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MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE

Are child occupants appropriately restrained while travelling in rideshare vehicles?

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BACKGROUND

Seatbelts & child restraint systems (CRS) are effective preventative measures against crash-related deaths & severe injuries for child occupants travelling in motor vehicles (Brown et al., 2023; Du et al., 2010; Elliot et al., 2006)

Effectiveness is critically dependent on correct & appropriate use (Brown et al., 2006)

Minimum legal restraint requirements for child occupants within PMV specified in Australian Road Rules (National Transport Commission, 2019)

Children aged ≤6mo	Restrained in a properly fastened & adjusted RF CRS in rear seat
Children aged 6mo-4yr	Restrained in a properly fastened & adjusted RF CRS OR a properly fastened & adjusted FF CRS with inbuilt harness in rear seat
Children aged 4-7yr	Restrained in a properly fastened & adjusted FF CRS with inbuilt harness OR BS restrained by either lap-&-sash seatbelt or child safety harness in rear seat UNLESS all rear seats are taken by other occupants <7yr
Child aged 7+yr	Restrained by lap-&-sash seatbelt OR lap-only seatbelt in rear or front seat

BACKGROUND

In Australia, child occupant restraint use in PMV is high (99.3%; Brown et al., 2023)

- Restraint use is lower in shared transportation modes such as rideshare vehicles (RSV)

  RSV = Service where individual can organise/hire driver to take them to where they need to go without sharing vehicle with others/having to make other stops along a route [Koppel et al., 2022])

Koppel et al. (2021) surveyed 621 Australian parents (Age: M=39.2, SD=10.5; Female: 63.4%) about restraint behaviours for youngest child while travelling in RSV

- 40.9% had travelled in RSV with youngest child (M=7.2, SD=5.2, Range=0.0–17.0; Male: 54.2%)
- Lower rates of appropriate child occupant restraint use within RSV (57.3%) than in their PMV (85.6%)
- Frequent reasons for not 'always' using appropriate child occupant restraint:
  - P did not have a child restraint available (39.6%)
  - Travelling a short distance (33.0%)
  - Not being required to use one (33.0%)
- Consistent internationally (Ehsani et al., 2021; Savage et al., 2021)

BACKGROUND

Lower rates of appropriate child occupant restraint use in RSV related to ambiguity around requirements for child occupants within shared transportation modes:

- RSV exempt from child restraint requirements in some states/territories (NT, QLD, WA)
- Other transport modes (taxis, public minibuses, hired cars, & tow trucks) generally exempt from child restraint requirements if *'No suitable approved child restraint available'*
    - Except in NSW where requirements apply to child occupants >12 months in taxi

Lower rates of appropriate restraint use for child occupants in RSV are ALARMING

- Inappropriate restraint associated with increased risk for crash-related fatalities & injuries
- RSV travel surging in popularity post-pandemic in Australia (Pawluk De-Toledo et al., 2024), & internationally (Uber Investor, 2021); potentially placing more child occupants at risk
- Koppel et al. (2021) findings relate to travel before COVID-19 - may differ in post-pandemic landscape

Current study implemented an online survey with two main objectives, to:

- Understand post-pandemic restraint behaviours when Australian parents travel with child(ren) in RSV
- Identify factors (socio-demographic characteristics, driving & restraint behaviours, child's PMV travel characteristics) associated with appropriate restraint use for child occupants while travelling in RSV

METHOD

Participants

Ps eligible if: aged ≥18 years; lived in Australia; drove ≥1 per week, & lived with ≥1 children (aged ≤17 years)

Materials

Ps completed online survey (approx. 20 min)

P Characteristics:

- Age, gender, education level, household income
- # (& age) of children (≤17 years) living with them

Driving Characteristics & Behaviours:

- Driving frequency (1=Daily; 4=1 per week), crash &/or infringement history in past 2 years (Yes/No), frequency of seatbelt use (1=Always; 6=Never)
- Driving Behaviour Questionnaire (DBQ) (Reason et al., 1990) - 28-items measuring frequency of engaging in risky driving behaviours (0=Never; 5=Always):
  - errors (e.g., Hit something when reversing that you hadn't noticed)
  - lapses (e.g., Forget where you left your parked car)
  - violations (e.g., Disregard the speed limit)
  - aggressive violations (e.g., Get angry at a driver and express your anger any way you can)

METHOD

Materials

Youngest Child's Characteristics, Restraint Behaviours in PMV & Frequency of Travelling in Different Modes:

- Age
- Gender
- Type of restraint (RF CRS, FF CRS, BS, seatbelt, no restraint)
- Frequency of appropriate restraint use (1=Always; 6=Never)
- Seating location (front passenger seat, rear seat, adult lap)
- Frequency of travelling in different transport modes, including PMV, active travel, public transport, RSV (1=Daily; 8=Never)

Restraint Behaviours when Travelling with Youngest Child in RSV:

- Type of restraint (RF CRS, FF CRS, BS, seatbelt, no restraint)
- Frequency of appropriate restraint use (1=Always; 6=Never)
- Seating location (front passenger seat, rear seat, adult lap)
- Reasons for non-use of appropriate restraint (if applicable)

METHOD

Procedure

Study approved by Institutional ethics committee

- Ps recruited through online & social media advertising
- Survey administered from February to March 2023

Data Analysis

Descriptive statistics used to describe sample

'Appropriate restraint use' based child's age, restraint type, seating location in vehicle, & restraint frequency:

- Aged <6 mo: RF CRS, in rear seat, 'always' restrained
- Aged 6 mo-4yr: RF OR FF CRS, in rear seat, 'always' restrained
- Aged 4-6 yr: FF CRS OR BS, in rear seat, 'always' restrained
- Aged 7+yr: BS OR seatbelt, in front or rear of vehicle, 'always' restrained

Bivariate analyses used to identify factors (e.g., socio-demographic characteristics, driving & restraint characteristics, & child & travel characteristics) associated with appropriate restraint use for youngest child while travelling RSV

All statistical analyses conducted using IBM SPSS v. 28

RESULTS

828 Ps (M=42.9 years, SD=6.3 years, Min=21 years, Max=86 years) completed online survey

Socio-demographic characteristics		% (N)
Age (years)	18-34	7.0% (58)
	35-44	54.7% (453)
	45-54	34.3% (284)
	55+	4.0% (33)
Gender	Male	60.0% (497)
	Female	39.3% (325)
	Other	0.7% (6)
Education level	Primary/Intermediate/High school	16.2% (134)
	Technical/Trade/Diploma	35.6% (295)
	Undergraduate	26.8% (222)
	Postgraduate	21.4% (177)
Annual household income ($AUD)	≤$50,000	63.6% (385)
	$50,001-$100,000	2.6% (22)
	$100,001-$150,000	17.1% (142)
	$150,001-$200,000	27.1% (224)
	$200,001-$250,000	29.7% (246)
	>$250,000	5.7% (47)
	Prefer not to say	4.6% (38)

Most Ps reported one child lived with them (1: 69.1%; 2: 20.4%; 3: 8.0%; 4: 1.8%; 5: 0.5%; 6: 0.2%)

RESULTS

Driving characteristics		% (N)
Driving frequency	Daily	50.6% (419)
	4–6 times per week	30.2% (250)
	1–3 times per week	19.2% (159)
Seatbelt use frequency	Always	64.4% (533)
	Almost always	18.5% (153)
	Usually	16.7% (138)
	Sometimes	0.1% (1)
	Almost never	0.1% (1)
	Never	0.2% (2)
Crash involvement (past 2 years)	No	94.4% (782)
	Yes	5.6% (46)
Driving infringements (past 2 years)	No	87.1% (721)
	Yes	12.9% (107)
Driver Behaviour Questionnaire (DBQ)	Errors (Max=55)	2.23 (0.93)
	Lapses (Max=30)	2.45 (0.81)
	Aggressive violations (Max=15)	2.35 (0.86)
	Violations (Max=40)	2.33 (1.03)

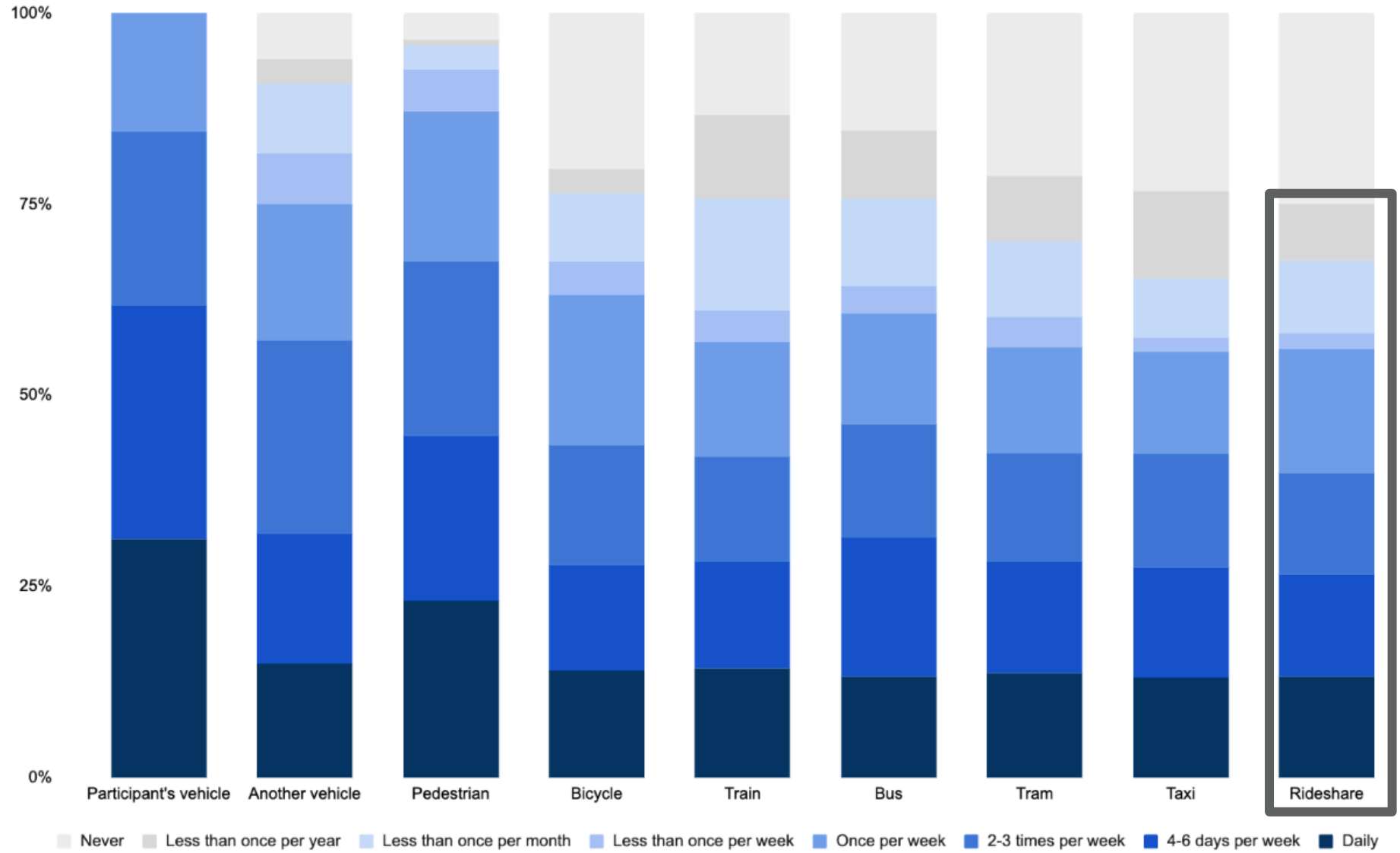
RESULTS

Most of the youngest children were aged 7-12 years (M=10.1 years, SD=4.0, Range=0.0-17.0 years)

Youngest child's characteristics		% (N)
Age (years)	<1	5.4% (45)
	1–3	5.1% (42)
	4–6	6.8 (56)
	7–12	52.9% (438)
	13–17	29.8% (247)
Restraint type in PMV	Rearward-facing CRS	6.3% (52)
	Forward-facing CRS	5.6% (46)
	Booster seat	12.6% (104)
	Seatbelt	73.8% (611)
	No restraint	1.8% (15)
Frequency of appropriate restraint in PMV	Always	62.7% (519)
	Almost always	17.4% (144)
	Usually	17.9% (148)
	Sometimes	0.2% (2)
	Almost never	0.0% (0)
	Never	1.8% (15)
Seating location in PMV	Front passenger seat	40.2% (333)
	Rear seat	59.5% (493)
	Adult's lap	0.2% (2)

61.4% were appropriately restrained based on age, restraint type, seating location, & restraint frequency

RESULTS


100%
75%
50%
25%
0%
Participant's vehicle
Another vehicle
Pedestrian
Bicycle
Train
Bus
Tram
Taxi
Rideshare
Never
Less than once per year
Less than once per month
Less than once per week
Once per week
2-3 times per week
4-6 days per week
Daily

RESULTS

Most of the youngest children were aged 7-12 years (M=10.8 years, SD=3.3, Range=0.0-17.0 years)

Youngest child's restraint in RSV		% (N)
Age (years)	>1	5.4% (45)
	1-3	5.1% (42)
	4-6	6.8% (56)
	7-12	52.9% (438)
	13-17	29.8% (247)
Restraint type in RSV	RF CRS	2.0% (12)
	FF CRS	1.5% (9)
	Booster seat	8.0% (49)
	Seatbelt	82.9% (510)
	No restraint	5.7% (35)
Frequency of appropriate restraint in RSV	Always	20.5% (126)
	Almost always	26.2% (161)
	Usually	25.4% (156)
	Sometimes	22.0% (135)
	Almost never	0.7% (4)
	Never	5.4% (33)
Seating location in RSV	Front passenger seat	28.5% (175)
	Rear seat	70.4% (433)
	Adult's lap	1.1% (7)

19.7% appropriately restrained based on age, restraint type, seating location, & restraint frequency

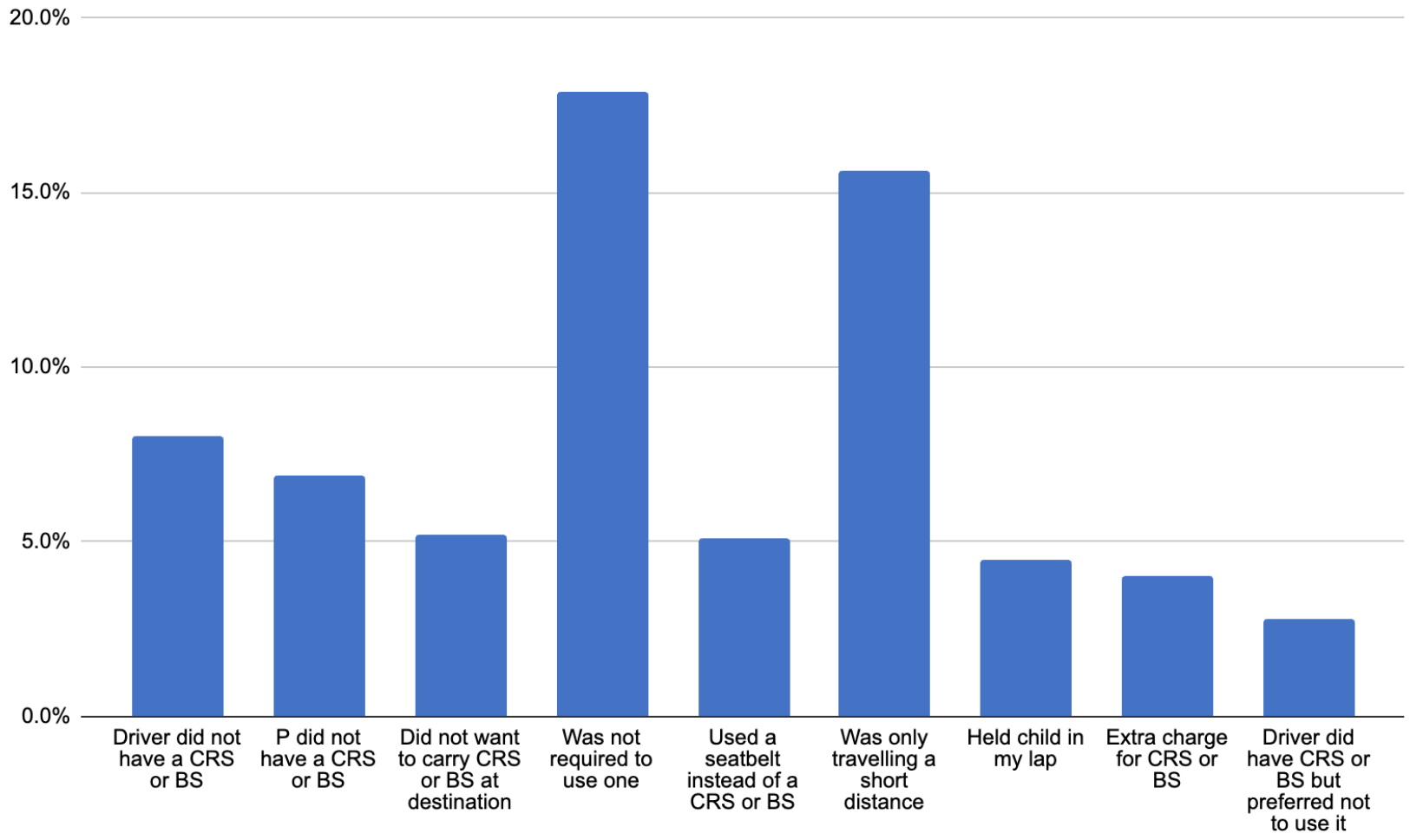
RESULTS

		Always appropriately restrained % (N)	NOT always appropriately restrained % (N)
Age (years)	18-34	24.8% (50)	75.2% (152)
	35+	17.2% (71)	82.8% (342)
Sex	Male	12.9% (36)	87.1% (242)
	Female	24.6% (82)	75.4% (251)
Education level	Primary/Intermediate/High school	7.3% (9)	92.7% (115)
	Technical/Trade/Diploma	7.3% (19)	92.7% (241)
	Undergraduate	24.4% (38)	75.8% (118)
	Postgraduate	73.3% (55)	26.7% (20)
Driving frequency	Daily	27.9% (79)	72.1% (204)
	4-6 times per week	17.8% (34)	82.2% (157)
	1-3 times per week	5.1% (7)	94.9% (131)
Seatbelt use (PMV)	Always	36.0% (117)	64.0% (208)
	Not always	1.4% (4)	98.6% (286)
Driving infringement	No	20.8% (112)	79.2% (426)
	Yes	11.7%(9)	88.3% (68)
		M (SD)	**M (SD)**
DBQ	Errors (Max=55)	1.47 (0.57)	2.83 (0.66)
	Lapses (Max=30)	1.90 (0.68)	2.87 (0.64)
	Aggressive violations (Max=15)	1.62 (0.58)	2.85 (0.64)
	Violations (Max=40)	1.50 (0.56)	2.90 (0.91)

RESULTS

		Always appropriately restrained % (N)	NOT always appropriately restrained % (N)
Age (years)	0–3	64.3% (18)	35.7% (10)
	4–6	34.5% (10)	65.5% (19)
	7–12	14.2% (51)	85.8% (307)
	13–17	21.0% (42)	79.0% (158)
Restraint type	RF/FF CRS	76.2% (16)	23.8% (5)
	BS	14.3% (7)	85.7% (42)
	Seatbelt	18.4% (94)	81.6% (416)
Frequency of appropriate restraint in PMV	Always	62.5% (195)	37.5% (117)
	Not always	1.3% (4)	98.7% (299)

RESULTS



Ps' reasons for not 'always' using an appropriate restraint in RSV with their youngest child (n=489)

DISCUSSION

Current study had two main objectives, to:

- Understand post-pandemic restraint behaviours when Australian parents travel with child(ren) in RSV
- Identify factors (socio-demographic characteristics, driving & restraint behaviours, child's PMV travel characteristics) associated with appropriate restraint use for child occupants in RSV

RSV use among Australian families surged in popularity post-COVID (from 40.9% to 75.0%)

- Transportation behaviours among Australian families influenced by evolving societal norms & attitudes towards RSV as convenient & accessible, as well as towards public transport as unsafe (i.e., personal safety, &/or public health concerns, Pawluk De-Toledo et al. 2024)

Concerning trend: Appropriate restraint rates low in PMV & **even lower** in RSV

- Only 61.4% 'always' appropriately restrained youngest child in PMV
  - Lower than previous findings in Australian surveys (Koppel, et al. 2022)
  - RSV survey focus may have attracted a distinct demographic
  - Ps predominantly males with technical/trade qualification, only 64.4% 'always' used their seatbelt in PMV
- Only 19.7% 'always' appropriately restrained youngest child in RSV
  - Consistent with previous literature indicating lower rates of appropriate restraint use in RSV in Australia pre-COVID-19 pandemic (Koppel et al., 2021) & previous research conducted in US pre- (Ehsani, et al., 2021; Owens, et al., 2019) & post-pandemic (Sifrit, 2024)

DISCUSSION

Ps who did NOT 'always' use appropriate restraints cited various reasons: misconceptions about necessity of using restraints in certain situations (including short trips), unavailability of restraints

- Consistent with international research which identified a lack of clarity regarding understanding restraint laws (McCourt, et al., 2022)
- Underscore need for comprehensive interventions addressing access to restraints, & education/awareness regarding importance of correct/appropriate restraint for EVERY trip

Ps who reported appropriate restraint use for youngest child in RSV were more likely:

- younger
- female
- higher level of education
- exhibit safer driving behaviours – including no driving infringements in past 2 yrs
- have 'younger' child
- 'always' use their seatbelt in PMV
- 'always' use an appropriate restraint for child in PMV

High proportion (79.0%) of teenage occupants (aged 13-17 yrs) NOT always restrained appropriately in RSV

- Educating teenagers about risks of unrestrained travel & misconceptions about perceived invincibility could increase seatbelt compliance within RSV (& in PMV generally)
- Improved seatbelt use in teenage occupants could translate to improved seatbelt use as young novice drivers, contributing to overall road safety efforts

DISCUSSION

Several limitations should be noted

Findings based on self-reported measures may introduce response biases & inaccuracies due to social desirability &/or recall errors

- Observation/NDS study recommended for objective data on restraint behaviours in RSV (for drivers, parents & children)

Parents' seatbelt use in RSV not collected

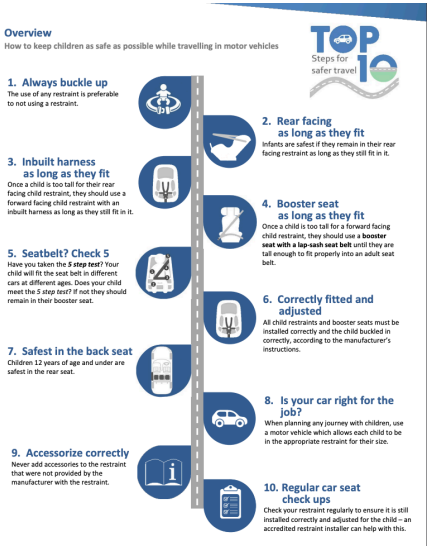
- Parents' seatbelt behaviour is crucial as they are role models & likely to influence restraint compliance

Restraint use across situations or destinations (e.g., holiday or out-of-town trips vs. routine local travel) not collected

- Could reveal specific countermeasures or opportunities for intervention

Appropriate restraint use defined as meeting minimum legal restraint requirements

- Evidence minimum requirements do not represent best practice child restraint use (Neuroscience Research Australia & Kidsafe, 2020)
- Findings may represent an overestimation of appropriate restraint use



CONCLUSION

The increasing popularity of RSV, coupled with observed low rates of appropriate restraint use for child occupants, suggests an impending rise in the number of children at heightened risk of injury in the event of a MVC

This underscores the need for:

1. Implementation of rideshare-specific regulation
2. Establishment of robust enforcement mechanisms &
3. Development of educational campaigns targeting rideshare drivers, parents, & child occupants to ensure their safety

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