

Sources of child restraint information utilized by parents in NSW

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Abstract

Suboptimal child restraint practices are widespread and parental knowledge about child restraint use influences child restraint practices. In this analysis we examine parent-reported sources of child restraint information and their influence on observed child restraint practices. Data collected during a cross-sectional study of restraint use among 503 NSW children aged 0-12 years was used in this analysis. Few children were unrestrained (<1%) but the prevalence of suboptimal restraint use was high (38% moderately or seriously incorrect, 52% inappropriate). Approximately one in five parents reported having obtained information about child restraints within the 6 months prior to observation. The primary information sources were the RTA (27%), health providers, e.g. child health clinics and ante-natal programs, (11%) and the media (17%). There were significant associations between information source and appropriateness of restraint, but no association with correctness of restraint use. Parents of the youngest children were more likely to get information from health providers and parents of older children more likely to use other sources. Of the 302 child restraint users, one third had parents who reported using a restraint fitting station. These children were significantly more likely to be appropriately restrained. However there was no association between fitting station use and correctness of restraint use. This information is useful for the development of targeted optimal restraint campaigns, and suggests a need for a broader review of how and what messages are being delivered by different information providers.

Keywords

Child occupants, child restraints, information sources, appropriate use, correct use, misuse

Introduction

Injury is the leading cause of death and disability among Australian children aged >1 years [1, 2]. Child occupants account for a substantial part of this problem, with 60-80 child occupants being fatally injured every year and many more sustaining serious injuries [3]. Using a restraint can prevent these injuries but it has been well established that the type of restraint, and the way a restraint is used can have a significant effect on the level of protection provided in a crash [4-9]. To be optimally restrained, a child needs to correctly use the type of restraint i.e use the restraint exactly as it was intended, and use the most suitable for that child's size i.e. the most appropriate restraint. Incorrect use occurs when a restraint is not installed, or used as intended e.g when the seat belt and/or top tether is not used to install the restraint properly or the internal harness system is not used or is very loose. Inappropriate use occurs when a child uses a restraint designed for a differently sized occupant e.g when a child who should a forward facing restraint uses a booster seat or an adult seat belt.

For parents to be able to choose the most appropriate restraint for their child and ensure it is used correctly, they first must know how to choose an appropriate restraint for their child and use it correctly. A lack of adequate parental knowledge about restraint use and child safety has been shown to be a significant barrier to appropriate restraint [10-13]. Parental knowledge does not appear to influence the correct use of restraints to the same extent [Bilston, Du and Brown, *submitted*], but research has demonstrated that the way information is delivered can influence the correct use of restraints [14].

Any strategy aimed at increasing correct and appropriate restraint use among children would therefore need to target parental knowledge and include an effective mechanism for transferring this knowledge. There are a number of potential points of information delivery in a community and understanding how these are used by parents would assist in the development of such strategies. There is, however, little information in the literature detailing where parents obtain their information about appropriate and correct use. Furthermore, it would be beneficial to know if the sources of information currently being used by parents are associated with how well their children are restrained.

Information can be actively sought or passively absorbed. In this analysis, we aim to explore information sources being used by parents of children travelling in cars in NSW and test the hypothesis that different sources of information are used by parents of children of different ages; and that restraint appropriateness and correctness varies with the information source utilized.

Methods

Data used in this analysis was collected as part of a cross-sectional observational study of child restraint practices among children across NSW. The study was designed to collect data representing the population of children aged 0-12 years in NSW, Australia. This was achieved using a multistage stratified, clustered random sample plan. Four strata were constructed from local government areas (LGAs) using the Australian Classification of Local Governments (ACLG) which is based on geographical location, socioeconomic characteristics, and accessibility to services [15]. Individual LGAs were then randomly selected from each stratum. For efficiency reasons LGAs with less than 0.5% of the total states population were omitted.

Baby/child health clinics; preschools/day care centres; and primary schools across NSW were then randomly selected from within these LGAs as the data collection points. Children recruited for the study were randomly chosen as they arrived at the data collection site.

Trained researchers attended data collection sites during drop off times at preschools and primary schools, and morning and afternoon sessions at early childhood health clinics, and approached potential participants as they arrived at the institution. All refusals were recorded.

For participating children, observations of the child in situ were made and the parent/driver participated in a structured interview. Once the child left the vehicle, their height and weight was measured, and a detailed examination of the restraint installation was conducted. Data collected relevant to this analysis is detailed in Table 1.

This study was approved by the UNSW Human Research Ethics Committee. Data collection from baby/child health clinics occurred with approval from NSW Health department ethics committees. Approval to collect data from outside schools was granted by the NSW Department of Education and Training and the Principal of each individual school.

Variable descriptions and definitions

Data was entered into a custom designed database and population weights were applied [16].

Variables of interest were whether or not the respondent reported having obtained information in the 6 months prior to the observation; the source of that information; whether or not the respondent reported using a restraint fitting station; and for child restraint users, where the restraint was obtained. Coding of these variables is listed in Table 1.

Outcome variables for this analysis were incorrect use, incorrect use severity, inappropriate use, and age.

Incorrect use was defined as any deviation from how the restraint was intended to be used. Each form of incorrect use was rated as minor or moderate/serious based on the likely threat of injury and/or the likely degradation in protection, examples are shown in Table 2. Inappropriate use is the use of a restraint that is designed for occupants of a different size. In this analysis, weight ranges for each child restraint type as defined by Australian/New Zealand Standard AS/NZS 1754 [17] were used to determine appropriateness of use.

Age at the time of observation was coded in years and in some parts of the analysis was collapsed into two categories – 0-3 years, 4+ years. These age groupings were chosen based on previous research demonstrating a substantial increase in restraint inappropriateness among Australian children 4 years and older compared to younger children [10, 18, 19].

Data Analysis

All data analysis was performed using SAS version 9.1 (SAS Institute, Cary, NC, USA). Population weighted estimates of the proportion of children restrained, using restraints correctly and using the most appropriate restraint for their weight were made taking into account the complex survey sample design and the probability of inclusion of occupants of different ages. The SAS procedure used incorporates the Taylor series linearization method to estimate variance and corresponding 95% CI. The significance of associations between the variables of interest and the outcome variables was tested using the modified Rao-Scott chi-square test, and included a correction for the complex sample design. When there was evidence of a significant association, the nature of the association was examined using adjusted residuals and estimated odds between specific pairs of variables exhibiting large residuals in opposite directions.

Table 1: Data used in this analysis.

SOURCE	VARIABLE	CATEGORIES	CONSTRUCTED VARIABLE	CODING
In situ observation	Restraint description	Rear facing infant restraint ; forward facing child restraint; booster; harness; seat belt	Restraint type	Child restraint/seat belt
Child measurements	Weight compared to restraint type	Appropriate/ Inappropriate	Restraint status	Unrestrained/Incorrect/Inappropriate/Incorrect & Inappropriate/Good
In situ observation	Restraint used as intended	Correct/Incorrect		
Inspection	Restraint installed as intended			
In situ observation	Restraint use	Yes/No		
Interview	Child's age	Age in years	Age group	0-3/4+
Interview	Have you obtained information about child restraint in the last six months?	Yes/No	Obtained information	Yes/No
Interview	If yes, where from	Free text	Information source	Media/Retailer/ Instructions/Internet/ Health/Education/RTA/ Fitting station/Brochures/ Police/Family& friend/ Not specified
Interview	Have you had the restraint you child is using today checked at a Restraint Fitting station?	Yes/No	Restraint checked	Yes/No
Interview	Where did you obtain the restraint your child is using today	Free text	Restraint source	Family or friend hand down/Gift/ Department or toy store/Specialist baby store/ Shop NFS/ Second hand shop/ mechanic or vehicle sales/ Restraint fitter or hire scheme/Unknown, N/A

Table 2: Examples of severity rating of incorrect use

SEVERITY	DESCRIPTION
Moderate/ Serious	Anchorage point problem such as top tether attached to luggage tie down, tether anchor bolt loose
	Belt guide not being using or being used to incorrectly position seat belt
	Gated buckle not being used, or incorrectly used when converting lap-sash belt for use with harness
	Harness problem such as being very loose, very twisted (>2 twists), positioned of shoulders, or one or both arms removed
	Child safety harness over tightened, lap belt pulled up high over abdomen
	Seat belt problem such as being slack >25mm, very twisted (>2 twists), not routed correctly, not engaged, sash not being used correctly by booster seat and seat belt users
	Top tether problem such as being slack >25mm, very twisted (>2 twists), not being used
	Miscellaneous problems such as use of non-AS approved restraint, stabiliser bar not used on rear facing restraint, bag/back pack worn on back, restraint installed in wrong orientation, or using armrest as booster
Minor	Anchorage problem such as safety clip on hook missing
	Harness problem such as being mildly twisted (≤ 2 twists), slightly loose (≤ 25 mm) or in wrong slots with little effect on harness fit
	Seat belt problem such as being mildly slack (<25mm) or twisted (≤ 2 twists), or routed incorrectly but without significant effect
	Top tether problem such as being mildly slack (≤ 25 mm) or twisted (≤ 2 twists),
	Miscellaneous problems such as baby insert still in place, stabiliser bar still in use

Results

Complete data, including age, weight and height information was available for 501 children aged 0-12 years across NSW. The participation rate was 63%. Restraint usage was high (>99%), but as shown in Figure 1, suboptimal restraint use was widespread with 25% of children being optimally restrained. Overall, 52% of children were appropriately restrained and 62% were correctly using their restraint (excluding minor forms of incorrect use). Approximately 60% of the sample was aged 4 years or older.

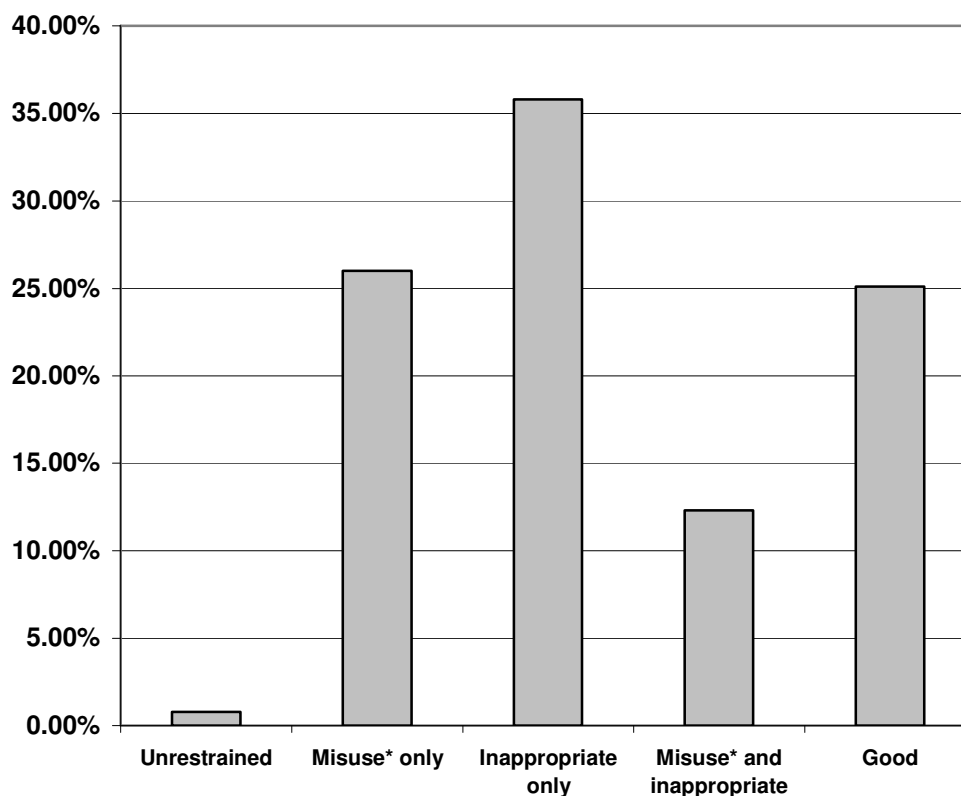


Figure 1: Restraint status of children travelling in cars in NSW

* Minor forms of incorrect use are excluded, 'Good' describes correct and appropriate restraint use, and includes appropriately restrained children with minor forms of incorrect use.

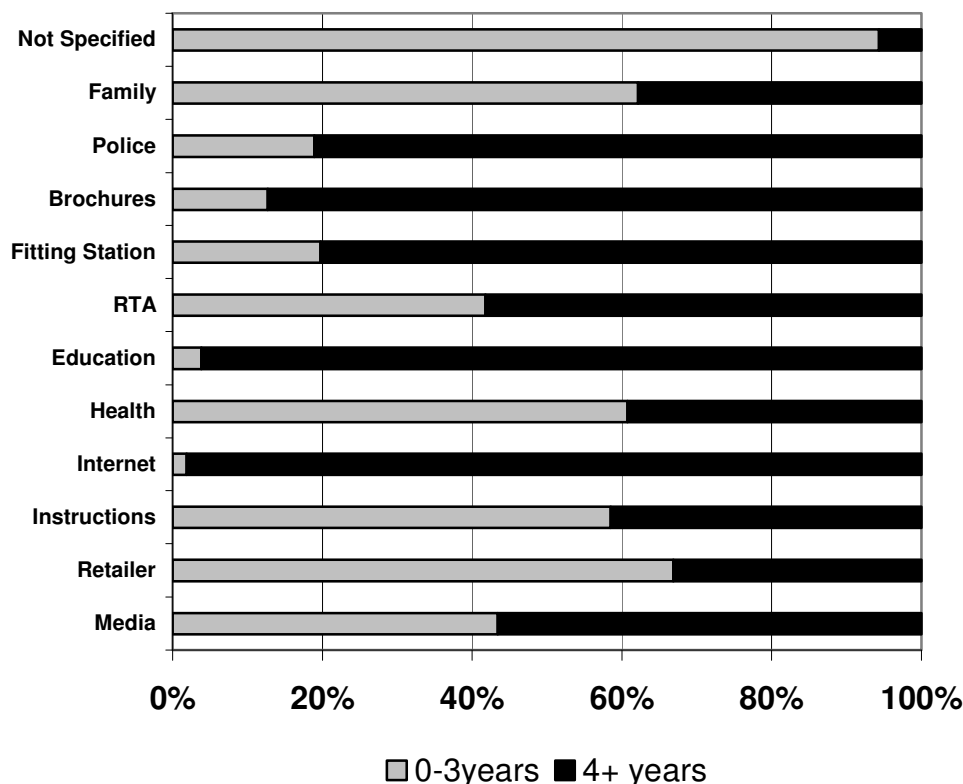
Reported sources of information

Approximately one in five (22.2%, 95% CI 15.6-28.7) respondents reported having obtained information about child restraints in the 6 months prior to observation. The information sources they utilized are given in Table 3. The most common sources cited were the RTA (27%), media, e.g. TV, newspapers, radio and magazines (17%), and health providers (11%). As shown in Figure 2, there were variations in the source cited with age of child, although these were not all statistically significant. However, from Figure 2, it appears that information sources such as the internet and education providers (e.g. pre-schools and schools) were predominantly used by parents of older children (4+ years), while the types of information sources used more frequently by parents of younger children (0-3+) were retailers, health providers and family and friends.

Overall, there was no association between restraint appropriateness or correctness of restraint use, and whether or not the respondent reported having obtained information in the 6 months prior to observation. However, among those who had obtained information, there was a significant association between restraint appropriateness and information source ($p < 0.05$). The proportion of children appropriately and inappropriately restrained whose parents reported obtaining information from different sources are presented in Figure 3. Appropriate restraint use was associated with obtaining information from health providers and vehicle or child restraint instructions manuals.

Table 3: Information sources cited by those who reported obtaining information (* includes brochures/pamphlets and internet sites specifically described as 'RTA')

INFORMATION SOURCE	ESTIMATE (%)	95% CI (%)
RTA*	26.8	6.0-47.6
Media	17.3	12.8-21.8
Health providers	10.6	0.1-21.1
Education providers	7.2	3.3-11.0
Internet	7.0	4.8-9.2
Restraint fitting station	6.8	0.0-19.2
Brochures/Pamphlets	6.6	0.0-17.2
Instructions (restraint/vehicle)	5.3	0.0-10.8
Not specified	4.4	0.0-9.3
Family/friend	4.3	0.0-11.8
Police	2.0	0.0-5.9
Retailer	1.7	0.0-4.7

**Figure 2:** Information source by age

Inappropriate restraint use was associated with obtaining information from the internet and restraint fitting stations. The estimated odds of the child being inappropriately restrained were 22% greater when the parent obtained information from the internet, and 17% greater when the parent obtained information from restraint fitting stations, compared to when they cited a health provider. Similarly the odds of being inappropriately restrained were 20% greater when parents obtained information from the internet, and 15% greater when parents obtained information from fitting stations than when instructions were cited as the information source.

There was no significant association between source of information and correctness of restraint use ($p>0.05$).

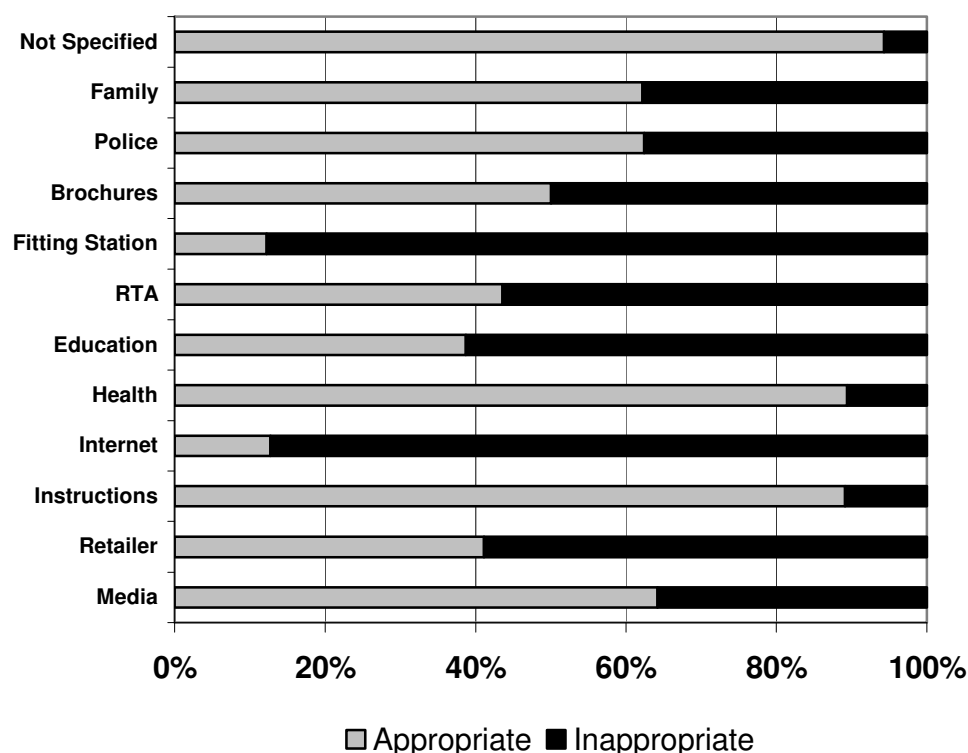


Figure 3: Information source by appropriateness of restraint

Restraint fitting stations

Across the entire sample of parents of children aged 0-12 years, almost 13% reported having used a restraint fitting station to check the restraint their child was observed to be using. (12.6% 95% CI 6.8%-18.4%). Significantly more parents of younger children (0-3 years) reported using restraint fitting stations than parents of older (4+ years) children ($p<0.05$, 87% of younger children; 13% of older children). The age distribution of children whose parents reported using restraint fitting stations is shown in Figure 4. No parent of a child aged over 6 years reported using a restraint fitting station. Restraint fitting station may be linked to the type of restraint being used, and, restraint fitting station use was much higher among those parents using child restraint systems. When adult belt users were excluded, 30% of the sample reported using a restraint fitting station (30.2% 95% CI 3.0-22.7%).

Respondents who reported having had their child's restraint checked at a restraint fitting station were significantly more likely to have sought information from other sources ($p<0.05$, 32% of restraint fitting station users reported obtaining information from another source in the last six months, compared to 18% of those who did not use a restraint fitting station).

Among children in child restraints, those whose restraints had been checked at a restraint fitting station users were significantly more likely to be appropriately restrained (97% of restraint fitting station users were appropriately restrained, compared to 86% of those who did not report using them, $p<0.05$). However there was no significant association between use of a fitting station and incorrect use. Incorrect use was observed among 60% of child restraint users whose parents reported using a restraint fitting station, and 63% of other child restraint users (i.e. children using rearward facing restraints, forward facing restraints, booster seats and child safety harnesses).

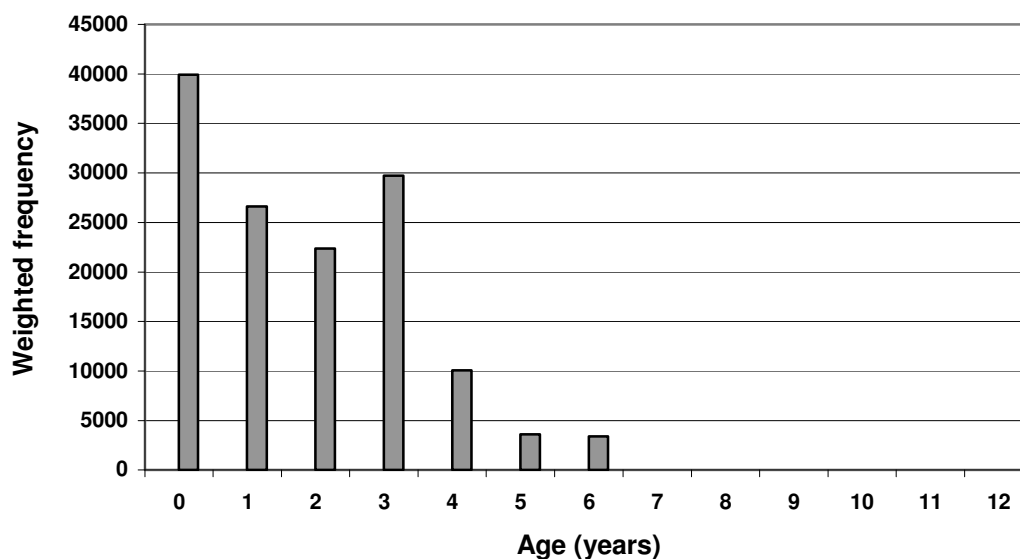


Figure 4: Age distribution of children whose parents reported ever using a restraint fitting station to check the restraint being used by the child observed in the study

Source of Restraint

lists the sources of the child restraints as reported by parents. Over one third of respondents did not supply this information. The most commonly listed restraint sources were specialist baby stores (21%), department or large toy stores (18%), and second-hand restraints from within the immediate family, extended family and friends (13%).

Due to the small number of restraints obtained from a second hand shop, this category was collapsed into the 'second-hand/handed down' restraints category for further analysis. For the same reason, the 'mechanic/vehicle sales' category was collapsed into the Restraint fitting station/Hire category for further analysis.

Although most child restraint users were appropriately restrained (86%), there were significant differences in restraint appropriateness depending on where the restraint had been obtained ($p < 0.05$). Figure 5 illustrates the proportion of children appropriately and inappropriately restrained by source of restraint. Restraints used by the children were appropriate more often than expected if they were bought from a shop (shop not further specified (NFS), specialist baby store, or department/toy store), handed down from family and friends, or obtained from a fitting station or a restraint hire scheme. Conversely they were inappropriate more often than expected if they were obtained as a gift, with restraints obtained as gifts having at least 3 times the odds of being inappropriately used than if those obtained from a shop.

Table 4: Restraint source reported by child restraint users

RESTRAINT SOURCE	ESTIMATE (%)	95% CI (%)
Specialist Baby Store	21.2	10.3-32.1
Department Store/Toy Shop	17.6	12.1-23.1
Family/Friend/Hand down	13.0	7.7-18.2
Shop NFS	5.0	0.3-9.7
Gift NFS	2.5	0.2-4.8
Restraint Fitter/Hire	2.1	0.0-4.6
Second Hand Shop	0.4	0.0-1.1
Mechanic/Vehicle Sales	0.4	0.0-1.2
Unknown/not reported	37.8	26.3-49.4

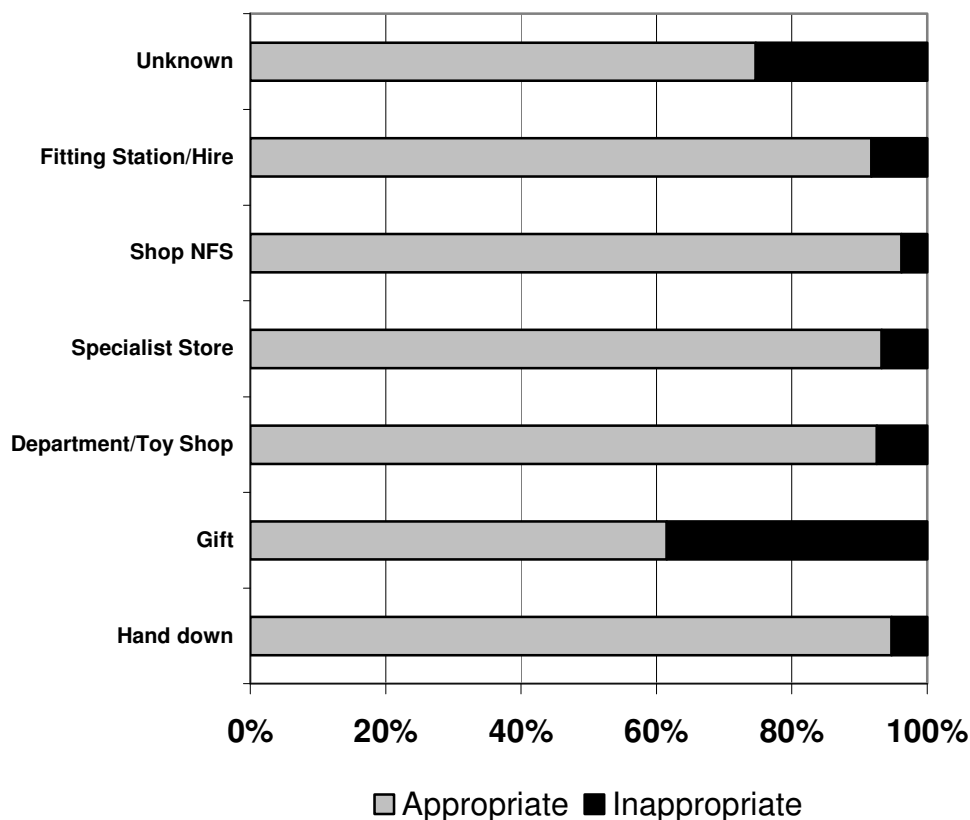


Figure 5: Appropriateness of restraint by restraint source

There was no significant association between moderate/serious forms of incorrect use and the source of the restraint.

Discussion

This work has demonstrated that parents who are actively obtaining information about child restraints are using a variety of sources. The primary implication of this is that if policy makers and safety advocates want to ensure that parents receive consistent (and correct) advice about child restraint use, the message needs to be coordinated between all of these sources. While some of the sources could not be identified explicitly e.g. brochures, pamphlets, internet sites that were not identified any further by respondents, most sources involved major stakeholders in road safety and child injury prevention education in NSW (i.e. the RTA, health, police) and therefore coordination should be achievable. The high frequency with which the media was cited as an information source indicates that the media should also be targeted in education campaigns and in getting out a coordinated message. Notably the types of sources included in the 'media' category in this study were TV, radio, and newspaper/magazine articles indicating the potential for using this type of information delivery system rather than just advertisements or editorials.

The fact that parents of differently aged children tend to report obtaining information from different sources is also important to the development of education and information campaigns targeting appropriate restraint use. As we demonstrated previously [11], parents are more likely to make appropriate restraint choices for their children if they possess restraint knowledge specific to their children's age and size. Our current findings suggest this is an area requiring further investigation to determine whether it would be useful to target different information sources for the delivery of specific information for children of different ages. It also indicates a need for further clarification of whether the problem lies in a lack of provision or availability of information for children of particular ages at some

sources, or if parents simply do not seek information at certain sources for children of particular age ranges.

The results also demonstrate that there is no association between the way a child uses a restraint when they travel in a vehicle and whether or not a parent has actively obtained information related to how the child should travel. While the structure of this question was such that parents 'who ever sought information' (and not just in the previous 6 months) would have been missed, it is possible that many parents are potentially making these judgements based on information they have passively gathered. Further investigation of how this occurs, or where the information has come from among these parents was outside the scope of this analysis but is worthy of further study. Two potential points for delivery of 'passive' information – restraint fitting station checks and the source of the restraint were examined separately here, and associations between restraint appropriateness and the reported use of restraint fitting stations and the source of the restraint were observed. However, it is important to point out that this analysis was not designed to identify any causal link. In terms of the influence these might have on restraint status, these results simply indicate further examination of the information related to restraint appropriateness being obtained from restraint fitting stations and where parents are obtaining their restraints is warranted.

We have previously shown that parents are overconfident in their knowledge of appropriate restraint use for their children. Specifically we have demonstrated that the vast majority of parents think they know all they need to know to safely restrain their child, while a substantial proportion of these are making significant errors in child restraint use [10]. This is consistent with the low numbers of parents actively obtaining child restraint information (22%) reported here, and is of significant concern.

Another issue arising from this data is the apparent relationship between receiving restraints as gifts and inappropriate restraint use – this may suggest that: labelling on the restraint packaging and/or available at point of sale is insufficient to guide appropriate restraint choice; purchasers of restraints as gifts do not know enough about the child to choose an appropriate restraint; and/or that other factors (such as a child's eagerness to use a new restraint, or not wanting to disappoint the giver) may play a role, but this data does not allow us to determine this. Related to this, is that those who reported gaining information from family and friends were less likely to have their children appropriately restrained than those who gained information from health providers and vehicle or restraint instructions. Similarly, the internet as an information source was associated with inappropriate restraint use, although it is not clear what types of internet sites were being used, or the accuracy of the information obtained. Many online parenting forums contain discussions of child restraint use, mostly consisting of parent-to-parent advice, and the correctness of advice in such forums is variable. This type of peer information is a particular challenge to address, but the need for authoritative internet information sources (health, traffic authorities, child safety organisations) to provide a clear and consistent message is obvious.

There was no association between restraint fitting station use and correct restraint use (or misuse), despite this being a major role of fitting stations, and the reasons for this disappointing finding require further investigation. It is important to highlight that this analysis did not attempt to examine differences in the relationship between the use of restraint fitting stations and the correctness of use of different restraint types. For example it is possible that there may be a positive association between rearward and/or forward facing restraints but not booster seats and child safety harnesses or vice versa and this is worthy of further analysis.

Note that we obtained information on the role of fitting stations through the use of two separate questions in the survey (i.e. "if you obtained information in the last 6 months, where did you get information from" vs "have you had the restraint being used by your child today checked at a fitting station"), and these provided conflicting results related to appropriate restraint use. This demonstrates the inability of this current analysis to establish causal links between child restraint practices and the sources of information investigated. In other words it is not possible from these results to say that restraint fitting stations are effective or not effective in causing appropriate restraint use. This is because this analysis has not attempted to control for all other possible influencing factors. In the case of the apparent conflict in results related to restraint fitting stations, it is possible that there are inherent differences between the people, (and/or their children and/or restraints) who reported using restraint fitting stations as an

information source, and those who reported having their restraints checked at a fitting station. These differences might better explain the observed associations.

There were also apparently low numbers reporting 'instructions' as an information source. This should not be misinterpreted as conveying anything about how widely 'instructions' may or may not be used, because there was no question specifically asking about their use of instructions.

Limitations

As with any study, there are a number of limitations that must be kept in mind when interpreting the results. The first of these relates to a lack of detail provided by many respondents. This meant that we could not identify where some information from sources such as "internet sites", "brochures" and "pamphlets" were actually originating from. Conversely a lot of people simply gave the 'RTA' as their response and therefore we were unable to discern the medium i.e. internet, brochure etc. Furthermore, some respondents gave more than one source, and only the first source mentioned was used in this analysis.

In this study, and the related discussion we have called those who reported having obtained information about child restraints in the last 6 months respondents who 'actively obtained' information. However, the information sources given include sources requiring the respondents to actively seek the information ie internet sources and other sources where the respondent may have gathered information but not been actively seeking information about child restraints e.g. newspapers, magazines, radio. This analysis does not provide enough detail to determine which respondents actively sought information on child restraints. Therefore our term 'actively obtained' more correctly refers to respondents who have recognized information related to how children should travel in cars, and can attribute that information to the particular sources nominated.

It is also important to point out that this analysis does not tell us anything about the quality of information being provided by the different sources. The associations (and lack of associations) found between the information sources and the observed child restraint practices may or may not be related to the correctness of the message. It is possible the associations (or lack of associations) say more about how different messages were interpreted, and/or remembered, and/or acted on by parents than the quality of the original information.

There are also a number of limitations inherent in the methodology used to collect the study data. The first of these is that the methodology assumes an equal probability of all children within NSW to be at the sites used as data collection points. This is unlikely to be strictly correct particularly among cases collected from pre-schools/long day centres and early child hood health centres, however these types of sites are the best available in terms of having a high concentration of target aged children and are not significantly likely to be used more or less often by any specific section of the community. Secondly, only those who agreed to participate could be included in this study, therefore it is possible that there may have been systematic differences between those who did and did not participate that may have introduced some bias. Finally, the data was collected during weekdays only, from one type of trip, and at one time of day. It is possible that restraint status might vary with time of week, trip type [20], and also time of day, and this may be another source of bias.

Conclusions

This study demonstrates that only one in five parents is likely to actively obtain current information about child restraints, and among those who do obtain this information, there is substantial variety in the information sources used. Furthermore, parents of children of different ages appear to be using different information sources. This has implications for the development of targeted education campaigns because it suggests a need for 'passively' dispersing information rather than relying on delivery systems requiring parents to actively obtain the information. It further implies that to ensure a consistent message, the messages being delivered from different sources need coordination.

Significant associations exist between appropriate child restraint selection and information source, restraint source and whether or not restraints are checked at restraint fitting stations. However the nature of these associations requires further investigation.

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References

1. Australian Institute of Health and Welfare, *Australia's health 2008*. 2008: Canberra.
2. World Health Organization, *World report on child injury prevention*, M. Peden, et al., Editors. 2008, World Health Organization: Geneva, Switzerland. p. 232.
3. Infrastructure Australia. *Road crash statistics*. 2009 [cited 2009 1/5/09]; Available from: http://www.infrastructure.gov.au/roads/safety/road_fatality_statistics/index.aspx.
4. Arbogast, K., et al., *An evaluation of the effectiveness of forward facing child restraint systems*. Accident Analysis & Prevention, 2004. **36**(4): p. 585-9.
5. Bilston, L.E., M. Yuen, and J. Brown, *Reconstruction of crashes involving injured child occupants: the risk of serious injuries associated with sub-optimal restraint use may be reduced by better controlling occupant kinematics*. Traffic Injury Prevention, 2007. **8**(1): p. 47-61.
6. Brown, J., et al., *Serious injury is associated with suboptimal restraint use in child motor vehicle occupants*. Journal of Paediatrics and Child Health, 2006. **42**(6): p. 345-349.
7. Du, W., et al., *Association between different restraint use and rear-seated child passenger fatalities: a matched cohort study*. Archives of Pediatrics & Adolescent Medicine, 2008. **162**(11): p. 1085-9.
8. Durbin, D.R., M.R. Elliott, and F.K. Winston, *Belt-positioning booster seats and reduction in risk of injury among children in vehicle crashes*. JAMA, 2003. **289**(21): p. 2835-40.
9. Brown, J. and L.E. Bilston, *Child restraint misuse: incorrect and inappropriate use of restraints reduces their effectiveness in crashes*. Journal of the Australasian College of Road Safety, 2007. **18**(3): p. 34-42.
10. Bilston, L.E., et al., *Age-specific parental knowledge of restraint transitions influences appropriateness of child occupant restraint use*. Injury Prevention, 2008. **14**(3): p. 159-163.
11. Ebel, B.E., et al., *Too small for a seatbelt: predictors of booster seat use by child passengers*. Pediatrics, 2003. **111**(4 Pt 1): p. e323-7.
12. Ramsey, A., E. Simpson, and F.P. Rivara, *Booster seat use and reasons for nonuse*. Pediatrics, 2000. **106**(2).
13. Rivara, F.P., et al., *Booster seats for child passengers: lessons for increasing their use*. Injury Prevention, 2001. **7**(3): p. 210-3.
14. Lane, W.G., G.C. Liu, and E. Newlin, *The Association Between Hands-On Instruction and Proper Child Safety Seat Installation*. Pediatrics, 2000. **106**(4): p. 924-929.
15. Carter, M., et al., *2006-07 Local Government National Report*. 2009, Department of Infrastructure, Transport, Regional Development and Local Government: Canberra. p. 297.
16. Lohr, S., *Sampling : design and analysis*. 1999, Pacific Grove: Duxbury Press. 494.
17. Australian/New Zealand Standards, *AS/NZS 1754. Child restraint systems for use in motor vehicles*. 2004, Standards Australia: Sydney.
18. Charlton, J., et al., *Factors that influence children's booster seat use*. 2006, Monash University Accident Research Centre: Melbourne. p. 81.
19. Lennon, A., V. Siskind, and N. Haworth, *Rear seat safer: Seating position, restraint use and injuries in children in traffic crashes in Victoria, Australia*. Accident Analysis & Prevention, 2008. **40**(2): p. 829-834.
20. Chen, I.G., et al., *Trip characteristics of vehicle crashes involving child passengers*. Injury Prevention, 2005. **11**(4): p. 219-224.