

Facilitators and barriers to child restraint use in motor vehicles: a qualitative evidence synthesis

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Abstract-431 words

Abstract

Background

Road traffic collisions contribute a significant burden of mortality and morbidity to children globally. The improper or non-use of child restraints can result in children sustaining significant injuries in the event of a collision. Systematic reviews on the effectiveness of various interventions to increase the use of child restraints already exist but to the best of our knowledge, there has been no qualitative evidence syntheses on the facilitators and barriers to child restraint usage. This review aims to fill that gap.

Methods

We searched for qualitative studies, which focussed on perceptions, values and experiences of children, parents/caregivers or any other relevant stakeholders on the use of restraints for children travelling in motor vehicles in PubMed, EMBASE and Global Health and screened reference lists of all included studies. We assessed the quality of included studies with the Critical Appraisal Skills Programme (CASP) checklist and used the PROGRESS Plus lens for an equity focussed analysis.

Results

We identified a total of 335 records from searching the databases and 5 records from other sources. After screening, we identified 17 studies that met our inclusion criteria. All but one study (which had children as participants) focussed on the perceptions, attitudes, and barriers of parents or caregivers.

The included studies were from three high-income (n=14) and one upper-middle income (n=3) country. In addition, although many focussed exclusively on participants from culturally and linguistically diverse minorities, the issue of equity was not well addressed. Five major themes emerged from the analysis: (1) Perceived risk for injuries and perceived safety benefits of child restraint usage varies in different settings and between different types of caregivers; (2) Practical issues around the use of child restraints is a major barrier to its uptake as a child safety measure; (3) Restraint use is considered as a mechanism to discipline children rather than as a safety device by parents and as children became older they actively seek opportunities to negotiate the non-usage of restraints; (4) Adoption and enforcement of laws shape perceptions and usage in all settings; and (5) Perceptions and norms of child safety differ among culturally and linguistically diverse groups.

Conclusion

The results of this systematic review should be considered when designing interventions to promote the uptake of child restraints. However, there is a need to conduct qualitative research around the facilitators and barriers to child restraint usage in low- and middle-income countries. Furthermore, there is a need for more evidence conducted in semi-urban and rural areas and to involve fathers, policy makers, implementers and enforcement agencies in such studies.

Keywords

Road traffic injury, child restraint systems, seatbelt, child seats, injury prevention

Background

Death, disability and economic burden due to road traffic injuries are a major public health problem globally and are expected to increase for at least the next two decades ¹. Children contribute a significant proportion of the burden ² and so addressing child road traffic injury risk factors is crucial.

Increasing the use of child restraints is one of five key behavioural factors being tracked globally that is aimed at reducing the burden of road injury and is the only one specific to children ². In addition, Target 8 of the Global Voluntary performance Targets for Road Safety, which was adopted by United Nations Member States through UN GA resolution 72/271 in April 2018, specifically aims to increase the use of standard child restraint systems to 100% by 2030 ³. As of 2016 only 33 countries, almost all of them high-income countries, had adopted best practice legislation in relation to the use of child restraints ². Ensuring the use of child restraints has been a major challenge despite the legal requirements in these countries ⁴⁻⁹. While systematic reviews on the effectiveness of various interventions to promote the use of child restraints have already been conducted ¹⁰ there has not been a synthesis of evidence to understand the facilitators and barriers to the use of child restraints. The current study, therefore, aims to synthesize qualitative evidence on the barriers to and facilitators of the use of restraints for children travelling in motor vehicles. To the best of our knowledge this is the first qualitative evidence synthesis on the topic and will provide important insights to understand the implementation of best practices and to improve the design of programmes to increase child restraint usage.

Methods:

While there are several approaches to qualitative evidence synthesis, the current review broadly follows the principles and guidance laid down in a recent series of papers by the Cochrane Qualitative and Implementation Methods Group ¹¹⁻¹⁶ . The protocol for the study was registered prospectively in PROSPERO (CRD42018102497).

Theoretical Approach

Our approach in this review is from the “critical realism” standpoint with a pragmatic lens. Critical Realism is a philosophical standpoint which recognises that an observable behaviour – in this instance the use of a child restraint – is influenced by unseen phenomena such as values and expectations. While child restraint use is observable, the use of child restraints is not independent of values, attitudes, prior experiences, capacities and motivations. As such through this philosophical standpoint, and wide qualitative evidence synthesis, we endeavoured to understand the diverse and multi-faceted external reality in all its complexity and depth through perceptions and interpretations reported in individual qualitative studies. A pragmatic lens allows us to include individual qualitative studies irrespective of their ontological stance.

Criteria for considering studies for this review

Type of studies

We included primary studies that have used qualitative approaches for both data collection and data analysis. We recognised focus groups, individual in-depth interviews, ethnographic interviews, participant observation, diaries and other narrative methods of data collection as valid tools for qualitative data collection. We also recognised narrative analysis, thematic analysis, grounded theory, phenomenological approaches and discourse analysis as valid methods for qualitative analyses. We excluded studies that used qualitative methods for data collection but did not analyse the data qualitatively. We included qualitative studies irrespective of whether or not they were conducted in conjunction with the implementation of interventions for the use of restraints for children travelling in motor vehicles. We included mixed methods studies only when both the methods and results for the qualitative component were reported separately.

Participants

We included studies that focussed on the perceptions, values and experiences of children; parents and/or caregivers; and any other relevant stakeholder involved in formulating policies or programmes or implementing child restraint programmes.

Setting

We included studies from anywhere in the world and in any setting provided that they met our inclusion criteria.

Types of phenomena of interest

We included studies where the primary focus were perceptions, attitudes and experiences of parents/ caregivers and children and other stakeholders towards restraints for children travelling in motor vehicles.

BOX 1: RETREAT APPROACH FOR SELECTING QUALITATIVE EVIDENCE SYNTHESIS APPROACHES ²⁰

Review question: What are the barriers and facilitators for the use of restraints for children travelling in motor vehicles?

Epistemology: Critical realism with the lens of pragmatism

Time/ Timeframe: 6 months,

Resources: Funded project with access to database and availability of qualitative software.

Expertise: Generic qualitative research skills; Specialist generic evidence syntheses skills; Specialist subject expertise.

Audience and purpose: Primarily academics but also other stakeholders, including policy makers (health, transport, urban planning), civil society representatives, and the private sector

Types of data: Scoping done indicates availability of some conceptually rich and adequately thick studies. We did not do a comprehensive search during the scoping phase.

Chosen method: Thematic Syntheses as outlined by Thomas & Harden

Rationale for choice: This systematic review does not seek to contribute to existing theory but aims to inform current practice around the implementation of interventions on restraints for children travelling in motor vehicles. The rapid nature of the review and the team expertise are other factors that guided the choice of method.

Searching for qualitative evidence

We searched PubMed, EMBASE (EMBASE Classic 1947 to 1973 & EMBASE 1974 to 2018 July 26) and Global Health for eligible studies using search strategies developed for this purpose (Appendix 1) and updated up to 27th July 2018. We also searched the reference lists of all included studies found by electronic database search. The search was not restricted by language.

Selection of studies

In the first phase, one review author (SB) independently assessed eligibility of primary studies based on titles and abstracts. We then acquired the full text of all papers identified as potentially relevant by at least one review author for independent review by two authors (SB, MP). We did not contact study authors for any further information because of pragmatic reasons and timelines.

Data extraction

We extracted data from studies using an extraction form that was developed iteratively. We extracted data on context, participants, study design and methods in addition to what was required for the quality appraisal of included studies and for thematic analyses. We extracted information on participants using

the PROGRESS Plus framework. The framework (in the form of an aide-memoire) is used to explicitly understand factors that lead to health inequity. It assesses place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, socio-economic status, social capital plus additional factors that may indicate disadvantage ¹⁷.

Assessment of the quality of the included qualitative studies

We appraised the quality of the included qualitative studies by using the Critical Appraisal Skills Programme (CASP) quality assessment tool for qualitative studies ¹⁸. The tool, which has been recommended for use by the Cochrane Qualitative & Implementation Methods Group, comprises 10 questions (applied in Table 2) and has been previously used in several other qualitative evidence syntheses studies.

Syntheses Methodology

We used thematic synthesis as defined by Thomas and Harden 2008 for the purpose of qualitative evidence syntheses ¹⁹. Box 1 presents the detailed rationale for the choice of thematic syntheses as defined in the RETREAT framework ²⁰.

We followed the standard methods outlined by the thematic approach wherein the entire text labelled as 'results' or 'findings' in study reports was used verbatim for further analyses. Broadly, this consisted of the following steps:

- Coding text and developing descriptive themes. The review author conducted line-by-line coding using NVIVO in a set of three articles and developed a hierarchical coding framework and then applied this to newer articles. After every third article, the coding framework was revised iteratively, based on the identification of newer concepts. The final coding framework developed as an output of the iterative process was then applied to all included studies. Repeat checks, constant comparison and discussion between the reviewers was undertaken to ensure consistency. Similarities and differences between codes were constantly compared to develop descriptive themes.
- Development of analytical themes. In the final level of synthesis, we developed higher-level analytical themes by inferring barriers and facilitators for the use of restraints for children travelling in motor vehicles going beyond the interpretations being offered by individual primary studies.

Differences in protocol and the full qualitative evidence synthesis are described in Appendix 2.

Results

Results of the search

We identified a total of 335 records from the databases and 5 records from other sources. After removing 90 duplicates, we screened 250 articles based on their titles and abstracts only. We considered 24 full-text papers for inclusion in this synthesis and found 17 studies that met our inclusion criteria (Figure 1).

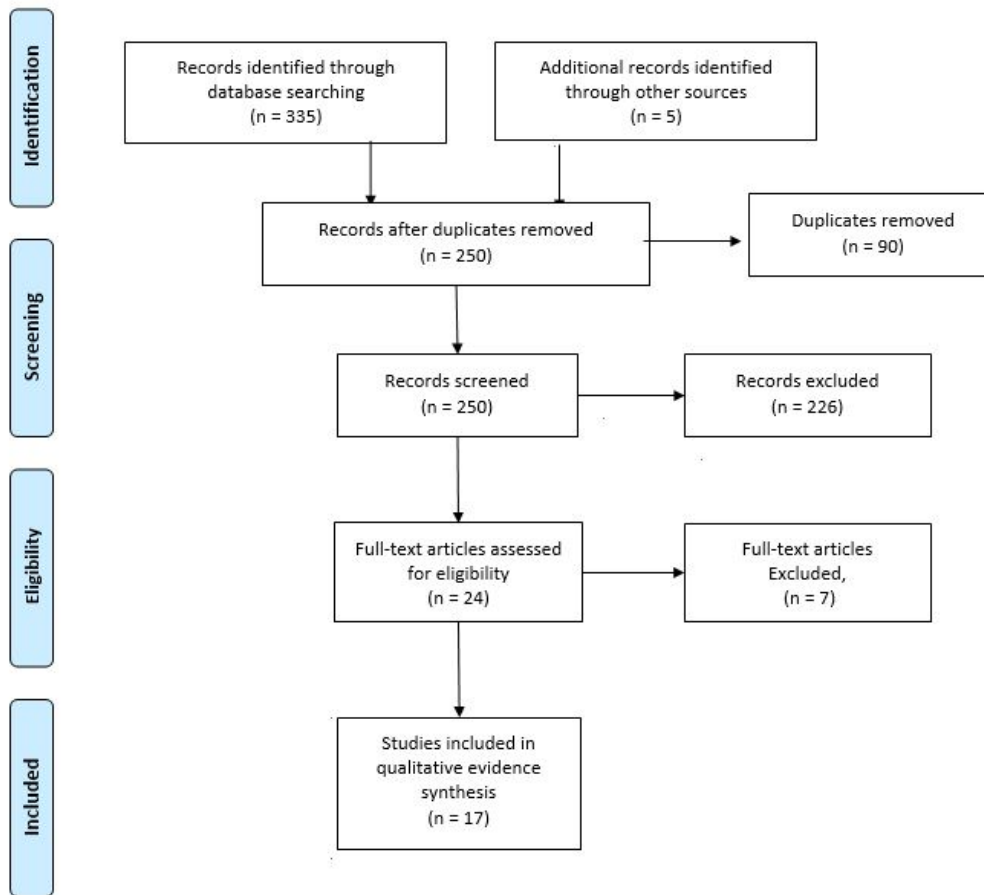


Figure 1 : PRISMA flowchart of the qualitative evidence syntheses

Description of included studies

Characteristics of the included studies is summarised in Table 1 and the details are narratively summarised in subsequent sections.

Table 1: Characteristics of Included studies

Study (Country)	Aim	Study Design Summary	Participant Type	Types of phenomena of interest	Sampling frame, & recruitment	Method of data collection	Method of data analyses
Rivara 2001 ²¹ (USA)	To explore parental knowledge, attitudes, beliefs, and barriers to use of booster seats in cars for 4–8 year old children.	Focus Group Discussion (FGD) (three).	Parents of Children aged ≤10 years (n=30).	Knowledge, attitudes, beliefs, and barriers.	Recruited through fliers at local child and day care facilities. Participants were paid \$30 cash and given a \$15 gift certificate.	Not adequately reported. FGDs were 2-hour duration.	The results of the FGDs were examined using the PRECEDE-PROCEED model of Green and Kreuter. ²²

<p>Simpson 2002 ²³</p> <p>(USA)</p>	<p>To identify barriers to booster seat use and to identify potential strategies to increase the use of booster seats among young preschool - and school-aged children.</p>	<p>FGD and In-depth interviews (IDI) in two phases.</p>	<p>Parents and children (n=111)</p> <p>Participant groupings were determined according to the age of the child, method of restraint. Those who had participated in any FGD in the last 3 months or were employees of the firm which conducted this were excluded.</p>	<p>Perceptions and experiences</p> <p>.</p>	<p>Phase I (n=54): 31 parents in 3 FGD + 8 children in 2 FGD + 15 parents in IDIs. Phase II (n=57): 36 parents in 4 FGD + 21 parents in telephone discussions. Recruited by local market research firms randomly chosen from databases. Eligible candidates received an honorarium for participation.</p>	<p>Moderator introduced the FGD process and the specific topic for the group. Sessions were audiotaped and videotaped and observed through a 1-way mirror by 2 physicians, a psychologist and a qualitative research specialist.</p>	<p>Experts, the moderator, and a research assistant conducted data analysis. Transcripts were reviewed for common themes and new ideas. After each phase of FGDs and IDIs, the moderator drafted an initial summary for review. All researchers who observed the FGDs reviewed the summary and made comments to reach consensus. All possible interpretations were recorded when no consensus was reached.</p>
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<p>Lee 2003 ²⁴ (USA)</p>	<p>To investigate Latino parents' knowledge, attitudes and beliefs about booster seats, barriers to booster seat use, and effective strategies for message delivery in the Latino community.</p>	<p>FGDs (two).</p>	<p>Parents were eligible if they were Spanish-speaking, had children under the age of 10 years, and owned or drove a car.</p>	<p>Knowledge attitudes and beliefs.</p>	<p>Recruited by a member of the research team, who went to two community centres in areas with high Latino population in Seattle. There were 23 participants (12 in the first group and 11 in the second).</p>	<p>Not much is reported - article only mentions what topics were discussed.</p>	<p>Only mentions that the results of the FGDs were audiotaped and reviewed by the authors to identify important themes.</p>
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Agran 2004 ²⁵ (USA)	To examine the factors contributing to non-use or part-time use of a child restraints and the effects of exposure to a violator class for those cited for violation of the California Child Passenger Safety (CPS) law.	FGDs and results were used to guide the development of a study of an existing violator class for CPS law.	3 FGDs included 24 individuals who had been cited for violation of the California CPS law	Not specified.	Recruited from violators registering for a class required by several courts in Los Angeles County.	2 FGDs in English and 1 in Spanish. Each of 90 minutes duration just before the violator class. Facilitators familiar with child occupant protection and child development led the groups.	An observer, supplemented by audiotapes of the sessions, conducted a thematic analysis of notes. The University of California institutional review board approved the protocol.
Lennon 2007 ²⁶ (Australia)	To explore parental perceptions of barriers to placing their children in the rear seat of passenger vehicles whenever possible.	Interpretive phenomenological qualitative approach with FGDs being held with urban parent-driver.	Parents of children aged > 12 years who regularly drive their children in passenger vehicles (with a rear seat). 24 parents participated in 5 separate groups.	Perception.	Parents of children aged > 12 years who regularly drive their children in passenger vehicles (with a rear seat) were recruited by personal approach in the open-air carparks of two urban shopping centres in Brisbane, Australia.	A semi-structured discussion schedule was used. Except for one group where notes were taken, discussions were transcribed by a professional stenographer to allow the accurate recall of exact terms used by parents.	Transcripts and discussion notes were analysed using QSR NVivo 2.0. Thematic analysis, following the process described by van Manen ²⁷ until data saturation was achieved.

Medoff-Cooper 2007²⁸ (USA)	To examine the beliefs, behaviours, barriers and motivating factors for use of child car seats among children aged 3 to 7 years.	FGDs and IDIs.	Mothers (16 in 2 FGDs) owning a car and having a child between the ages of 3 and 7 who rode in the car at least once a week.	Beliefs, behaviours, perceived barriers, and motivations .	Participants were recruited from a marketing data base of individuals who met the sampling criteria of owning a car and having a child between the ages of 3 and 7 who rode in the car at least once a week. Institutional Review Board approval was obtained before the study. Written consent was obtained from all participants.	FGDs had a professional group leader with a graduate degree in clinical psychology. The in-depth interviewing of respondents was done with skill in a dynamic atmosphere of rapport, sensitivity, and openness to sharing thoughts and feelings. The interview guide contained open-ended questions.	The analysis came from understanding and interpreting the verbal, visual, and other inputs from respondents and client-relevant themes. The moderator using the topics identified in advance as the areas of interest completed an in-depth report.
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<p>Winston 2007 ²⁹</p> <p>(USA)</p>	<p>1. To identify factors that influence parents' current child restraint use behaviour s and intentions for future use, and 2. To test interventions that address these factors as a means to promote appropriate restraint use behaviour s, particularly the use of belt-positioning booster seats.</p>	<p>3 phases: Formative Phase – FGDs defined barriers; Development Phase - literature review to identify interventions and in the Evaluative Phase – 4 existing and 3 new interventions were evaluated. There was also a follow-up telephonic survey.</p>	<p>Parents of children between the ages of 3 and 8 years who never or rarely used appropriate restraints. Additional inclusion criteria included: educational attainment of, at most, a high school diploma, and travel with children in motor vehicles at least once a week</p> <p>Formative phase: 10 FGDs, n = 117</p> <p>Evaluative phase: 20 FGDs, n=171</p>	<p>Beliefs and behaviours.</p>	<p>Study participants were recruited in both phases using telephone calls and printed flyers, through an existing injury free children network. All participants were offered reading assistance and/or Spanish language translation, according to the participant's preference. The Institutional Review Board at The Children's Hospital of Philadelphia approved all recruitment and consent procedures, as well as all study protocols and surveys.</p>	<p>Discussion guides prepared for both Formative and Evaluative phases. In Evaluative phase the parent's reactions to interventions were assessed after they were provided with free belt-positioning booster seats as well as education on their use. Follow-up interviews were conducted 6 weeks later.</p>	<p>FGDs were taped and transcribed . Transcripts were coded, and thematic analyses done 2 by research assistants under the supervision of the study coordinator. When consensus on interpretations was not reached all interpretations were included in the summary document.</p>
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Johnston 2009³⁰ (USA)	<p>To expand our understanding of the determinants of booster seat use with a broader range of families from our priority population (low-income African American, Somali, and Vietnamese parents).</p>	<p>FGDs</p>	<p>African American, Somali, and Vietnamese parents or custodial grandparents of children between birth and 9 years of age and reported that they “did not always” use a booster seat when their booster-eligible child was riding in a car. There were 26 participants across 3 FGDs.</p>	<p>Not specified.</p>	<p>Participants were recruited through posters, flyers, and information booths at community clinics, community centres, and other social service providers. Interested individuals were pre-screened to ensure eligibility criteria was met. All participants received childcare, a meal, a small stipend (\$25), and information on child passenger safety at the conclusion of FGDs.</p>	<p>FGDs were conducted by an experienced African American, male facilitator. Somali and Vietnamese sessions included an interpreter who also co-facilitated the group. A semi-structured guide was used. FGDs were conducted at settings familiar and comfortable to the attendees.</p>	<p>FGDs were audiotaped, transcribed and translated. Three researchers independently reviewed transcripts and field notes completed by study staff. Major themes in each language or cultural group were identified and categorized according to the major domains of the theoretical models.</p>
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<p>Erkoboni 2010 ³¹</p> <p>(China)</p>	<p>To explore the efficacy and acceptability of using a US-developed belt-positioning booster seat use promotion intervention in Beijing.</p>	<p>FGDs were conducted in relation to an intervention (a Chinese-produced instructional video and an English-language video dubbed into Mandarin) with theoretically driven messages through a personal story – knowledge only video versus knowledge + motivation video.</p>	<p>Eligible parents were those who owned a car and had children between the ages of 3 and 8 years enrolled in a Beijing kindergarten or elementary school.</p>	<p>Parents' perceived benefits, disadvantages, facilitators, and barriers.</p>	<p>Parents were recruited for the study through kindergartens and elementary schools. Parents were informed about the study in school or parent-teacher meetings and those willing participated (five groups, 71 participants).</p>	<p>Collection of qualitative data on target constructs – initial FGD. Collection of qualitative data on reactions to videos. Parents were shown the two videos and then FGD was conducted after it.</p>	<p>FGDs were taped, transcribed, and translated into English. Transcripts were coded by research staff on the basis of the themes. In addition, parent responses to the video interventions were coded to qualitatively assess participant's response to the programmes. To supplement these transcripts, field notes were taken by researchers present during the discussion. A translator was present during the FGD for each English-speaking researcher.</p>
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<p>Brown 2013 ³²</p> <p>(Australia)</p>	<p>To qualitatively explore barriers to optimal child restraint use using the integrative behaviour change model in culturally and linguistically diverse communities in New South Wales, Australia</p>	<p>11 language specific FGDs involving 71 parents or grandparents of children aged 3-8 years.</p>	<p>Participants had to: (1) speak a language other than English at home; (2) be aged over 18 years; and (3) have travelled in a car with at least one child between 3 and 8 years old in the last 6 months.</p>	<p>Existing knowledge and experience as well as underlying beliefs and motivations .</p>	<p>71 participants for 11 FGDs. Recruitment was done using advertisements in target languages through existing community groups or by direct invitation from community leaders to increase homogeneity within groups, and ensure participants were in comfortable and familiar settings to encourage free discussion.</p>	<p>FGDs were held over a 2-hr period and aided by a semi-structure topic guide which was not changed during the entire study. A standardised questionnaire was used to collect demographic information.</p>	<p>Content analysis using major concepts of Fishbein's integrative behaviour change model ³³. Initially a single researcher went through the transcripts to do content analysis. This was repeated by a second author and finally two other researchers reviewed the final assignment of discussion elements to the model constructs. Non-spoken communication was not communicated in the study.</p>
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<p>Chen 2014 34 (China)</p>	<p>To explore parent drivers' perceptions and experiences regarding use of child safety restraint, and to identify the differences in the perceptions and experiences between child safety restraint users and non-users.</p>	<p>14 IDIs among parents with a child under the age of 6 years. Of 14 parents interviewed, 7 parents were child safety seat users while 7 were non-users. Ages of parents ranged from 29 to 34 years</p>	<p>Parents living in downtown Shantou, with a child under the age of 6 years living in the same household, and who had been a primary driver and driving more than one time every week for at least 2 years.</p>	<p>Perceptions and experiences regarding use of child safety restraint.</p>	<p>20 participants who met the selection from the 1069 drivers who had previously participated in an observational survey, and expressed willingness to be contacted for future study were identified for IDIs. A small gift of child stationery and a toy were given.</p>	<p>Face-to-face interviews were conducted by one trained author. Each of the interviews lasted 35 to 50 minutes and was guided by a topic guide designed based on the Health Belief Model. All of questions were open-ended.</p>	<p>Research team familiarised itself with the data and to identify patterns and their links to the theoretical framework. Thematic analyses were done using NVivo 10. Finally, the bilingual and bicultural research team evaluated the data and results.</p>
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<p>Nelson 2015 ³⁵</p> <p>(Saudi Arabia)</p>	<p>To identify the salient beliefs of pregnant women in Saudi Arabia that may influence their intentions to use infant restraints for their children</p>	<p>FGDs.</p>	<p>25 pregnant women participated in 2 FGDs.</p>	<p>Behavioural , normative, and control beliefs were elicited. ³⁶</p>	<p>Pregnant women from Dallah Hospital were eligible to participate regardless of the number of children. The hospital's representatives approached individuals during their regular prenatal appointments with an invitation to participate in the study and explained the requirements . Informed consent was obtained prior to the start of each of the FGDs. participants received a gift card equivalent to \$13.33.</p>	<p>The FGDs were moderated by the health educator from the research team and were digitally recorded, after which they were transcribed and translated into English by an independent translator. A topic guide was used.</p>	<p>Researchers used the cut-and-paste technique, where the transcript of the discussions was cut up into segments and grouped into individual constructs. Statements and comments of each individual section (behavioural, normative, and control belief) were then analysed and sorted into specific logical categories. Each category was then analysed and a belief statement was formulated .</p>
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Liu 2016 ³⁷ (China)	To investigate the knowledge, attitudes, and intended behaviours of child safety seat use among parents of newborns and to explore expectant mothers' views and decisions regarding child safety seat use.	Mixed method-cross-sectional survey and semi-structured interview.	The inclusion criteria were: >12 weeks pregnant; owned a car; and agreed to participate through signed consent. Those with high risk pregnancy or who were unable to complete more than 15 minutes of an in-person interview were excluded. The targeted sample size was 30 to reach saturation.	Views and decisions regarding child safety seat use.	Pregnant women who sought prenatal care at Shantou Women's and Children's Hospital were recruited for a semi-structured interview. Nothing else reported. The study protocol, along with the consent process, was approved by Medical Ethics Committees of Shantou University Medical College.	A semi-structured interview guide was used. Interviews were conducted in a private room in the hospital and lasted about 30 minutes. All interviews were audio recorded and transcribed into electronic documents word-for-word on the same day by another author of this manuscript before data analysis.	The transcribed electronic documents were imported into NVivo 8.0 and read repeatedly by two researchers, who coded and analysed them thematically. The data and results were assessed by researchers who speak English, Chaozhou-Shantou dialectal and Mandarin, the languages used by the participants.
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<p>Fleisher 2017 ³⁸</p> <p>(USA)</p>	<p>To assess perspectives on and use of existing tools to guide car seat installation, as well as to explore the acceptability of using a mobile app to guide car seat installation.</p>	<p>Mixed methods study consisting of survey, and FGDs using phenomenological approach.</p>	<p>Parent/guardian with a child between ages 0 and 5 years (inclusive) treated at the participating practice. Participant eligibility was determined according to the age of the child, child race, child medical insurance type (private or Medicaid), parent report of transporting a child in a car seat at least 2 times per week, parent report of installing any type of car seat at least 5 times in the last 6 months, and parent ability to travel to the local paediatric practice.</p>	<p>Perspectives and experiences.</p>	<p>Primary care practices were chosen based on geographic location to ensure variability in participant race/ethnicity, community setting and socioeconomic status. A list of 400 potentially eligible participants was generated for each practice. Eligible parents/caregivers were invited to participate by mail and telephone. Parents and caregivers who contacted or were contacted by study staff and screened to be eligible were enrolled and scheduled for a focus group until an initial enrolment goal of at least 40 participants was achieved.</p>	<p>The lead author who has training and extensive experience in focus group facilitation led the FGDs. The participants were recruited through each primary care practice and were not familiar with the research team. The FGDs were conducted at each of the participating clinics and therefore convenient for participants. A phenomenological research approach was employed.</p>	<p>FGD recordings were transcribed and analysed using inductive thematic analysis to identify patterns across the dataset. Three reviewers conducted initial coding and then coding conferences were held to discuss and resolve discrepancies. In the first phase of analysis, apparent themes were identified from an initial review of the data. FGD recordings were then transcribed and read in entirety by members of the research team, who identified</p>
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<p>Hunter 2017 ³⁹</p> <p>(Australia)</p>	<p>To explore parental knowledge and attitudes and self-reported child car seat use.</p>	<p>Mixed methods study consisting of survey, and FGDs using the PRECEDE-PROCEED conceptual framework.</p>	<p>Parents or carers whose children aged 3–5 years were enrolled in any of the three early learning centres (two preschools and one long day care centre) in regional NSW. 10 in 3 FGDs.</p>	<p>Knowledge and attitudes.</p>	<p>Participants were recruited through posters that were displayed at the centres. The centre director was also asked to encourage parents of Aboriginal children to attend and directly approached participants through personal invitation.</p>	<p>A researcher experienced in qualitative methods conducted three FGDs of 60–90 min duration at each of the centres, 6–14 weeks after the surveys were administered . Focus groups were conducted during the day at times convenient for parents and centre staff.</p>	<p>FGD recordings were listened to in full then transcribed verbatim by a transcription service and then checked for accuracy by the first author. Each transcription was read and re-read and codes were developed deductively , based upon the theoretical framework . Non-verbal communication was not systematically interpreted . NVIVO 9 to organise the qualitative data.</p>
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<p>Mckenzie 2017 ⁴⁰</p> <p>(USA)</p>	<p>To determine prevalence of child safety seat use, awareness of and barriers to use; and to use the information gained in the first phase to develop, implement, and evaluate a child passenger safety program for Somali families living in Columbus, Ohio that is both sustainable and culturally appropriate.</p>	<p>Mixed methods study consisting of survey, IDIs and 2 FGDs to develop an intervention followed by a telephonic survey to get feedback on the intervention. The intervention was a video which was given to community leaders to show - this was developed based on results of a component of this study.</p>	<p>Key informants (10) in the local Somali community were initially identified by the executive director of a Somali family alliance organization in Columbus, Ohio. Additional community leaders were identified as the interviews progressed. To participate in FGDs, parents had to be Somali, at least 18 years of age, and have at least one child ≤8 years old.</p>	<p>Knowledge of and barriers to proper use in order to inform development, implementation, and initial evaluation of a culturally appropriate intervention for Somali families.</p>	<p>Key informant (n=10) were initially identified by the executive director of a Somali family alliance organisation and later snowballing done. No information is provided on how Somali parents (n=30) were recruited. The study was approved by the Institutional Review Board at the Research Institute at Nationwide Children's Hospital.</p>	<p>No information provided on data collection of key informants, but for FGD it is mentioned that an interpreter was used, and open-ended questions were asked.</p>	<p>Only mentions that the data was recorded and transcribed and common themes were extracted upon review and briefly summarized.</p>
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<p>Hall 2018 ⁴¹ (Australia)</p>	<p>To explore how child restraint use might function as part of an individual's capability, opportunity, and motivation and how this varies across high education and income (high SES), low education and income (low SES), and culturally and linguistically diverse (CALD) users</p>	<p>FGDs.</p>	<p>All parents or carers over 18 years and conversant in English were eligible. Two groups each of high SES participants, CALD participants, and low SES participants. All participants had some previous experience in installing a child restraint system or securing a child into a restraint. Participants were reimbursed AUD\$25.00 for their travel costs.</p>	<p>Perceptions (insights) and experiences .</p>	<p>High SES participants were recruited through university and research organisation email distribution channels. Community playgroups specifically for English as second language residents in South-eastern Sydney, and community playgroups in areas low SES as indicated by the Australian Government were used to recruit CALD and low SES participants.</p>	<p>Two researchers attended each FGD; one facilitated discussion using a semi-structured discussion guide and the other took notes. The discussion guide was formulated on a review of factors previously reported to be associated with errors in child restraint use.</p>	<p>The COM-B model of behaviour was used to deductively analyse discussions. Transcripts and discussion notes were then coded according to these categories independently by two researchers using QSR International's NVivo 11 Software. This included any mention of any issue relevant to these pre-defined categories. Where any inconsistencies between researchers occurred, these were discussed between the researchers until consensus was reached.</p>
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Focus of included studies

Most of the studies intended to understand perceptions, attitudes, and barriers to the use of child restraints in motor vehicles. The qualitative studies were standalone projects except for three studies, which were undertaken in conjunction with an intervention^{29 31 38}.

Type of studies

The studies included were either standalone qualitative methodologies or mixed methods. The different types of studies included were:

- focus group discussions only ^{21 24-26 28-32 35 41}
- in-depth interviews only ³⁴
- focus groups and in-depth interviews ²³
- mixed method study designs ³⁷⁻⁴⁰

Study participants

All but two of the included studies targeted parents or caregivers of children as participants. Only one study ²³ included children in a qualitative component in addition to parents or caregivers. One study included known violators of the child restraints law, including parents and caregivers ²⁵ and two studies focussed on pregnant women^{35 37}. Many studies included participants from culturally and linguistically diverse minorities ^{24 32 40} – two looked specifically at low-income communities^{30 41}.

Study setting

All the qualitative studies included were from high-income (USA=9, Australia =4, Saudi Arabia =1) (HIC) or upper-middle-income countries (China=3) (UMIC). Studies were mostly community-based.

Methodological quality of the included studies

The methodological quality of the included studies as assessed by the CASP tool is summarised in [Table 2](#). Most studies were clear about their research aims, had justified the use of a qualitative design and the overall design was appropriate. The recruitment strategy was not clear in four studies ^{21 28 35 37}. Nine studies ^{21 24 25 28 30 32 35 39 40} were adjudged to not have sufficiently rigorous data analysis methods (and one study was adjudged unclear ²³ on several counts including for methods of analysis), reflexivity not being reported and data saturation not being reached or not reported. Three studies^{21 25 31} were adjudged to not have clear statement of findings since they did not present quotes of the participants to back-up their results and/or did not describe basic characteristics of participants.

Table 2 : Methodological limitations of included studies using the CASP qualitative study tool

CASP criteria¹⁸	Was there a clear statement of the aims of the research?	Is a qualitative methodology appropriate?	Was the research design appropriate to address the aims of the research?	Was the recruitment strategy appropriate to the aims of the research?	Was the data collected in a way that addressed the research issue?	Has the relationship between researcher and participants been adequately considered?	Have ethical issues been taken into consideration?	Was the data analysis sufficiently rigorous?	Is there a clear statement of findings?	How valuable is the research?
Rivara 2001²¹	Yes	Yes	Yes	Unclear	No	No	No	No	No	The study had a small sample size. Data saturation and analysis methods were not properly described. There was discordance between the age in objective and eligibility criteria. Participant quotes to back up themes was sparsely presented.
Simpson 2002²³	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Yes	Not much reported on analyses to decide on reliability, validity, or reflexivity. However, the results discussed how the study contributed to determining parental differences between optimal child restraint use and the need for quantitative studies in the future. It was not clear why the ethics exempt status was given for this research

Lee 2003 24	Yes	Yes	Yes	Yes	No	Unclear	Yes	No	Yes	Data saturation was not mentioned. Not much detail about analysis methodology or results was presented and only a narrative report was provided with positionality and reflexivity remaining unclear.
Agran 2004 25	Yes	Yes	Yes	Yes	Unclear	No	Yes	No	No	The study did not include much detail about data collection. Reflexivity and data saturation were not mentioned. Basic characteristics of the participants or quotes were not reported. However, the researcher briefly discussed the contribution the study in terms of implementation of laws.
Lennon 2007 26	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	The study was well conducted, and the researcher discussed the contribution it made in the larger context and the issue of generalisability, reliability and validity.

Medoff-Cooper 2007 28	Unclear	Yes	Yes	Unclear	No	Unclear	Yes	No	Yes	The study abstract and main text aims were not the same – there was no clear statement of the aim of the research. There was no discussion on data saturation or reflexivity or other issues regarding reliability and validity of the data. Considering there were only two FGDs it is not clear how valuable the research is to local context. The discussion did not adequately describe the specific contribution to the literature or what the implications of the study were other than the statement that there was need to conduct this study in larger groups.
Winston 2007 29	Yes	Yes	Unclear	Yes	Unclear	No	Yes	Yes	Yes	The evaluation phase of the study was not appropriately designed to achieve the second objective of the study. It was not clear how and when and who implemented the interventions mentioned thereby preventing any inference. Data saturation was reached on some groups only, but the author described limitations, future research and the implication.
Johnston 2009 30	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	The study had a small sample and no data saturation was mentioned. Reflexivity and other issues related to data analyses etc. were not adequately reported. However, it discussed the results in perspective of the limitations, available research and future research implications and the limitations.

Erkobi 2010 31	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	The research had a problem of data saturation and positionality of researcher was not described. Results did not have quotes. The study, however, noted the wider literature and the generalisability in the local context in comparison to the original study done in USA and study limitations.
Brown 2013 32	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	Yes	The author identified the future implication on research and the contribution made by the study. However, the data were not analysed rigorously and there was no information on data saturation. Not enough details on reflexivity either.
Chen 2014 34	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	The author identified the future implication on research and the contribution made by the study including the transferability of the findings in other settings. Limitations were discussed.
Nelson 2015 35	Yes	Yes	Yes	Unclear	Yes	Unclear	Yes	No	Yes	The researcher did not clearly state why only pregnant women were targeted for the study. Data saturation, small sample size and the lack of information on researcher's role and reflexivity were limitations. However, the data did discuss local implications considering the larger literature, as well as strengths and limitations of the study.

Liu 2016 37	Yes	Yes	Yes	Unclear	Yes	No	Yes	Yes	Yes	The study was well conducted, and the researcher discussed the contribution it made in the larger context and the issue of generalisability, reliability and validity and the need for future research. However, there was inadequate reporting of actual recruitment strategy and reflexivity.
Fleisher 2017 38	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	The study was well conducted, and the researcher discussed the contribution it made in the larger context and the issue of generalisability, reliability and validity.
Hunter 2017 39	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	No	Yes	The study was well conducted, and the researcher discussed the contribution it made in the larger context and the issue of generalisability, reliability and validity. However, reflexivity was not reported and data saturation was not reached. There was also some discordance between the total number of participants and the individual participants in each FGD.
McKenzie 2017 40	Yes	Yes	Yes	Yes	No	Unclear	Yes	No	Yes	The overall design involved designing an intervention and obtaining pilot feedback. The design was reasonable but not much can be said about the reliability and validity of the research or the generalisability of it due to poor reporting of methodology and results. Data saturation and reflexivity was not mentioned.

Hall 2018 41	Yes	Yes	Yes	Yes	Yes	Uncle ar	Yes	Yes	Yes	The study was well conducted, and the researcher discussed the contribution it made in the larger context and the issue of generalisability, reliability and validity.
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Equity lens using PROGRESS Plus

We applied an equity lens on a post-hoc basis using the PROGRESS Plus framework to better understand the equity issues around facilitators and barriers for child restraint use ¹⁷ and this is shown in Table 3. However, for many studies the reporting was not detailed enough to enable a better understanding of equity. Almost all the studies were conducted in big cities in high-income countries and seven studies specifically focussed on culturally and linguistically diverse groups ^{24 30 32 38-41}. Studies typically did not intend to explore differences between mothers and fathers. Occupation, a key factor which might influence risk perception and risk-taking behaviour as well as socio-economic status was not reported in eleven studies ^{21 23-26 30 32 34 35 37 38}. Religion was mentioned only in one study ³⁵; socio-economic conditions were not reported in six studies ^{23-25 31 32 35}. Social capital was reported only in one study ⁴⁰. Even when they have reported equity factors, studies did not look specifically on its effect, except when they looked at culturally and linguistically diverse communities.

Table 3: Equity characteristics of participants in included studies using the PROGRESS Plus framework

[illegible]

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
Lennon 2007 ²⁶	Brisbane, Australia	Most were Caucasian	Not reported	21 mothers and 3 fathers	Not reported	Most parents had at least some post-secondary education (20/24)	Centres for recruitment were selected based on SES indicators of the surrounding suburbs (one in an upper SES area; one drawing on lower SES suburbs). Around half (13/24) of the parents indicating family income. \$A60 000 per annum (consistent with national figures for median income for couple-families with children)	Not reported	Most parents were aged between 30 and 39 years (16/24); two step families and at least two sole-parent families
Medoff - Cooper 2007 ²⁸	Large mid-Atlantic city, USA	One focus group consisted of 8 White women; the other focus group consisted of 4 African American women and 4 Latina women.	Most participants were employed either full time or part time	All female	Not reported	At least a high school education	Household income of at least \$20,000	Not reported	Not reported

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
Winston 2007 ²⁹	Philadelphia, USA	Formative phase: African American 46.7%, white 17.8%, Hispanic/ Latino 35.5%. Evaluative phase: African American 56.3%, white 18.8%, Hispanic/ Latino 25.0%	Among those employed formative phase - 44.9% were in service and 20.4% administrative evaluative phase - 33% was in service and 44% administrative	86.9% female in formative phase; 89.8% in evaluative	Not reported	Inclusion criteria was educational attainment of, at most, at most a high school diploma	Unemployed 50.5% in formative phase; 43.2% in evaluative phase	Not reported	Formative phase: 30.8% single, 5.6% separated, 3.7% divorced Evaluative phase: 45.5% single, 4% separated, 5.3% divorced
Johnston 2009 ³⁰	Central and southeast Seattle, USA	Only African American, Somali, and Vietnamese parents were recruited.	Not reported	80% female overall (disaggregated by race reported)	Not reported	Not reported	Low income groups were specifically recruited for the study; 63% own a vehicle; (disaggregated by race reported)	Not reported	Are likely to be immigrants

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
Erkobo ni 2010 31	Beijing China	Not reported	8.5% were unemployed and rest employed (12.5% medical, 12.5% administrative, 37.5% service)	Not reported	Not reported	Not reported	Not reported	Not reported	Aged 31 to 35 (56.5%) and married (98.6%)

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
Brown 2013 ³²	New South Wales, Australia	11 language specific focus groups in Arabic, Assyrian, Cantonese, Mandarin, Vietnamese and Turkish.	Not reported	Ten groups were female-only and one Arabic - speaking group was male-only	Not reported	Not reported	Not reported	Not reported	All participants were non-English speaking in Australia and the study was hence focussed on a linguistic minority. However, majority also spoke English in Arabic and Assyrian group only. Many of them are immigrants (mean duration in Australia is 10-20 years in different groups with the minimum being one year in Assyrian and

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
Chen 2014 ³⁴	Shanghai , China	Not reported	Not reported	Two of the 14 participants were fathers and the rest were mothers	Not reported	Bachelors or higher	Monthly income at or above average of city ; all drove to work using car	Not reported	Young age 29 to 34 years
Nelson 2015 ³⁵	Riyadh, Saudi Arabia	All spoke Arabic	Not reported	All female	Not reported specifically but mentions predominantly Muslim population as influencing perception.	Not reported	Not reported	Not reported	Only pregnant women. Over 50% of the participants were in the second half of pregnancy. For 7 women this was their first pregnancy, and the rest already had children

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
Liu 2016 ³⁷	Shantou, China	Not reported	Not reported	Not reported	Not reported	Not reported but all participants owned at least one private car	Twenty-five of the 30 participants were native to Shantou, and the rest were originally from other parts of China	Not reported	Only pregnant women were recruited . 76.7% were pregnant for the first time
Fleisher 2017 ³⁸	USA	African American (48%)	Not reported	Female (86%) ,	Not reported	At least some college education (62%)	Primary care practices were chosen based on geographic location to ensure variability in participant race/ ethnicity, community setting and socioeconomic status	Not reported	Not reported
Hunter 2017 ³⁹	New South Wales, Australia	Aboriginal but spoke English as their primary language at home	Not reported	All were female	From different educational strata; almost equally .	Not reported	Not reported	Not reported	Not reported

Study	Place of residence	Race/ ethnicity/ culture/ language	Occupation	Gender/ sex	Religion	Education	Socio-economic Status	Social capital	Plus
McKenzie 2017 ⁴⁰	Columbia, USA	Somali refugees and immigrants in USA	Key informant interviews revealed unemployment is a problem in the community	Not reported	Not reported	Key informant review revealed that the community has a problem of illiteracy	Not reported but says the community has a problem of daily living	Key informant reviews mentions says the community has a problem of adjustment and culture shock	Key informant interviews revealed that time spent in refugee camps and displaced status has led to mental health issues
Hall 2018 ⁴¹	Sydney, Australia	Culturally and linguistically diverse group included (also see education and SES column)	Not Reported	95% were female	Not Reported	Three groups of child restraint system (CRS) users: (a) Participants in high income and high education brackets (high SES) (b) Participants in lower income and lower education brackets (low SES) and (c) Participants from a culturally and linguistically diverse background (CALD		Not Reported	Not Reported

Syntheses of findings

Five key themes emerged from the thematic analysis of the included studies: (1) Perceived risk for injuries and perceived safety benefit of child restraint usage varies in different settings and between different types of caregivers. (2) Practical issues around the use of child restraints was a major barrier to its uptake as a child safety measure. (3) Restraint use was considered a mechanism to discipline children rather than a safety device by parents and as children became older, they actively seek opportunities to negotiate non-usage of restraint. (4) Adoption and enforcement of laws shaped perceptions and usage in all settings. (5) Perceptions and norms of child safety differed amongst culturally and linguistically diverse groups.

Perceived risk for injuries and perceived safety benefit of child restraint usage varies in different setting and between different types of caregivers

A mixture of perceived risk of injuries and the perceived safety benefit of using child restraints to prevent road traffic injuries influenced uptake of restraints and this varied not only across different contexts but also between different types of care givers.

Many studies ^{21 23 26 28-30 32 34 35 37} included participants who acknowledged that it was “dangerous for children to travel unrestrained” ³² owing to a high risk of injuries. Participants also reported that the risk of injuries was dependent on the duration of rides, speed, driver experience (being ‘safe drivers’) and ‘safe areas’ ^{21 23 25 28 30 34 39}. Authors reported that among non-users of child restraints, child restraint use was determined by risk perception with authors concluding that a “short distance and slow speed in the city would not cause serious injury even in a crash; CSS is not that important.” This was evidenced by the quote from parents “We don’t ask my child to wear the seat belt because most of the time we are driving in the downtown area” ³⁴. Mothers often mentioned that fathers, grandparents and other caregivers had lower risk perceptions and allowed children to be transported unrestrained which made enforcement difficult. In one study ²⁴, “mothers felt it was important for more educational efforts targeted specifically at fathers, who often were working and therefore not present during potential teachable moments such as doctor visits, or school and community events”. Often fathers played an important role in decision-making on buying restraints, and convincing them was often difficult due to a lack of knowledge “I heard it and want to buy it, but I fail to persuade my husband because I don’t know much about it” (non-restraint user mother) ³⁴. Participants in the study from Saudi Arabia mentioned that, “*Allah* is in control of everything that happens, and it is all in His hands. Whether or not I use a car seat will not matter”³⁵. Similar thoughts were expressed by Arab-speaking male participants in another study ³².

The perceived safety benefits of child restraints was low in many settings ^{30-32 34}. Concerns were raised about the balance between “being belted versus the risks of being trapped in the car” ^{30 37}. Participants often expressed doubts on the preventability of particular types of restraints or belt-positioning. Booster seats and forward-facing restraints were mentioned to be untrustworthy by participants; “I don’t think they [belt-positioning booster seats] are safe—they are more dangerous than a car seat [forward-facing restraint]” ²⁶. Cultural notions on what constitutes safety was also reflected when participants mentioned that holding children on laps provided better safety in case of a crash – “It is a natural human response that people would hold children tightly when a car brakes. If a child is restrained in a safety seat, I feel I could not protect my child when a car suddenly brakes” ³⁷.

Practical issues around the use of child restraints was a major barrier to its uptake as a child safety measure

Participants in all studies mentioned several practical barriers in using child restraints. Cost was almost a universal cause of concern which limited use^{21 23 24 26 29 30 32 39}. Educational sessions were thought to be useful when accompanied by discounts or giveaways of restraints. Rebates were thought to be an impractical method because of the difficulty in obtaining rebates and the time delay. Discounts were also reported to be inadequate²¹. A few studies reported the need for them to be provided completely free^{38 40}. Interestingly, costs were not reported to be a barrier in three studies from China. The difference in studies from China might be due to the fact that most participants in these studies had jobs or were earning at or above the average wage in the city (one of these studies did not report on socio-economic or job status but authors reported cost was not a barrier)^{31 34 37}.

The issue of cost was also related to other practical constraints like family size. Restraints were thought to be like, “sardines in the back seat.... [The car seats] take up too much space. In particular, full-back booster seats allow for only two children in a mid-sized car, with no room for extra passengers”²⁸. This was particularly problematic in cultures which do not have nuclear family set-ups or had large family sizes and in communities where parenting responsibilities were often shared or where providing or taking lifts was common^{24 25 28-30 32 35}. One study from Australia mentioned the importance of “learning from the authorised fitter while others felt paying for an authorised restraint fitter to fit the car seat was a waste of money”³⁹.

The practicalities around restraints as children grow up and the need for frequent transitioning after a particular age or when they have attained a particular weight or height was identified as a major practical issue for use by participants in seven studies^{21 23 26 28 32 38 39}. Some of these studies highlighted the lack of knowledge about transition as well as different viewpoints among parents about the suitability of such legislation for older children.

The comfort of children was also raised as an important consideration in many studies^{28 32 34 35}. Comfort often outweighed safety concerns leading to non-usage: “when the kid’s on the restraint actually crying a lot, crying like crazy, and at that moment if you cannot stop him crying, especially on a long journey”³². The only study that included children as participants reported that most of their comments were about comfort and that they “liked ones that were large enough for them and disliked ones that seemed or felt ‘too skinny’. Comfort seems to be a significant issue for children”²³. As such, comfort of children seems to be an important practical enabler to increased use of restraints. Few studies had parents mentioning that booster seats provided a better view of the outside to their children, thus improving compliance^{21 28}. Other issues that limited use of child restraints were lack of availability, incompatibility between cars and booster seat designs, lack of shoulder belts in the rear seats of older vehicles, and the time consuming and complicated nature of buckling children^{21 23 24 26 28 32}.

Restraint use is considered a mechanism to discipline children rather than a safety device by parents and as children grow older, they actively seek opportunities to negotiate non-usage of restraints

Many parents saw the use of restraints as more of an issue of disciplining their children. This meant that parents often relaxed rules for restraints as need be. For example, several parents had commented that they had an “obedient child, and therefore the parent could let the child use a lap belt”²¹. They also “gave in to children who resisted CSS use, often citing a need to keep the child quiet to avoid distracting the driver”²⁵. Studies also reported that parents occasionally “would allow a child to travel in the front seat as a special treat or because the trip was perceived as a short one... (with a) desire to support children in their maturation and perceiving the move to the front seat as part of this: ‘there’s a sense

that your kid is growing up and you kind of want to—it feels good when they’re taking their little steps like that and I guess subconsciously you weaken”²⁶.

As children grew older (reported around 3-5 years in different studies), peer pressure and the desire for children to be perceived as a “big kid” was a major factor preventing restraint usage. This was particularly problematic because, “few older siblings or friends used booster seats”²¹ and as such parents often found it “harder to resist as children grow older”²⁶ due to social norms and pressure—“many said that after a certain age (4 or 5 years), children say that they feel like “babies” if they sit in a car seat”²⁸.

How parents negotiated with children making these demands seemed to play an important role in child restraint use. Some parents could draw a distinction between safety (non-negotiable) and bath time and eating habits (negotiable), whereas others failed to do so and allowed children to negotiate on the use of restraints. Older children mostly learnt to unbuckle themselves too, which probably limited negotiability.

Adoption and enforcement of laws shaped perceptions and usage in all settings

The adoption and enforcement of laws mandating usage of restraints in children was identified as a very important factor influencing usage as well as influencing perceptions almost universally. This was true even when there was low awareness about the actual specifics of the law or there were gaps in the actual law (particularly around transition ages). Having a clear set of laws and guidelines which had been properly communicated leading to a high level of awareness was thought to be very important.

Enforcement of the law and perception of likelihood of enforcement were identified as important factors for compliance. For example, sometimes respondents “did not use the child seat restraint at night, thinking that a police officer could not see into the car in the dark”²⁵.

Presence of the law and its enforcement not only shaped parents’ perceptions but was also often used by parents to explain to children or negotiate with them. Children were often told that “Mommy will get in trouble”²⁸ and thus it was “easier for the kids to obey the police”³². In a study from the USA, the African-American community was dismayed that the laws did not take equity into perspective - “It’s always about money. If it is mandatory, it should be affordable”³⁰.

Perceptions and norms of child safety differed among culturally and linguistically diverse groups

The use of an equity lens allowed us to explore some issues around equity but due to limitations in the availability of primary data, this could not be fully evaluated around all PROGRESS Plus domains. While all studies were from HIC or UMIC context, many studies focussed specifically on immigrants or culturally and linguistically diverse groups; one study³⁹ was based in a regional area of a high income country with parents of low socio-economic status where approximately a third of participants were parents of Aboriginal children. Child safety in general was perceived very differently across groups implying that ‘one-size fits all type of approach’ might not be feasible when implementing programmes. As for example, immigrants mentioned “seatbelts and child safety restraints were not commonly used in their native countries, which may have contributed to the lack of awareness and low perception of risk among Latinos”²⁴. Immigrants perceived booster seats to be a reflection of an “overprotective culture” or not being in alignment with their own culture in which “we love our kids. So we want to hug them.... hold them in our laps in cars”³². In fact, in the study specifically on Somali refugees and immigrants in USA,

“child passenger safety, was never mentioned without prompting from the interviewer. Due to the abundance of other problems, safety issues are not top priority in the Somali community”⁴⁰. The study from Saudi Arabia had mothers who felt, “this may be American culture, but in our culture, they will laugh at us if we place the child” (in a restraint)³⁵. A study from USA ²⁸ which explored differences in norms between White mothers and African-American and Latino mothers found, in addition to differences in usage, that the African-American and Latino mothers mentioned that the comfort of children when sleeping in a booster seat was a key reason for non-usage. African-American and Latina mothers also felt that their children did not like to sit in a child safety seat and this was an issue compared to white mothers who said this was not so much of a problem.

Discussion

Our narrative synthesis aimed at identifying the factors reported to influence the use of child restraints. The review was prospectively registered. We searched multiple databases and did not purposively sample within the studies we found.

We sought to understand the factors influencing the use of restraints from a wide section of stakeholders, including children but most of our studies focussed on parental perceptions only. Only one study involved a few children in a single phase of the study and none of the studies included policy makers, traffic policemen or others involved in formulating or implementing laws or policies around child restraints. Even among parents, mostly the mothers were involved and not fathers or other male family members, who often play important roles. In certain cultural and linguistic groups men are more often the drivers of motor vehicles. For example, in Saudi Arabia women have only been legally allowed to drive from 2018. As such, even sub-group analyses (such as type of participant, country income level, and type of qualitative study, i.e. associated with an intervention or stand-alone study) that we had planned a priori could not be conducted due to the paucity of data. We recommend future qualitative studies to include children and other participants to understand their perspectives. This would be particularly important for older children who actively negotiate for restraint exceptions with their parents.

The use of a PROGRESS Plus framework ¹⁷ as an equity lens in the current study is novel. PROGRESS-Plus has been used in quantitative systematic reviews and meta-analysis previously, to understand how an intervention is affected by equity factors. However, we are not aware of its use in qualitative systematic reviews. Although data on equity issues in the primary qualitative studies were scarce thereby limiting interpretation we contend that it is a feasible and essential element in qualitative evidence synthesis in order to explore how equity affects different social phenomenon and its interpretations. More methodological work on this is essential. This post-hoc approach was not planned during protocol phase but enabled us to understand the role of these equity parameters around this topic and demonstrate gaps in research in terms of equity. While differences based on gender and cultural and linguistically diverse backgrounds were evident, applying an equity lens through PROGRESS-plus broadens the scope to investigate factors that may influence child restraint use. This includes consideration of occupation, education, socio-economic status, social capital and personal circumstances (such as disability), relationship status (for example single/separated parents). Future qualitative studies should explore such factors to better understand child restraint usage. Most of the evidence we found was from high income countries and from big cities and this should be considered when making

judgements on generalisability of the results of the studies to low- and middle- income countries or semi-urban areas, where different issues might affect the use of child restraints.

As in primary qualitative research, we reflected on how our backgrounds and positions might have influenced the conduct of this study. As a team, we decided on the choice of review topic through extensive deliberation over e-mail. We had initially planned to do a quantitative systematic review and meta-analyses but the availability of such studies in literature and feedback on the need for understanding the facilitators and barriers from team members in South Africa and India led to a refocussing of the review to target factors influencing restraint use. In our review, only a single author (SB) conducted all the data extraction and we acknowledge this as a limitation, although we verified extraction to ensure accuracy. As a team we had researchers and clinicians from the United Kingdom, South Africa, Australia and India, with expertise and experience in injury epidemiology, child injury and qualitative research. While it was not possible to involve the entire team in the analyses, formulation of themes was initially done by SB, refined with KH and then the final derivation of themes, interpretation of the results and critical feedback was done collectively by the entire team. We conducted a thematic synthesis of the included studies to investigate factors that impact child restraint use, which was in keeping with the epistemology of those studies as per the RETREAT criteria²⁰. We have used standard methods to assess the quality of the included studies and saturation of themes was achieved. The quality of included qualitative studies varied and many did not report adequately on analysis methods or discussed issues around data saturation, positionality and reflexivity and some did not present quotes. We recommend future qualitative studies in this domain to use standardised reporting checklists like COREQ or SRQR.^{42 43}

Results from our study demonstrate the wide range of issues that affect uptake of child restraints. As such, it is imperative for future child restraint research and programmes aimed at increasing child restraint use, focus not only on effectiveness but also embed the qualitative factors identified in our review. Implications from this review are broad. They highlight the need to develop targeted interventions for culturally and linguistically diverse groups (rather than just tailoring interventions), this may be particularly relevant in high-income countries. Further, caregivers within the same family have different perceptions (of injury risk and the value of using a child restraint) and there is a need to take that into consideration when developing programmes and messaging. Similarly, messaging should also consider the variations of perception between different parents and caregivers, this includes some parents' perception that child restraint use is a form of discipline. Differentiating between negotiable (example, sleeping late) and non-negotiable (safety) behaviour is key to promote child restraints as children grow up. As such child restraint usage programmes should focus on aspects of effective parenting too. Such perceptions could be factored into the development of effective parenting programmes to include negotiating with children. Laws appear to be universally useful in shaping perceptions as well as promoting usage. However, considering equity is important during formulation of laws. A robust and consistent law enforcement is also key to promote usage of restraints. Finally, the impracticalities reported by parents in the included studies around using the restraints (installing them in the vehicle and properly securing the child) demonstrate the need for better designs of child restraints, which could lead to both more children being restrained and fewer errors in child restraint use.

Conclusion

Many factors affect the use of car restraints for children which should be considered when planning and developing messaging and programmes to increase child restraint use. In addition, equity issues should also be targeted when planning interventions to promote uptake. There is also a need to conduct equity

focussed qualitative research in low-income and middle-income countries in semi-urban and rural settings, involving fathers and policy makers, service providers and enforcement agencies to understand issues around usage of child restraints in those settings in the future.

Competing Interests:

KH authored one included study and therefore was not involved in data extraction or quality assessment. No other competing interests to declare.

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What is already known on this subject?

- Child restraint usage will save children's lives in the event of a crash.
- Many countries have child restraint laws but parents still do not use them. It is not clear what the barriers and/or facilitating factors are in this regard.

What this study adds

- To our knowledge, this is the first qualitative evidence synthesis on the topic.
- It provides important insights into understanding reasons behind compliance or non-compliance of child restraint usage.
- It will inform the design of programmes locally to increase the usage of child restraints.
- It will help countries achieve Target 8 of the Global Voluntary performance Targets for Road Safety which specifically aims to increase the use of standard child restraint systems to 100% by 2030.

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