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Understanding parental risk perception regarding unintentional injuries of infants and toddlers within the home: a grounded theory approach

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ABSTRACT

Unintentional injuries within the home are a major health risk for infants and toddlers. Previous theoretical and empirical work identified parental risk perception as a key determinant of parents' preventive behaviour. Yet, little is known about how parents perceive their children's risk for unintentional injuries within the home. Since unintentional injuries are considered largely preventable, theoretical guidance that helps to better understand parental risk perception is required. The objective of this study was to develop a theoretical model which helps to better understand how parents perceive the risk of their infants and toddlers regarding unintentional injuries within the home. In this qualitative study, nine photo-based semi-structured interviews were conducted with parents of infants and toddlers (0 to 4 years) in the city and district of Munich. Grounded theory methodology was used for data collection and analysis. Findings indicate that parental risk perception can be described as a continuum which is determined by the development and personality of the child as well as by 'teachable moments', such as previous (near-)injuries. While risk perception of parents with only one child was predominantly driven by the development of the child, risk perception of parents with two children was driven by the personality of the child. A first theoretical model that describes how parents perceive their children's risk regarding unintentional home injuries was developed. Since this study highlights differences in parental risk perception depending on whether one or two children are living in the household, future research on parental risk perception should consider the number of children living in the household. From our theoretical model, practical implications for tailoring prevention interventions by health practitioners can be derived (e.g. exposing parents to information of the developmental process of the child), which may increase parents' engagement in injury prevention.

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Childhood injury prevention; parental risk perception; unintentional injury; home; grounded theory

1. Introduction

Childhood unintentional injuries represent the most common cause of death among children in Europe aged 1 to 14 years (EuroSafe 2016). While fatal injuries in childhood have constantly

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declined in the last 15 years, the number of non-fatal injuries have remained stable (Eurostat 2019). Results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), for instance, show that the prevalence of non-fatal injuries in Germany remained nearly unchanged over the study period from 2003 to 2017 (Saß, Kuhnert, and Gutsche 2019). However, a significant change can be observed in the development of the hospitalization rate regarding unintentional injuries. Compared to other age groups, the hospitalization rate of infants and toddlers increased more strongly in the period of 2005 to 2014 (+ 34% and + 21,6% for infants and toddlers vs. 9,4% for children 5 years or older; ICD 10: S00-T98, T90-T98) (Ellsäßer 2017). Unintentional injuries are thus a significant health risk for children under 5 years. In this age group, unintentional injuries happen particularly often in the domestic area (EuroSafe 2016). Among children aged 1 to 2 years, three-quarters of all non-fatal injuries occurred in this area and in 2017, a total of 25 infants and toddlers died due to unintentional injuries within the home (ICD 10: V01-X59, 0-4 years) (Statistisches Bundesamt 2019). Therefore, the epidemiology describes infants and toddlers aged 0 to 4 as a high-risk group for unintentional injuries within the home.

According to the WHO, unintentional injuries are largely preventable, and hence health practitioners, researchers and policy should focus on the prevention of those (World Health Organization and Unicef 2008; World Health Organization Europe 2008). Since infants and toddlers are not yet aware of the dangers and must therefore be protected from unintentional injuries by supervision and protective measures, parents are the primary addressees of prevention interventions (Ellsäßer, Trost-Brinkhues, and Albrecht 2014; Glik, Kronenfeld, and Jackson 1991). Adequate and detailed information on home injuries of children is required to plan and implement appropriate prevention interventions (Kolip 2014).

From a theoretical perspective, the risk perception of the addressees, as a socio-cognitive determinant influencing preventive behaviour, is of importance for the planning of successful interventions, which has been supported by research (Brewer et al. 2004; Schmäzle, Renner, and Schupp 2017; van der Pligt 1996). Various theoretical models assume that high risk perception leads to health-related change in behaviour (Lippke and Renneberg 2006). The Protection Motivation Theory, for instance, proposes that the perceived severity and vulnerability as dimensions of risk perception predict and explain health-related behaviour (Rogers 1975).

The few available studies on parental risk perception have indeed found that it is an important factor influencing parents' preventive behaviour regarding unintentional home injuries among their children (Ablewhite, Peel et al. 2015; Kronenfeld, Glik, and Jackson 1991; Simpson et al. 2009; Smithson, Garside, and Pearson 2011). Ablewhite and colleagues (2015), for example, found that parents' not anticipating injury risks (i.e. low risk perception) is a barrier of injury prevention at home for children under the age of 5 (Ablewhite, Peel et al. 2015). Other studies have identified additional factors that determine parental risk perception, including age, character, previous injuries or the developmental stage of the child (Ablewhite, McDaid et al. 2015; Glik, Kronenfeld, and Jackson 1991; Morrongiello et al. 2009; Simpson et al. 2009).

While this line of research suggests that multiple factors affect parental risk perception, an overarching theoretical framework of parental risk perception regarding unintentional home injuries of their children that describes its antecedents and consequences for injury prevention in young children is missing. Thus, little theoretical guidance is available that could help planning and implementing successful interventions to prevent unintentional injuries of infants and toddlers within the home (Früh 2014).

The present study addresses this theoretical gap by aiming to reconstruct parental risk perception. Since little is known about parental risk perceptions, grounded theory methodology was used to develop a theoretical model that helps to better understand how parents perceive the risk of unintentional home injuries of their infants and toddlers aged 0 to 4 (Strauss and Corbin 1990).

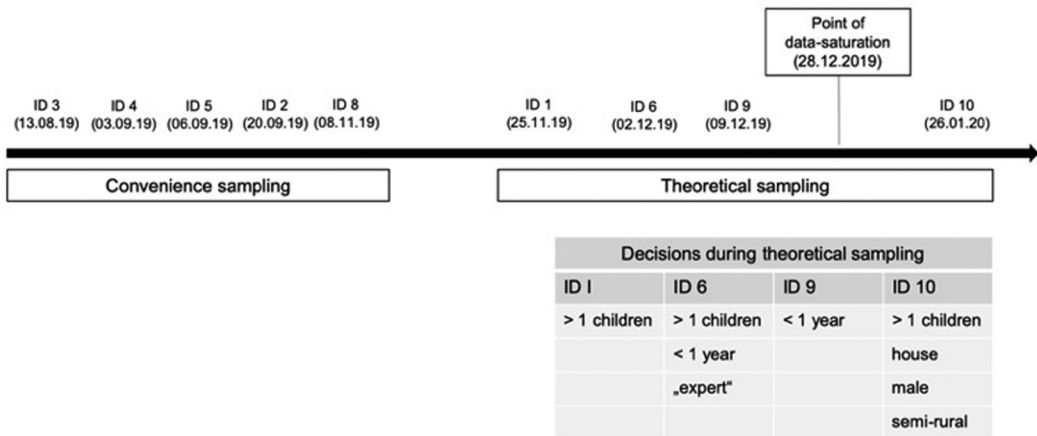


Figure 1. Sampling strategy from convenience to theoretical sampling.

2. Materials and methods

2.1. Sampling

We recruited nine parents of infants and toddlers by distributing the study information to a convenience sample. Inclusion criteria were place of residence (city or district of Munich) and age of the child (0 to 4 years). Initially, five cases were collected. The remaining four cases were collected according to theoretical sampling recommended by Strauss and Corbin (Strauss and Corbin 1990) (Figure 1). The data collection took place from August 2019 to January 2020 and continued until it reached the point of saturation. An overview of the characteristics of the participants is provided in Table 1.

2.2. Data collection

After the parents agreed to participate in the study, an information letter and a disposable camera were sent to them by post. Disposable cameras were chosen for two reasons: they require little technical understanding and the photos taken cannot be changed or deleted afterwards. In the information letter, parents were asked to document the individually perceived risks for unintentional home injuries of their children in their home with the disposable camera ('We kindly ask you to photograph the places, settings and situations you perceive as a risk for your child's unintentional home injuries with the enclosed disposable camera.').

Next, photo-based semi-structured face-to-face interviews were conducted by the first author in settings chosen by the parents. Only one out of nine interviews did not take place in the home of the participants, but in a room at the local university. In the interviews the parents were asked to narrate about their documented risk perception using their photos ('How do you assess the risk of your child having an unintentional injury in your home? Please refer to the individual photos and tell us about the risks documented by you.'). The length of the interviews varied between 17 and 85 minutes.

2.3. Analysis

The interviews were digitally recorded and transcribed verbatim. The computer-assisted qualitative data software f4 (dr. dressing & pehl GmbH, Marburg, Germany) was used for both, transcription and analysis. The transcripts were analysed using a grounded theory constant comparison approach as well as open, axial, and selective coding suggested by Strauss and

Table 1. Characteristics of the participants.

ID	Characteristics							Age, gender (children in the household)	Children in the household
	Age, gender (parent)	Country of birth (parent)	Marital status (parent)	Single parent (yes/no)	Residential area	Housing tenure	Number of floors and rooms		
3	35 (m)	Germany	married	no	urban	apartment (rented)	1 floor, 3 rooms	4 (m)	1
4	40 (f)	Germany	not married	no	semi-rural	house (owned)	2 floors, 5 rooms	1 (f)	1
5	33 (f)	Germany	married	no	semi-rural	apartment (owned)	2 floors, 5 rooms	1 (m)	1
2	38 (f)	Germany	not married	no	urban	apartment (rented)	1 floor, 3 rooms	2 (m)	1
8	30 (f)	Irak	married	no	urban	apartment (rented)	1 floor, 3 rooms	2 (m), 4 (m)	2
1	37 (f)	Germany	married	no	urban	apartment (rented)	1 floor, 3 rooms	1 (f), 4 (m)	2
6	35 (f)	Germany	married	no	urban	apartment (rented)	2 floors, 3 rooms	2 months (f), 1 year (m)	2
9	30 (f)	Germany	married	no	urban	apartment (rented)	1 floor, 2 rooms	4 months (m)	1
10	38 (m)	Germany	married	no	semi-rural	apartment (owned)	2 floors, 5 rooms	4 years (m) 5 years (m)	2

Corbin (Strauss and Corbin 1990). In addition, the developed memos, field notes and 128 photos, which were taken by the participants, were included in the analysis. Data collection and analysis were carried out simultaneously.

Open coding was used to identify first theoretical concepts in this initially broad research context. During axial coding, connections within and between categories were explored. In accordance with grounded theory methodology, relevant categories emerged as the study progressed. Overall, a total of 41 categories emerged from the entire coding process. Research meetings with the involved researchers took place to validate these categories, as well as to ensure data-saturation. After axial coding, selective coding was conducted to identify the three core categories ('development', 'personality' and 'teachable moments') and finally answer the research question.

3. Results

The theoretical model shown in Figure 2 presents the main findings on how parents perceive risk regarding unintentional injuries of their infants and toddlers within the home. Based on the analysed transcripts, memos and photos taken by the participants, the parental risk perception can be described as a continuum which is determined by two key factors: the development of the child and teachable moments as specific triggers of risk perception. In households with two children, however, the personality of the child is an important influential factor on the parental risk perception. The theory also acknowledges that differences in parents' background, including socio-economic status, parental style etc. may impact risk perception, as indicated by the past research (Glik, Kronenfeld, and Jackson 1991; Inbaraj et al. 2017). However, the background of the parents was not the focus of the study.

3.1. Development

Parents predominantly narrated about their risk perception by pointing out various aspects of the child's development. The developmental steps noticed by the parents determine their risk

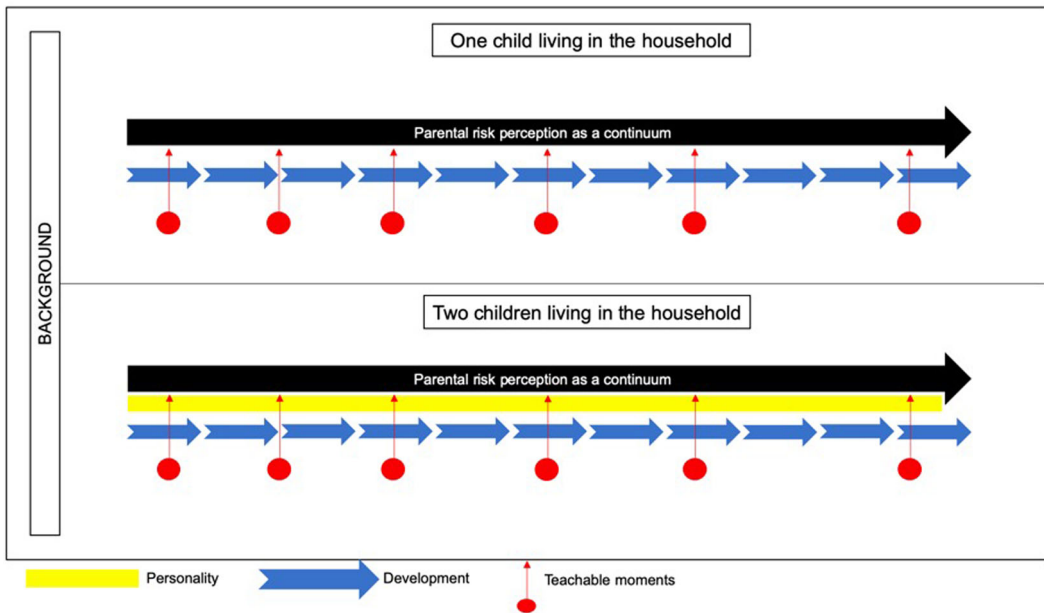


Figure 2. Theoretical model of parental risk perception.

perception and occur as recurring moments on the progressing continuum. Consequently, parents perceive their child's risk according to the child's developmental process and strongly adapt their preventive behaviour to the child's individual developmental steps.

A mother of a 4-months-old child reported:

I believe that a lot of things simply happen according to the development of the child, because there are many things that we are yet not aware of. Well, and that it will only come with time, where the risks really are and what we can do about it. And then you have to look individually at each step of development to see what WE can do for OUR child in OUR household.

By taking a closer look at the category development, it becomes clear that the participants derived this category mainly from aspects such as the advancing age or the increasing mobility of the child (Figure 3).

The baby is born, and you think 'Okay, what do we need to start with?'. You don't need anything at first. First, you make sure that he doesn't fall off the changing table. But as soon as he starts to move, there are just things, a lot of things, that just become dangerous. Well, that the more mobile he gets, the harder it gets.

In addition, specific skills were also mentioned as factors determining the parental risk perception:

Because she can already turn, I can't swaddle [a technique where the child is tightly wrapped into a blanket] her under any circumstances. Otherwise she would turn on her stomach and then breathe into the bed and then the risk would be extremely high that she could not turn back if her arms are not free and then the risk would be high that she would suffocate.

3.2. Personality

The findings indicate that parent's risk perception differs depending on whether only one child is living in the household or another child is present. While the child's developmental process is recognised gradually by aspects such as age, mobility or specific capabilities of the child, the



Figure 3. The child's increased mobility (development) directs the parental risk perception towards the garden shed containing sharp tools and chemicals.

personality of the child is perceived by the parents mainly by comparing their children with each other. The personality thus becomes an important determinant regarding the risk perception of parents of two children. A mother of two children, aged 1 year and 2 months, describes this comparison as follows.

That's funny. You just approach the second child with the attitude 'Well, I know everything about it and can do everything. All good'. And then you find out that they're two completely different personalities, who are completely different, which means that certain things work, others don't.



Figure 4. The (younger) child is described as much more active than the older sibling, thus, risk perception is differentiated by the personality of the individual child.

In response to the change in risk perception caused by the child's personality, parental strategies to prevent unintentional injuries are being adapted, e.g. by tightening up safety measures (Figure 4).

Well, my older son was much calmer, he didn't do many dangerous things. The little one is more active and does not really listen to me. It was different with the older one. We initially had a fuse where you could still see the socket. But because of the second child, we installed fuses that completely cover the socket to have more protection.

3.3. Teachable moments

Another key factor mentioned by the participants can be interpreted as 'teachable moments'. In this study, they are defined as instructive or particularly formative situations, such as previous (near-)injuries of the child, which trigger parental risk perception and lead to an immediate change in the parents' behaviour. While the development and the personality of the child determines the parental risk perception from the birth of the child either according to the child's developmental steps (development) or constantly (personality), the teachable moments have a rather selective and sudden effect on the parental risk perception. One participant delineates teachable moments as follows:

I went to the toilet and wanted to close the door. (...). I closed the door, but the door didn't close so I tried it again, but this time a little bit harder. When I think about it, it still hurts me. Firstly, I asked myself why the door doesn't close, but then I realised. I looked at his finger and it looked like an accordion. (...). Fortunately, it was not broken, but the blood gushed out. This was one of the worst accidents that happened to him. As an adult, you are very ashamed allowing an accident like this happening to your own child. Now we are strongly sensitised. We as his parents more than him. These days, when we want to close a door at home, we pay attention to whether he is nearby the door and, if it is necessary, tell him to get away from this door. (Figure 5)

A concrete situation that almost led to an unintentional injury was also described as a 'teachable moment'.

Well, nothing happened, but he got it [chemicals] out. It wasn't an accident in a proper sense, but he got it out and that was when I decided that it had to be removed.



Figure 5. Teachable moment. Outcome of door injury leading to altered risk perception and behaviour change.

4. Discussion

Past research suggests that parental risk perception is a key determinant of parents' efforts to prevent unintentional injuries of their children (Ablewhite, Peel et al. 2015; Glik, Kronenfeld, and Jackson 1991; Kronenfeld, Glik, and Jackson 1991; Smithson, Garside, and Pearson 2011). The aim of this study was to develop a first theoretical model of parental risk perception regarding unintentional home injuries of their infants and toddlers. We found that parental risk perception can be described as a continuum which is determined by the development and personality of the child as well as by teachable moments. Differences in parental risk perception were evident

depending on whether one or two children are living in the household. While parents who live with only one child perceive the injury risk of the child mainly according to the individual developmental process of the child, the risk perception of parents living with two children is additionally and predominantly determined by the respective personality of the child, which is compared to the personality of the older sibling.

Although our results relate to the child's health and not to one's own health, they support the assumptions of various theoretical models, which propose that perceiving risk leads to preventive behaviour (Inbaraj et al. 2017; Morrongiello and Dayler 1996; Murphy 2001; Schmäzle, Renner, and Schupp 2017). Accordingly, parents who participated in the present study usually reported changes in their preventive behaviour in response to changes in their risk perception. For instance, the participants described their adapted preventive behaviour as a result of noticing increasing skills of the child, e.g. the skill to turn independently.

It is important to note though, that previous studies have sometimes found that perceiving certain risks for children does not necessarily translate into preventive behaviour as parents may lack the resources or view smaller injuries as a natural part of childhood that children can learn from (Ablewhite, Peel et al. 2015; Eichelberger et al. 1990; Lewis, DiLillo, and Peterson 2004; Morrongiello and Dayler 1996; Murphy 2001).

The determinants of risk perception identified in this study are overall consistent with past research. For instance, prior research suggests that mothers' perception of their children's skills (development) affect their risk perception (Gärling 1989; Sellström et al. 2000). Regarding personality, one study reported that having an active child or a child with a risk-taking personality was positively related to parents' risk perception (Glik, Kronenfeld, and Jackson 1991). Similarly, another study found that parents list the personality of the child as one important factor affecting their risk perception (Ablewhite, McDaid et al. 2015). In line with our findings, past studies have also revealed that teachable moments can affect risk perception and preventive behaviour regarding unintentional home injuries of young children (Ablewhite, McDaid et al. 2015; Glik, Kronenfeld, and Jackson 1991). One study, for instance, found that if a child had an injury that required medical care this was a teachable moment that sensitized the parents and led to more safety behaviour (Morrongiello et al. 2009).

The results of the present study also highlight important differences in the determinants of risk perception between parents of one child and parents of two children, which, to our knowledge, have not been examined by past research. While the present study cannot draw conclusions regarding differences in safety behaviour or in the magnitude of risk perception between parents of one compared to parents of two children, it suggests two different processes how parents perceive risk of their children. While these findings require further validation through studies using larger sample sizes, they could have important implications for tailoring prevention interventions by health practitioners. For instance, exposing parents to information of the developmental process of the child as well as scenarios of situations that (almost) lead to an injury ('teachable moments') may increase parents' engagement in injury prevention.

Since the sampling was not done randomly, we cannot exclude the possibility that we have a selected group that is especially interested in the topic. This group might be more informed and alerted regarding unintentional home injuries of their children. However, we did not find strong evidence for this assumption from photos or the household visits, where a series of potentially dangerous arrangements were found that could have easily been resolved, e.g. regarding electric wiring. Another limitation of the study is that we were not able to differentiate our theory by further background variables as for instance socio-economic status, parenting style etc. This was not the focus of the present study but should be addressed in future research. A strength of the study is the approach of actively engaging the parents in the data collection, by letting them take photos beforehand. This approach helped getting the parents engaged in the topic and was also helpful for the interviews. It is planned to complement the study in future research

with a quantitative assessment where the theory can be tested in a representative sample and in different social and cultural groups of parents.

5. Conclusions

This study adds to a deeper understanding of parental risk perception regarding unintentional home injuries of their infants and toddlers and presents a first theoretical model, which if further validated could help practitioners to better tailor health prevention interventions. The present study suggests two different processes how parents perceive injury risks depending on whether one or two children are living in the household. Future research on parental risk perception should therefore consider the number of children living in the household.

Declaration of interest statement

No potential conflict of interest was reported by the authors.

Data available statement

The interview codings are available upon reasonable requests to the corresponding author and are not permitted to be reused.

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