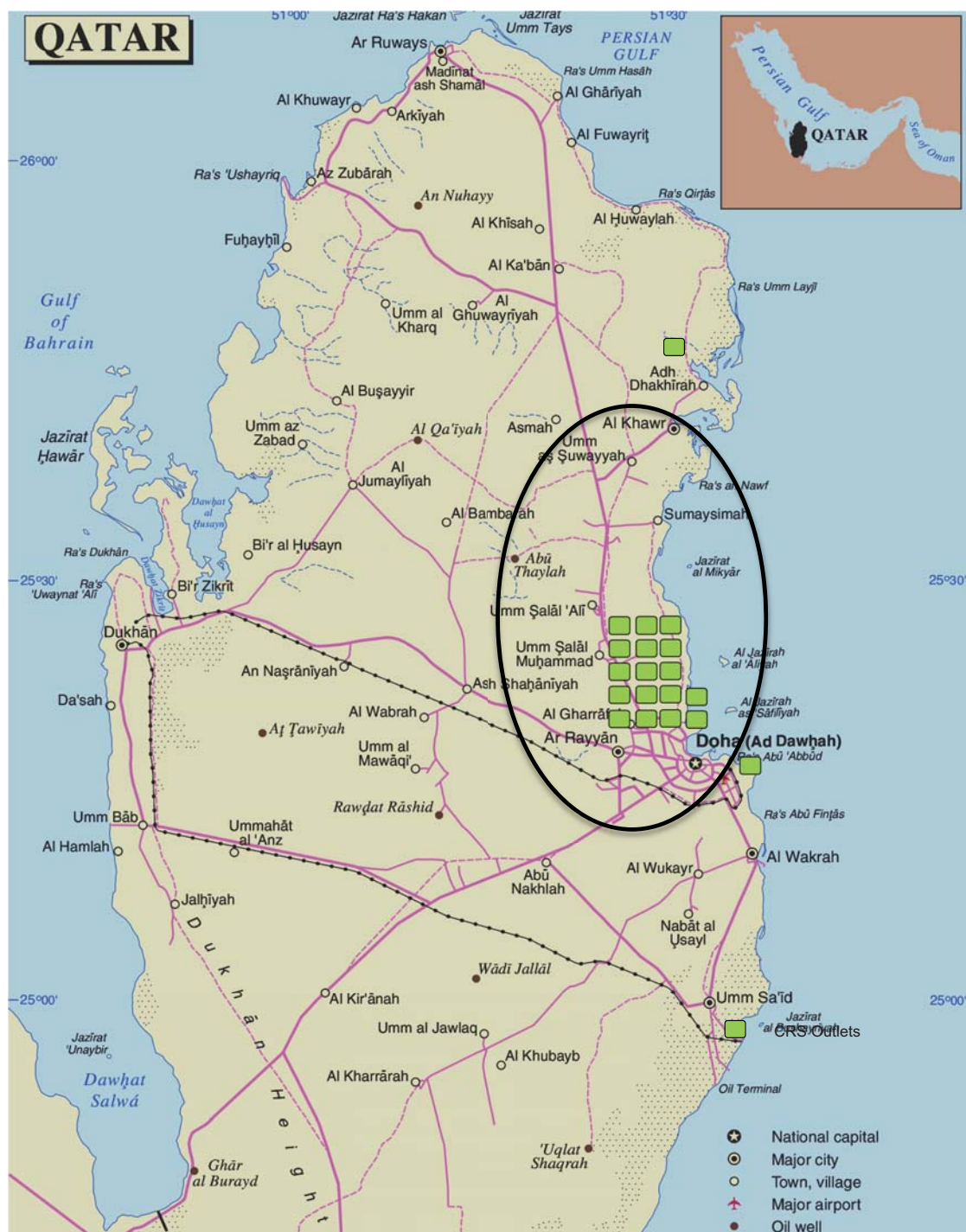


Figure 1. Geographic distribution of CRS outlets in Qatar, July 2015. Source: www.worldatlas.com. \*\*\*Based on the Municipality report that 85% of the total population lives within 50 km of Doha.

nurseries and daycare centers in the State of Qatar showed that 69% of the observed 2232 child passengers (aged 0 – 5 years) were in a CRS. Of those using a CRS, almost 60% were properly restrained. Overall, 21% were improperly restrained, 38% were

unrestrained, and 10.9% were in the front seat.<sup>4</sup> A survey is also underway at various well-baby clinics to assess the KAP of parents who visit well-baby clinics and have at least one child aged 0 – 5 years. This will contribute to the scant qualitative research on this

**Table 2. Results from the RMS: by type, ECE compliance, and manual availability in Arabic (Qatar: 2015).**

Types/Characteristics of Car seats (n = 83)	Rear facing	Combination	Convertible	Forward facing	Booster	Total
Number (%)	29 (34.9%)	16 (19%)	13 (16%)	17 (20%)	8 (9.6%)	83
ECE compliance (%)	100%	100%	100%	100%	100%	100%
With manual	22 (76%)	4 (25%)	9 (69%)	13 (76%)	4 (50%)	52 (63%)
Manuals in Arabic n (%)	10 (34%)	2 (12%)	2 (15%)	8 (47%)	1 (12%)	23 (28%)

(ECE: European safety standard, seats displaying the European standard orange label, indicating approval of the Standard to ECE R44/03, ECE R44/04, or i-Size [UN R129]).

topic and contribute to an improved understanding of the mindsets of parents and their reasons for nonuse of CRSs.

Improvements in the content and languages of the CRS manuals could help address the observed misuse of CRSs. Improved affordability and accessibility could reduce the percentage of observed children who were unrestrained. Further studies are being conducted under this grant, i.e., KAP surveys, to ascertain other obstacles to restraint use that need to be addressed. Consistent enforcement of existent laws prohibiting child passengers in front seats and public education is still needed to protect the 11% of young child passengers who are still seated in the front row of vehicles. Recent work from Chile has demonstrated that the effectiveness of CRS laws may be short term. The researchers stress the need for police enforcement, public information campaigns, and the involvement of public health professionals in educating parents about the benefits of using child restraints to ensure long-term gains.<sup>25</sup>

Of 96 countries in the world that have mandatory car child safety restraint laws, only 22 countries rate their enforcement of CSR an 8 on the scale 10.<sup>15</sup> Moreover, of the world's 10 most populous countries

that account for almost 4.2 billion people and 56% of the world's traffic deaths, only two countries—Brazil and Russia, representing a population of 340 million—have child restraint laws meeting best practices.<sup>15</sup>

Currently, no law exists requiring child restraint use in the GCC region except for Saudi Arabia, making it the only country in the Middle East to have such legislation. However, even in Saudi Arabia, the effectiveness of enforcement of this law is only 20%.<sup>11</sup> In comparison, all 50 states of the US and the District of Columbia have child safety seat laws.

Additionally, all European countries mandate the use of CRSs as well, with the effectiveness of such laws ranging from 20% to 80%.<sup>16</sup> Given that Qatar and other Gulf States are HICs with adequate resources for enforcement, laws and regulations, requiring CRS use should be in place.

The top price of CRSs found in the survey was higher (\$1399) compared to that in the US where the price range for CRSs was reported to be \$30–\$400. The range of CRS prices in the UAE was narrower (\$85–\$465) and closer to that of the US.<sup>26</sup> An average CRS in Qatar costs 10 hours or 1.25 days of work. When compared to the group mean costs from similar HICs (Australia, Austria, Canada, Germany,

**Table 3. Price and affordability of different CRSs, in 2015 USD and equivalent working days (Qatar, 2015<sup>21,22</sup>).**

	Rear facing	Combination	Convertible	Forward facing	Booster	Total
Price range	\$49–\$536	\$46–\$481	\$48–\$813	\$49–\$1,399	\$14–\$63	\$14–\$1,399
Mean cost (Working days equivalent)	\$154 (1.12 day)	\$190 (1.39 days)	\$300 (2.2 days)	\$177 (1.29 days)	\$38 (0.28 day)	\$171 (1.25 day)
Median cost (Working days equivalent)	\$126 (0.92 days)	\$119 (0.87 days)	\$232 (1.7 days)	\$139 (1.02 days)	\$45 (0.33 days)	\$126 (0.92 days)

Israel, Japan, United Kingdom and the United States), which are 5.0 and 1.3 hours, respectively, it takes considerably more hours of work to buy a car seat (10 hours) or booster seat (2.6 hours) in Qatar.<sup>22</sup> In a local context, if the average cost of a CRS in Qatar, approximately \$300, is divided over a period of two years (the time for which the child will use the car seat), the cost calculates to be \$12 a month, which is less than 0.5% of the prescribed monthly wage for expatriate workers.

Addressing the high acquisition costs of CRSs in Qatar could be left to market forces; however, they would work better in conjunction with other measures,<sup>27</sup> such as encouraging financial incentives for the production, importation, and use of protective equipment and ensuring that usage laws are properly enforced.<sup>28</sup>

A study of financial constraints as a potential barrier to widespread utilization of CRSs in Qatar is the subject of future research from the Y-KISS project [NPRP 7-1681-3-429], which will describe the CRS KAP of families with young children in Qatar.

Child safety seats must be installed appropriately for them to be maximally effective. According to an EU study,<sup>15</sup> the average rate of incorrect usage of child restraints was approximately 65%. The causes for the alarmingly high improper restraint use are most likely engineering/design problems (the ISOFIX system was developed to overcome this problem and make child restraint use more effective), physical difficulty with installation, and limited comprehension of the instruction manuals.<sup>29</sup> Our survey shows that 37% (31 of 83) of the CRSs lacked an accompanying manual enclosed and only 44% (23 of 52) had a manual with instructions in Arabic, which is one of the official languages of the State of Qatar. Therefore, it is highly recommended that user manuals be provided with all CRSs, particularly in Arabic.

Rear facing infant car seats, which are specifically designed for infants (aged < 1 year), had the highest availability, whereas booster seats, meant for children aged 4–8 years, were the least common. Whether this is reflective of the age-dependent demand for CRSs seen in other countries, wherein CRS utilization rates for infants and younger children are much higher than those for booster seats for older children or other nonmarket forces, is a matter for future study in this setting. Another area that requires attention and improvement is compliance with globally accepted

safety standards, especially expiry and manufacturing dates, which were shown by the study to be present in only 2% of the car seats. Long, frequent use and exposure to sunlight and/or extreme heat (> 40–45°C in the summer months) can damage the plastic frames and the safe-use labels on the seats can fade away, potentially leading to suboptimal child passenger restraint protection and installation.

## LIMITATIONS

Regardless of the coverage and capture of this rapid market survey, it underreports the true availability and diversity of the present local CRS market. The 'gray' market of used CRSs available from expatriates leaving the country, garage sales, and individual sellers online was not captured by this survey. Similarly, the characteristics of CRSs bought from online retailers or individuals who ship CRSs to Qatar are unknown and were not assessed. Currently, these are sectors of this market that remain unrecognized and undocumented. Finally, numerous new retail outlets for CRSs and other child-focused items have opened since this survey was conducted; undoubtedly, these add to the number, types, and geographic availability of CRSs in Qatar.<sup>24</sup>

## CONCLUSION

This study paves the way for the implementation of important child passenger restraint laws by demonstrating the national accessibility and affordability of CRSs in Qatar. Furthermore, it highlights the need for improvements in product standard regulations, specifically those that will require CRS manuals in Arabic and consistent display of manufacturing and/or expiry dates.

As highlighted by the WHO Decade of Action for Road Safety 2011–2020, increasing the safety of children in vehicles is an important public health issue that must be addressed. This is based on the understanding that this leading cause of death and disability among children is preventable through the collective actions of individuals and local and national organizations.<sup>16</sup> This study's findings, coupled with ongoing national programs to improve child passenger safety in Qatar (such as the National Child Passenger Safety Program), Kulluna<sup>30</sup> will help to inform future child passenger safety interventions and prevent child occupant injuries and deaths in Qatar.

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## Competing Interests

None declared.

## Ethical approval

Institutional Review Board of the Medical Research Centre of the Hamad Medical Corporation and the Traffic Department, Ministry of Interior in Qatar.

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