

The Prevalence of Child Restraint System Use and Pattern of Child Transportation in Buraidah City

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ABSTRACT

Background: The motor vehicle crash (MVC) is a major cause of injuries and deaths among children worldwide. The child restraint system (CRS) is designed to protect children from injury and death if passengers are involved in MVC. **Objectives:** To determine the prevalence of CRS use for children aged 5 years and below and to explore the pattern of child transportation inside cars in Buraidah, Saudi Arabia. **Methods:** A cross-sectional study was conducted using a self-administered questionnaire distributed among parents attending primary healthcare centers. Simple random sampling was used to select 330 participants. The survey was conducted from January to March 2020. **Results:** A total of 135 (40.9%) respondents had CRS available in their cars, and only 51 (15.5%) participants reported using it 'always'. Child discomfort, difficulty in handling CRS, and being unaware of CRS importance were the commonly reported reasons of not using CRS. The most common practiced mode of transportation, in case of not using CRS, was seating the child in the front seat on an adult lap. Twenty-eight (8.2%) respondents experienced a MVC while driving with a child; half (53.6%) of these were not using CRS at the time of the accident. Less than half (47.1%) of the participants were aware of the CRS law in Saudi Arabia. **Conclusion:** The prevalence of using CRS is low. Creating awareness among parents and strict implementation of the CRS law can lead to increase in the use of CRS which will lead to prevention of traffic-related injuries and deaths among children.

Keywords: Child restraint system, child transportation, motor vehicle crash, Qassim, Saudi Arabia

Introduction

The annual global road crash statistics state that the worldwide motor vehicle crashes (MVC) are responsible for around 1.35 million deaths annually; more than 90% of these deaths occur in low and middle income countries.^[1] MVC is also reported to be the leading cause of death among children and young adults.^[2] Child restraint system (CRS) is designed to protect a child from lethal injury and death if passengers are involved in MVC. By using child restraint system, there is at least 60% reduction in deaths that can result from MVC.^[2]

Since it is important to use the child restraint system to protect the children and decrease serious injury and death rate, this study was conducted to identify the prevalence of CRS use, and to explore the parent's behaviour and perception toward it. The objectives of the study were to determine the prevalence of CRS use for children aged 5 years and below, of parents attending primary healthcare centres (PHCCs) in Buraidah city, and to explore the mode of children transportation inside the cars if a CRS is not used. The study also identified relation of sociodemographic factors and CRS use in the study population, and assessed the parents' awareness of law regarding CRS use in Saudi Arabia.

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Subjects and Methods

A cross-sectional survey was conducted at PHCCs in Buraidah City, Qassim region, Saudi Arabia. The study included parents attending PHCCs who had at least one child 5 years of age

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or younger. The sample size was calculated using open Epi software.^[3] At 95% confidence level with 5% bound on error and an expected prevalence of CRS use 30%,^[4] the required sample size was 323. The sample size was rounded off to 330 participants.

The participants were selected by the two-stage cluster sampling method. In the first stage, a simple random sampling technique was used to select 5 PHCCs canters out of 43 functioning centres in the city. In the second stage, from each PHCC, 66 participants, including 33 males and 33 females, were randomly selected.

A semi-structured, self-administered questionnaire was used to collect the data. The contents of the questionnaire were adapted from a valid and reliable instrument used in a previous study conducted in Riyadh, Saudi Arabia.^[4] The questionnaire was pre-tested and modifications were done according to feedback of the participants.

Ethical approval was obtained from the Qassim Region Research Ethics Committee (QREC). The questionnaires were distributed after taking consent from the participant. The survey was conducted in 2020 over a 3-month period from January to March. The data were collected by the main author and the nurses at PHCC who were trained for data collection before start of the study.

Data were analysed using the Statistical Package for the Social Sciences (SPSS), version 25. Descriptive statistics are reported as frequencies with percentages distribution, and mean with standard deviation. For inferential statistics, Chi-Square test, independent sample *t*-test, and one-way ANOVA tests were used to determine significant statistical difference. A significant difference was accepted at a *P* value less than 0.05.

Results

For completing the sample size of 330, the total number of eligible participants contacted was 380, giving an overall response rate of 86.8%. The majority (47.6%) of the participants were aged 31-40 years. A total of 184 (55.8%) participants had 5 or less family members, and 191 (57.9%) participants had one child aged 5 years or below [Table 1].

The participants were asked about the use of seat belt. Although 292 (88.5%) participants responded that they use the seat belt, only 98 (29%) participants, including 59 males and 39 females, were 'always' using the seat belt.

Figure 1 shows the availability of CRS in the cars of the respondents. A total of 135 (40.9%) respondents stated that CRS is available in their cars. Out of these, 27 (20%) mothers and 24 (17.8%) fathers reported that they always used the CRS [Figure 2]. In contrast, 7 (5.2%) mothers and 10 (7.4%) fathers reported that they rarely use the CRS for their children.

The parents were asked about the reasons of not using CRS [Table 2]. The most common reported reason was refusal of child because of discomfort [118 (47.6%)]. A total of 73 (29.4%) parents were unaware of CRS importance while 37 (14.9%) had difficulty in handling their children CRS. Moreover, 37 (14.9%) parents thought that CRS is expensive.

Table 3 presents the mode of child transportation inside the car. The most common response [137 (53.9%)] was seating the child on the lap of the passenger on the front seat, followed by passenger's lap in the back seat [65 (25.6%)], and seated in the back seat without seat belt [46 (18.1%)]. Nine (3.5%) participants mentioned seating of the child on the driver's lap.

A total of 28 (8.2%) participants had experienced a car accident while driving with a child inside the car. Out of the total 28 participants who experienced car accident, 15 (53.6%) had not used any protection method for the child at the time of the accident. Regarding outcome of the accident, 15 (53.6%) participants reported no injury to the child, 10 (35.7%) mentioned that their child had simple wound or bruises, 1 child (0.3%) suffered fracture, 1 child (0.3%) had critical injury that required

Table 1: Demographic characteristics of the participants (n = 330)

Demographic characteristics	Demographic characteristics	n	%
Gender	Male	165	50%
	Female	165	50%
Age group (years)	30 and below	76	23%
	31-40	157	47.6%
	41-50	76	23%
	51-60	18	5.5%
	61 and above	3	0.9%
Education level	Illiterate	5	1.5%
	Primary school	11	3.3%
	Middle school	20	6.1%
	High school	77	23.3%
	Diploma	9	2.7%
	Bachelor	195	59.1%
Family member number	Higher study (master and above)	13	3.9%
	≤5	184	55.8%
Family member number <5 years	≥6	146	44.2%
	1	191	57.9%
	2	121	36.7%
	3	17	5.2%
Monthly income of household (Saudi Riyal)	4	1	0.3%
	<5,000	39	11.8%
	5,000-9,999	91	27.6%
	10,000-14,999	131	39.7%
	15,000-20,000	56	17%
Participants' youngest child age group	More than 20,000	13	3.9%
	≤1 year	135	41.2%
	>1-2 years	88	26.8%
	>2-3 years	48	14.6%
	>3-4 years	39	11.9%
>4-5 years	18	5.5%	

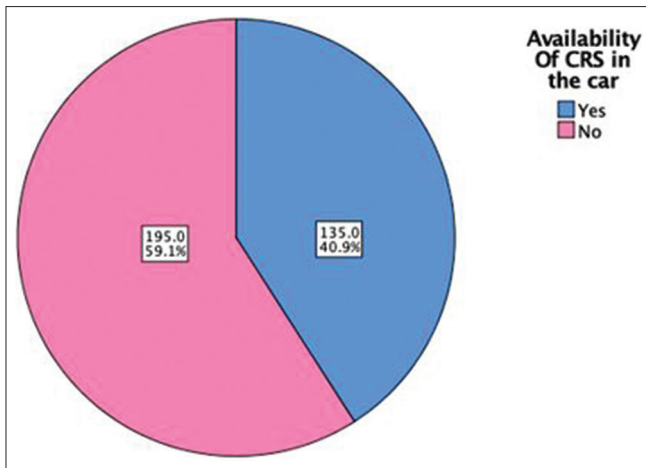


Figure 1: Availability of CRS in the cars of the study participants (n = 330)

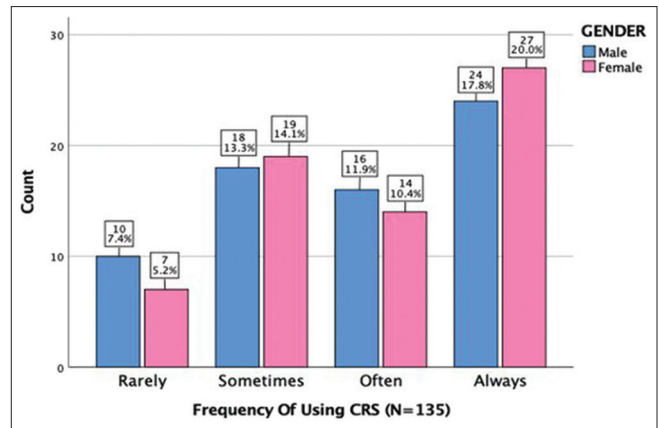


Figure 2: Frequency of using child restraint system among study participants (n = 135)

Reason	Number of responses	Percentage of participant
Child refuses to use because of discomfort	118	47.6%
Unaware of the importance of CRS	73	29.4%
Difficult to handle by parents	37	14.9%
Expensive	37	14.9%
Unnecessary	33	13.3%
No space in the car	9	3.6%
Others	9	3.6%
Total	316	127.4%

Total percentage is >100% because multiple responses were allowed.

Mode	Number of responses	Percentage ¹ of participants
Front seat on the lap of an adult	137	53.9%
Back seat on the lap of an adult	65	25.6%
Back seat without seat belt	46	18.1%
Back sea with use of a seat belt	43	16.9%
Front seat without using a seat belt	40	15.7%
Front seat using a seat belt	24	9.4%
Driver lap	9	3.5%
Others	2	0.8%
Total	366	144.1%

¹Total percentage is >100% because multiple responses were allowed

ICU admission, and 1 (.3%) respondent reported death of the child. On enquiring if the parents began using CRS after car accident, 9 (32.1%) stated that they started using CRS while 19 (67.9%) did not change the practice.

A total of 155 (47.1%) participants were aware that there is legislation regarding child restraint system in Saudi Arabia while 40 (12.2%) thought that there is no law regarding it. More than one-third (40.7%) of the participants responded ‘don’t know’ to this survey question.

Table 4 shows the participants’ attitude towards CRS. A total of 220 (66.7%) participants agreed that CRS is an essential device while driving with children while less than half (46.6%) thought that they had enough information about CRS. Regarding costs, 39.1% had an opinion that CRS is expensive. Many respondents (32.6%) had the opinion that CRS is only important while driving fast. Moreover, 25.4% thought that CRS is not important for children more than two years of age.

Table 5 shows the association between respondents’ demographic data and the availability of CRS. The availability of CRS is significantly associated with the age group of the parents ($P < 0.0001$), family member number ($P < 0.0001$), child age ($P < 0.0001$), and education level of the parents ($P = 0.034$). However, gender, monthly income, and family member number of less than 5 years of age showed no significant statistical association with the availability of CRS.

Discussion

The present study determined the prevalence of CRS use, reasons of not using CRS, and pattern of transportation of children inside the car in the absence of CRS. Moreover, the current study explored the attitude of the parents towards CRS use, and their awareness regarding CRS law in Saudi Arabia.

In the current study, males and females had equal representation, and the majority (47.6%) of the participants were 31-40 years old. In comparison, the female gender was dominant (77.1%), and 35.4% of participants were aged 25-30 years old, and 27.4% were aged 31-35 years old in a similar study conducted in Unaizah.^[5] In another study in Riyadh, most of the participants were males (62.6%) and 47.9% of parent participants were aged 30-39 years old.^[4] Internationally, similar studies have reported different proportion of male participants; 79.5% in Brazil,^[6] 59% in Pakistan,^[7] and 88.6% in Shanghai.^[8]

The results of this study showed that CRS was available in 59.1% of the participants’ cars and 37.8% reported regularly

Table 4: Participants attitude towards child restraint system

Statement	Disagree		Neutral		Agree	
	n	%	n	%	n	%
Child restraint system is an essential device while driving with children (n=330)	45	13.6%	65	19.7%	220	66.7%
I have enough information about CRS (n=328)	96	29.3%	79	24.1%	153	46.6%
CRS is expensive (n=327)	91	27.8%	108	33.0%	128	39.1%
CRS is only important when driving fast (n=328)	168	51.2%	53	16.2%	107	32.6%
CRS is not important for children more than two years old (n=327)	157	48%	87	26.6%	83	25.4%

Table 5: Association of respondents demographic characteristics with child restraint system availability

Demographic characteristics	Demographic characteristics	Availability of CRS		Chi-square	
		Yes	No	χ^2	P
Gender	Male	68	97	0.013	0.911
	Female	67	98		
Age group (years)	≤30	46	30	Fisher's exact test 25.301	<0.0001
	31-40	66	91		
	41-50	17	59		
	51-60	6	15		
Education level	High school & lower	36	72	4.484	0.034
	Bachelor and above	99	118		
Income	<10,000	51	79	0.250	0.617
	10,000 and more	84	116		
Family member number	1-5	93	91	15.969	<0.0001
	6-16	42	104		
Family member number <5 years	1-2	127	185	0.098	0.754
	3-4	8	10		
Participant Child age group	≤1 year	69	66	30.390	<0.0001
	>1-2 years	42	46		
	>2-3 years	15	33		
	>3-4 years	7	32		
	>4-5 years	0	18		

using it. In comparison, 42.7% study participants owned a CRS in Unaizah^[5] while in Riyadh 36.6% participants had a CRS and 30% reported regularly using it.^[4] Thus, the availability of CRS was higher in our study but the prevalence of regular use is similar to the study done in Riyadh, Saudi Arabia. The availability of CRS in our study was also higher as compared to Brazil (29.5%),^[6] Pakistan (6.6%),^[7] and Shantou (6.6%).^[9] However, it was comparable to availability of CRS in Shanghai (55.5%)^[8] and lower in comparison to Australia (99.2%).^[10] As the use of CRS is expected to be 100%, the finding of our study underscores the importance of increasing the population awareness about the CRS use as well as the crucial role of law enforcement agencies in the country to monitor for the CRS law violation.

In our study, in case of non-availability of CRS, the most common (53.9%) mode of transportation was on the passenger lap in the front seat. Our results are comparable to a study conducted in Riyadh, in which 55% parents reported that the child sat in the lap of the passenger in the front seat.^[4] In contrast, in the study conducted in Unaizah, 64.4% of the children were seated in the back seat.^[5] A study from United Arab Emirates, also reported that the unrestrained children were seated in the

front seat.^[11] In Brazil, 47% children were seated on the back seat without any restraint system while 17% seated on the adult lap.^[6] In Shantou, 18% seated alone in the front seat and 10% sat in the adult lap while travelling in a car.^[9]

In the current study, the most common reason of not using CRS was discomfort of the child and refusal to use the CRS. In another study from Saudi Arabia, the most common reason was refusal of the child to use the CRS.^[5] Similarly, a study from Shanghai found that in 33.6% cases, CRS was not used because of inconvenience.^[8] In our study, around one-third of the participants were unaware of the importance of CRS, and 13.3% the parents thought that CRS is unnecessary. Similar findings are reported by other studies nationally and internationally. In Saudi Arabia, 22.3% parents thought it was unnecessary^[5] while in Brazil and Pakistan, CRS was considered unimportant by 64.5%^[6] and 57%^[7] parents, respectively. Another reason for not using CRS, reported by 44% participants of a study in China, was the absence of law enforcement.^[9] Thus, the commonest reported causes for not using CRS were child discomfort and unawareness of the parents about its importance. This highlights the importance of creating awareness among the parents and guiding them on

choosing the appropriate CRS and using it correctly to keep the child comfortable in the car journey.

The motor vehicle accident is known to be one of the leading causes of child injury and death. In our study, 8.2% of the participants experienced motor vehicle accident while accompanied with a child, similar to the finding from a study done in Riyadh where 13.5%^[4] participants reported of motor vehicle accident. However, it was higher in Unaizah where 31.3% participants^[5] had experienced a car accident while travelling with the family members, and among these in 40.6% incidents there was child involvement.

In our study, in 53.6% accidents, there was no injury to the child while in 35.7% accidents, the child had simple wounds or bruises. These findings are comparable to the study from Unaizah where in 25.6% incidents, children had only a minor injury^[5] while in Riyadh, in 76.5% incidents, children had no accident related injury while 21.6% of the incidents resulted in simple wound or bruises to the children.^[4] Our study showed that more than half of the participants who experienced car accident had not used any protection method for the child at the time of the accident, and around two-thirds of them did not change their practice even after the accident. This important finding stresses on the need of raising parents' awareness about their children safety inside the car.

Our study showed that only 47.1% of the participants were aware of the legislation regarding CRS in Saudi Arabia. In contrast, 86.2% of participants reported awareness regarding children's safety seat legislation in the country in Shanghai.^[8] Awareness of less than half of the participants about the car seat legislation is an important finding in our study which underscores the importance of creating awareness about this law by various means of communication, such as posters, brochures and mass media messages. Moreover, implementation of law and strict monitoring of compliance with the law needs to be done by law enforcing agencies.

To adopt the practice of using CRS for the child, it is important that the parents have a positive attitude towards CRS use. Most of the participants had a positive attitude toward CRS in our study which is similar to the study in Unaizah, where 53.4% had positive attitude towards CRS use.^[5] Other studies have also shown a positive attitude towards CRS use. In Riyadh, 81% of participant agreed that CRS is essential while driving accompanied with a child.^[4] In China, 95.3% of the study participants thought the use of child restraint system is necessary for the safety of children.^[9]

An interesting finding in our study was statistically significant association of attitude scores with educational level of the parents ($P < 0.0001$), and the availability of CRS in their cars ($P < 0.0001$). It can be inferred that the well-educated parents, being more aware, had a positive attitude towards CRS leading to having a CRS for their children.

Our study has certain limitations. Our study measured the prevalence of use of CRS but it did not observe for proper use of the child safety seat. Further research regarding CRS use is recommended, to explore that the parents use an appropriate CRS and follow the proper way of installation inside the car. We used a self-administered questionnaire, so the participants might have misunderstood some questions. However, the questionnaire was pre-tested and modified to remove the ambiguities. Moreover, the data collector used to be present at the time of the survey to respond to the queries of the participants. Although data were collected in multiple PHCCs in different neighbourhoods inside the city to minimize the selection bias, this study covers only one city. Thus, the generalizability of the results may be limited. However, the demographic profile of the parents is expected to be similar in other parts of the province and the country, making it possible to generalize our findings to some extent.

Based on the findings of the current study, it is recommended to increase the population awareness about the importance of using CRS and the children safety inside the car. Since there is legislation available for the use of CRS in Saudi Arabia, implementation needs to be strictly monitored. The monitoring can be done in the same way as is being done for the safety belt for the driver and front seat passenger using surveillance cameras, and imposing fine on those who break the law. It is suggested that importance and proper use of CRS may be included in health education during antenatal and well-baby clinic visits to create awareness about the importance of CRS, and also to educate the mothers about its proper use.

To conclude, the prevalence of using CRS is low in Buraidah city. In case of non-availability of CRS, the most common mode of child transportation was being seated in the front seat on the passenger lap. The most common reason of not using CRS was child discomfort and refusal to use it. Moreover, the parents were unaware of the importance of CRS, and the awareness regarding country legislations toward CRS use was also not adequate.

Child healthcare is the cornerstone of primary healthcare and one of the main responsibilities of primary healthcare physicians. Our study provides baseline information about CRS use among children which is one of the important preventive measures for child health and safety. This baseline information will help the primary health care physicians to create awareness and educate the parents regarding use of CRS for the safety of the children.

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Conflicts of interest

There are no conflicts of interest.

References

1. Association for Safe International Road Travel. Road Safety Facts. Available from: <https://www.asirt.org/safe-travel/road-safety-facts/>. [Last accessed on 2020 Nov 20].
2. World Health Organization. Global status report on road safety 2018. World Health Organization; 2018. Available from: <http://apps.who.int/iris/bitstream/handle/10665/277370/WHO-NMH-NVI-18.20-eng.pdf?ua=1>.
3. Dean A, Sullivan K, Soe M. OpenEpi: Open Source Epidemiologic Statistics for Public Health version 3.01. 2013. Available from: <http://www.openepi.com>. [Last accessed on 2020 Nov 20].
4. Alsanea M, Masuadi E, Hazwani T. Use of child restraint system and patterns of child transportation in Riyadh, Saudi Arabia. *PLoS One* 2018;13:e0190471. doi: 10.1371/journal.pone.0190471.
5. AlSallum GA, Alwassel AA, Alshushan AM, Abaalkhail AK, Alhasoon MA, Aldamigh AS. Parent's knowledge, attitude, and practice about children car seats at Unaizah city, KSA. *J Family Med Prim Care* 2019;8:805-11.
6. Garcês AQ, Coimbra IB, Silva DS. Transporting children in cars and the use of child safety restraint systems. *Acta Ortop Bras* 2016;24:275-8.
7. Siddiqui E, Ejaz K, Waheed S, Kazi GI, Khursheed M. Attitudes towards child restrains and seat belts usage in the learned population of Karachi, Pakistan. *World J Emerg Med* 2014;5:223-8.
8. Niu L, Gao Y-M, Tian Y, Pan S-M. Safety awareness and use of child safety seats among parents after the legislation in Shanghai. *Chin J Traumatol* 2019;22:85-7.
9. Lei H, Yang J, Liu X, Chen X, Li L. Has child restraint system use increased among parents of children in Shantou, China? *Int J Environ Res Public Health* 2016;13:964.
10. Brown J, Hatfield J, Du W, Finch CF, Bilston LE. Population-level estimates of child restraint practices among children aged 0-12 years in NSW, Australia. *Accid Anal Prev* 2010;42:2144-8.
11. Bendak S, Alkhaleedi K. Child restraint system use in the United Arab Emirates. *Transp Res Part F Traffic Psychol Behav* 2017;51:65-72.