Child Injury: The Role of Supervision in Prevention

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AMERICAN JOURNAL OF LIFESTYLE MEDICINE 2010; 4; 65 originally published online Oct 7, 2009;
DOI: 10.1177/1559827609348475

STATE OF THE ART
REVIEWS

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Abstract: *As the leading cause of death and major contributor to hospitalization for children, unintentional injury is a significant health problem in the United States. How supervision influences children's risk of injury has been of interest for some time, and much progress has been made recently to address definitional and measurement issues pertaining to supervision. Increasing evidence supports the notion of a general relationship between increased supervision and decreased injury risk, but also reveals that child behavioral attributes and environmental characteristics can interact with level of supervision to affect injury risk, making it challenging to develop guidelines regarding what constitutes "adequate" supervision. Further research is needed to explore if and how children's risk of injury varies with different supervisors (eg, mothers vs fathers vs older siblings) and how these relations change as a function of children's developmental level. Recent research has identified messaging approaches that are effective to invoke a commitment to more closely supervising young children at home. Examining how these messages affect actual supervisory practices is an essential next step in this research and can support the development of evidence-based programs to improve supervision and reduce children's risk of injuries.*

Keywords: supervision; child injury; risk reduction; prevention

The problem of childhood injury is a significant one. In the United States, as in many industrialized nations,[1] unintentional injuries are the leading cause of death and a major contributor to hospitalizations for children beyond 1 year of age.[2,3] Indeed, the number of child deaths related to injury in the United States exceeds that of the next 9 causes combined.[2] On average, 12 175 children 0 to 19 years of age die each year in the United States from an unintentional injury, about 33 children every day.[4] Not surprisingly, the direct and indirect costs related to childhood injuries are staggering. In 2000, for example, child and adolescent injuries in the United States resulted in an estimated $24 billion in lifetime medical costs and $82 billion in present and future work losses, including caregiver income lost.[5] Of course, these financial estimates do not even capture the burden of suffering and quality-of-life losses that can result from injury.

The scope of the childhood injury problem has prompted research to determine what factors influence risk of injury to children.[6-8] Leading researchers in the field agree that caregivers can substantially affect children's risk of injury,[9] particularly for toddlers and preschool-aged children whose injuries often occur in the home when they are presumably being supervised by a caregiver.[10-12] Because most of these injuries are preventable,[13] efforts have sought to determine caregiver practices, why they choose certain practices, and how to motivate them to make better choices about safety practices to reduce children's risk of injury at home. Although the majority of this research has focused on environmental modifications, such as caregivers' use of safety devices or hazard removal practices,[14-18] there is increasing interest in understanding the role of supervision as a risk management strategy.

> Helping parents and supervisors implement 'best practices' could save lives.

What Is "Supervision"?

Surprisingly, most studies that examine *supervision* have not provided a definition of the term. Moreover, a review of definitions that have been published reveals little or no consensus on an operational definition. The act of supervising (ie, directly

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observing and attending to the child) and prior knowledge of the child (ie, the child is not in view, but the supervisor knows how the child usually behaves) both must be considered. However, there is currently no consensus about whether a supervisor's level of knowledge about the child can substitute for directly observing and attending to that child. Given how unpredictable young children's behavior can be,[19] it would seem that direct "attention" to confirm what the child is doing would be an essential aspect to defining *supervision*. However, for older children, monitoring or knowing the child's whereabouts and activities *without* necessarily observing these directly is more commonplace.[20] Whether monitoring should be considered as supervising is debatable. Interestingly, low levels of monitoring (ie, knowledge of a child's activities and location) are associated with high levels of problem and risk behaviors.[21]

Not only is attention to a child relevant, but so is the caregiver's capacity to intervene. For young children who may not comply with verbal directives by a supervisor,[22] a definition would need to take into consideration a supervisor's proximity to the child because this affects how quickly the supervisor can reach the child and intervene to stop a risk activity.

Drawing on a consideration of these issues, a definition of supervision relevant to young children's (<6 years) risk of injury was recently proposed by Morrongiello.[23] According to this definition, 3 dimensions of behavior are considered: *attention* (extent of watching and listening), *proximity* (within vs beyond arm's reach), and *continuity* of attention and proximity (constant/intermittent/not at all). Maximum supervision and lowest risk of injury is most likely to occur when a supervisor is attentively watching and listening to the child, is in the closest proximity possible (ie, touching), and these behaviors are sustained and constant over time. Any change in 1 or more of the 3 dimensions (eg, being further from the child/lack of constant attention) would result in lower levels of supervision and, therefore, increased risk of injury. The usefulness of this definition has been confirmed in studies that have found that distinct patterns of supervision systematically relate to young children's frequency of injury (see literature below).

What Is "Adequate" Supervision?

Children's age is one factor that affects the level of supervision needed to ensure their safety. There is general agreement across professionals from a variety of disciplines that young children require continuous, close supervision to ensure their safety in most situations, and the need for continuous, direct supervision declines with increasing age during childhood.[24] However, there are no clear guidelines or minimal standards in the literature for supervising children at different ages. Most jurisdictions simply set a minimum legal age at which children can remain at home unsupervised, but there is no indication this is based on any scientific evidence per se.

Context is another variable that affects what constitutes "adequate" supervision. For example, there is general agreement that unsupervised time should decrease when the level of environmental risk is high,[24,25] and recent research on farms confirms this view.[26] Furthermore, Morrongiello and her colleagues[19] examined supervision at the time of farm injuries and found that one third of the children who were injured were receiving what would typically be considered "adequate" supervision (ie, acceptable levels of attention, proximity, and continuity). This increased injury risk under adequate supervision reflects the fact that when children are on a farm, being in close proximity to an adult often means greater exposure to hazards (eg, machinery, animals) because the adult is working. Findings such as these highlight the challenge of determining what constitutes adequate supervision. Simply stated, if both child age and situational context interact to influence risk, it may be unrealistic to create one set of guidelines to protect all children in all circumstances.

How Should Supervision Be Measured?

Progress in exploring links between supervision and injury risk also has been hampered by measurement issues. Because research on the relationship between supervision and injury risk is relatively new, the methodology used to assess supervision has varied greatly, and no standardized measure has been developed yet.

Many studies examining supervision have included questionnaires that ask parents to indicate how they supervise their own children,[22,27-35] whereas others have used questionnaires that ask parents to report on how they would supervise a child in described situations.[24,25,36,37] Some have had parents listen to story vignettes or watch videos about children engaging in risky behaviors and then report how they would react if they were supervising that child.[38] A handful of studies have used participant event monitoring, in which parents are required to keep track of their actual supervision on a day-to-day basis,[25,34,39-43] an approach that allows the comparison of supervision during injury versus noninjury periods. However, a major limitation when using self-report measures is the possibility of response bias: parents may be reluctant to report information if they feel it could reflect poor parenting skills. As well, the ecological validity of these self-report measures is questionable, as supervisors might behave very differently in actual supervisory situations.[23] An additional limitation arises when the self-report measures used are retrospective, adding an additional limitation of possible recall bias and/or missing information in the recalled account.[27,44-48]

Morrongiello[23] has suggested an alternative approach to self-reports on actual supervisory practices, focusing instead on measuring parent attributes (eg, attitudes toward closely supervising, beliefs about children's need for close supervision, parenting values related to safety, personality traits that affect parent practices such as conscientiousness) that provide a foundation for parenting decisions and reflect different supervision

styles (ie, consistent behavioral patterns or approaches to supervising). The Parent Supervision Attributes Profile Questionnaire (PSAPQ[28]) was developed based on this approach and measures parental attributes that have been shown to influence supervision decisions. The measure has been found to be both reliable and valid.[29] High scores on the PSAPQ have been shown to predict close supervision and low scores to predict poorer supervision in naturalistic observation situations, and these scores have been related to children's frequency of risk taking and injuries.

Observational studies provide an alternative approach to measuring supervision. Harrell[49-53] conducted a series of naturalistic observations of children and their supervisors, which maximizes ecological validity. However, this type of methodology is time intensive, and it is not feasible for use in all settings (eg, home). An alternative approach to naturalistic observation involves the use of contrived hazards—that is, hazards that appear real but have been modified to pose no real risk of injury in laboratory settings.[22,54] This approach creates a simulated risk situation, and supervisors' reactions can be unobtrusively recorded via videotape, providing a more accurate index of typical supervision practices. This is a refined approach to measuring supervision, although not all types of injury risks can be represented by contrived hazards.

Supervision and Injury: A Complex Process

There is a longstanding assumption in the child injury literature that supervision must serve a protective role and prevent injury, particularly for young preschool children who have limited capacity to keep themselves safe.[9,55,56] Indeed, some have argued that inadequate supervision leading to injury should be reported as child abuse if the child is younger than 2 years of age.[57] A lapse in caregiver attention has been mentioned as a possible contributing factor for a variety of types of injuries affecting children, including drowning,[58] pedestrian injuries,[59,60] poisoning,[61] choking,[31] playground injuries,[62] dog bites,[63] escalator injuries,[64] falls,[49] and injuries from handling dangerous substances in grocery stores[52] or at home.[65] In nearly all of these cases, however, mention of the etiologic role of supervision is based on intuitive grounds as opposed to convincing evidence.[66]

Additional findings that have been cited in making a case that supervision influences risk of injury comes from epidemiological data showing increased frequency of injuries for children living in families with only a single parent[67] or with multiple siblings at home,[68] which are both characteristics that can decrease the potential for supervision. Thus, there are a variety of sources of indirect evidence in support of the notion that supervision serves a protective function and can reduce children's injury risk. Research aimed at gathering direct evidence of this relation has been conducted only recently, and the findings suggest a more complex relation between supervision and childhood injury than previously thought.

Supervisor Presence and Children's Risk Taking

One way that supervisors can exert an influence is if children change their risk behaviors in response to the presence of a supervisor. School-age children have been shown to behave more cautiously when a supervisor is nearby.[69,70] Similarly, young children have been shown to engage in more risky play activities at supermarkets and playgrounds when supervisors are more distant physically,[28,49] and adult and child swimmers violate more rules in public pools when fewer lifeguards are present.[53]

When gender differences have been evaluated, boys' risk behaviors seem not to be influenced by the presence of a supervisor to the same extent as girls' risk behaviors. For example, in a prospective study of home injuries and caregiver supervision patterns, a supervisor's periodic appearance in a playroom to check on the child moderated girls' behaviors such that injuries occurred as infrequently as if the supervisor were present and attending constantly. In contrast, boys' risk behaviors were unaffected by intermittent checking by a supervisor, resulting in their frequency of injury being as high for this pattern of supervision as when they were completely unsupervised for an extended period of time.[34] Similarly, unobtrusive observations of parent-child dyads in injury risk situations reveal that boys do more ignoring of supervisors than girls, resulting in caregivers needing to enact more effortful supervision strategies (eg, physically redirecting away from a hazard) to ensure that boys do not interact with hazards.[22] In summary, the pattern of findings indicates that the presence of a supervisor can result in children moderating their level of risk taking, but boys seem to be less likely to do so than girls and, therefore, they require more active supervision efforts than girls to keep them safe.

Supervisory Behaviors and Child Injury

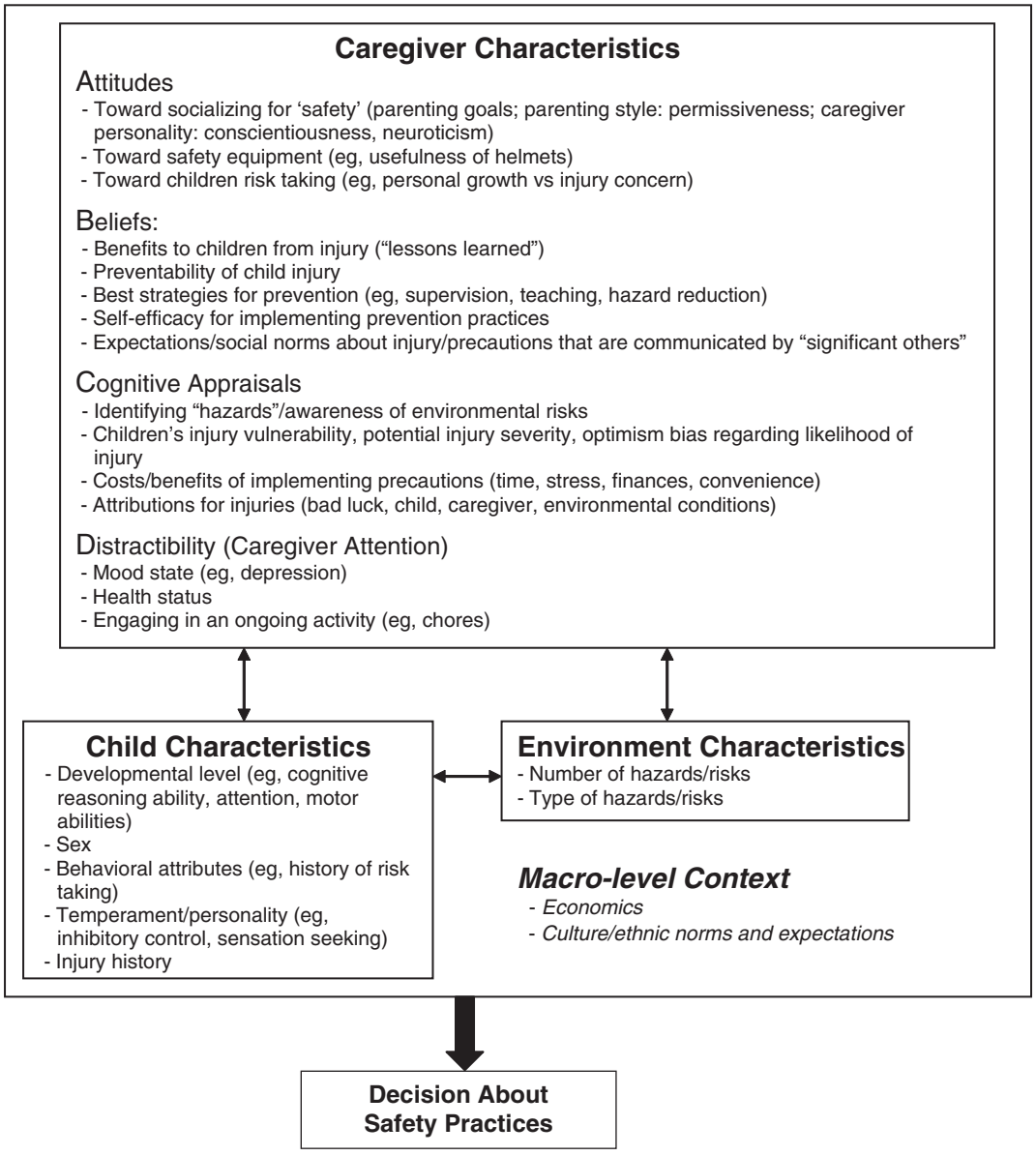
Although it is desirable that parents consistently engage in the highest level of supervision possible to prevent injuries to children, evidence indicates this is not often the case. Consistent with social-cognitive models of health behavior,[71] research has shown that parents are strategic in allocating effort and, therefore, their strategies for preventing injuries to their young children vary depending on their appraisals about injury (eg, occurrence, their child's personal vulnerability, potential injury severity, attributions for injury to bad luck), as well as parent characteristics (eg, personality, parenting style), environmental context (eg, presence of hazards), and perceived child attributes such as age or personality.[34,43,72-77] Parents expend more efforts in child safety if, for example, they believe

- resulting injuries are likely to be severe,
- their child is particularly vulnerable (eg, because of age),
- the level of inconvenience is low,
- they have the potential to lower risk and prevent injury.

An evidence-based conceptual model (see Figure 1) illustrates the multidetermined nature of childhood injury risk,[23]

Figure 1.

Empirically derived conceptual model representing the dynamic interplay of factors that affect caregivers' decisions about whether to implement safety precautions to prevent injury to young children. Adapted from Morrongiello and Corbett.[94]



and similar complexity is emerging in research examining links between caregiver supervisory behaviors and children's risk of injury.

A relation between level of supervision shown by caregivers and frequency of children's injuries has been reported in a number of studies. In a prospective study of children's minor injuries in the home, the patterns of supervision provided by parents to 2- to 3-year-olds at the time of injury revealed 5 levels of supervision, and as supervision level decreased, there was an increase in the frequency of children's injuries.[34,77] Similarly, research relating reports of supervision on a questionnaire measure (PSAPQ,[28,29]) to children's injury histories revealed that mothers who more strongly endorsed statements indicative of supervision (eg, "I keep a close watch on my child") had children with a history of fewer injuries. Most recently, in a study applying a case-control design, the supervision provided to "injured children" (cases) at the time of injury was compared with that experienced by same-age/sex-matched "uninjured ill children" (controls) the last time they did the play activity that resulted in injury to their matched case, with all

children recruited at the same hospital emergency department to match for demographic characteristics.[78] Results revealed significantly lower levels of supervision for injured than uninjured children, and this pattern emerged across several measures of supervision. Thus, a variety of measures of supervision reveal that when young children are injured (minor or medically attended), there is often reduced supervision at the time.

In considering the broader question of how caregivers *routinely* supervise, however, the complexity of the relation between supervision and injury risk becomes more evident. Research examining how often children routinely experience different types of supervisory patterns when at home reveals that lower supervision levels (eg, child out of view of supervisor) occur for about 8% of young children's awake time when at home with a parent.[43] The fact that not all children incur injuries under reduced supervision conditions, however, raises questions about why reduced supervision poses greater injury risk for some children than for others.

One possibility is that child behavioral attributes *interact* with supervision to increase injury risk for some children. In a study aimed at addressing the issue of whether supervision statistically moderates the relation between child behavioral attributes and injury risk, Morrongiello and her colleagues[34,76] found that not only were mothers well aware of their child's behavioral attributes and altered their level of supervision accordingly, but supervision moderated the relation between several of children's behavioral attributes and injury outcomes.[79] For example, children who scored high in behavioral intensity had a history of more medically attended injuries when their parents reported reduced supervision but not when their parents reported close supervision. Thus, close supervision functioned to counteract the elevated risk of injury typically found for temperamentally difficult children.[80,81] On the other hand, the child attribute of inhibitory control (eg, child can exercise self-control and resist doing things prohibited by a caregiver) served a protective function and predicted a history of fewer medically attended injuries, even under conditions of *reduced* supervision. Interestingly, the one behavioral attribute that supervision did not moderate was sensation seeking (ie, the tendency to seek novel and excitement-eliciting risky activities). For children high in sensation seeking, there was elevated risk of medically attended injury *regardless* of the level of supervision, whereas for children low in sensation seeking, supervision level influenced risk such that less supervision was associated with more frequent injuries. It may be that children high in sensation seeking are so driven to seek risk-taking experiences[82] that even the presence of a supervisor does not deter them. Figure 1 illustrates this dynamic interplay of factors.

Overall, the pattern of these findings suggests that high levels of supervision can counteract the potential negative effect on injury risk of some child attributes, thereby serving a protective or risk-reducing function, although there are some attributes (sensation seeking) for which this is less likely to occur. Thus, level of supervision often interacts with children's behavioral attributes to influence risk of injury.

Siblings as Supervisors

Additional findings that highlight how supervision can interact with child attributes to affect injury risk can be found in the limited research examining siblings as supervisors. Estimates indicate that younger siblings are one third more likely to be injured when supervised by an older sibling, particularly when the supervisee is younger than 2 years of age and there is less than a 2-year interval between children.[83] Although few studies have explored how often siblings act as primary supervisors in North America, 1 study in the United States found that this occurred 8% of the time after school,[84] and another in Canada reported 11% of the time when siblings were awake and at home together.[85] The general assumption is that the risk arises because older children who supervise younger siblings lack the judgment[83] and cognitive skills[86] to effectively deal with young children. Only 1 study, however, has actually attempted to examine how older children supervise younger siblings and to compare this with parental supervision strategies.

Examining injury history scores of supervisees and relating these to the extent of sibling supervision revealed that the more often siblings supervised, the more frequently younger children experienced minor injuries requiring the parent's attention and moderately severe injuries.[85] However, parental reports on how older children (approximately 6 years of age) supervise younger ones (approximately 2 years of age) revealed *no* differences between mothers, fathers, and older child supervisors regarding supervisory patterns and strategies used to gain compliance of the supervisee. What reportedly differed, however, was compliance by the supervisee: younger children were reported to be significantly less compliant when the older sibling was supervising compared to when the mother or father was supervising. In fact, parents' ratings of their younger child's compliance when the older sibling was supervising predicted the younger child's frequency of injury independently of how often the older sibling supervised. Thus, it appears that it is the younger child's noncompliance, not the older child's supervision per se, that most influences the younger child's risk of injury. More detailed examination of sibling interaction patterns over time is needed to confirm this result and gain greater insights into how injury risk arises within sibling dyads. Suffice it to say, at this time, there is evidence that sibling supervision increases a younger child's risk of injury, and the findings suggest that this arises from an interaction of characteristics involving the younger child (extent of compliance) and the older sibling supervisor (supervisory practices).

Environmental Risks

In addition to supervision interacting with child attributes to influence risk of injury, level of environmental risk is also critical. The usual assumption is that proximity to a supervisor enhances readiness to intervene and, therefore, reflects

a high level of supervision associated with reduced risk of injury for children. The findings from a retrospective review of 334 pediatric farm injuries that resulted in death or hospitalization, however, challenge this assumption.[19]

Based on narrative information about the circumstances leading to injuries, patterns of supervision were coded according to attention, proximity, and continuity. Surprisingly, approximately one third of injuries occurred under what traditionally would be interpreted as adequate supervision—namely, supervision was available, proximal, and continuous. Such injuries occur because, on farms, children who are proximal to adults are typically in the vicinity of environmental hazards (eg, machinery, animals) because supervising adults are also farming. Hence, although proximity to a supervisor usually increases readiness to intervene and improves supervision in most contexts, on farms it also often increases exposure to environmental hazards. Coupled with normative unpredictability in how young children behave, this obviously creates risk of injury by increasing the likelihood they will interact with hazards, particularly in the case of preschoolers.[26] Thus, defining adequate supervision is more complex than assuming that greater attention, proximity, and continuity will necessarily translate into a reduction in children's risk of injury. What constitutes adequate supervision will likely need to reflect a consideration of the interactions between the environment and child characteristics, and different definitions of *adequate* are likely to be needed for children in high- versus low-risk environments.[24]

For certain activities and contexts, such as in organized sports, there is debate about not only what constitutes adequate supervision but whose responsibility it is to ensure a child's safety (eg, should a child be expected to know how to behave safely, should parents be present to supervise, are coaches substituting for parents and responsible for supervising every child at all times). Many of these issues remain to be resolved, although there is increasing interest in them.[87]

Strategies to Promote Supervision

It is remarkable how often supervision is mentioned as a risk factor for injury in the pediatric literature but how few prevention programs target supervision. This is particularly surprising given that supervision is also relevant to assessing parenting neglect[88,89] and that effective interventions to improve supervision could also prevent child maltreatment. In fact, a review of the child injury prevention literature reveals a plethora of excellent reports about strategies to increase caregivers' safety knowledge and/or their use of safety devices for hazard reduction in the home,[14-16,18,90,91] but a dearth of studies addressing ways to promote closer supervision practices by caregivers, even though some findings indicate that supervision probably matters more than household hazards for preventing childhood injury.[92]

In a study of caregiver perceptions of factors that led to their child experiencing an injury in or around the home, caregivers did not mention poor supervision as a contributing factor. Instead, they focused on hazards in the physical environment, citing passive prevention approaches as primary ways to improve a child's safety at home.[93] Thus, despite the fact that caregivers recognize that close supervision can promote children's safety,[36] they admit to varying their level of supervision depending on numerous factors and do not seem to recognize or admit that supervisors are implicated when young children are injured. It may be that attributing injuries to hazards instead of to inadequate supervision is important for preserving self-esteem and a positive parental identity.[94] The challenge then is to identify messaging strategies aimed at improving supervision that do not evoke defensiveness and challenge parenting identity.

A recent study aimed at testing parental reactions to different types of messages about supervision suggests several possible strategies that merit further investigation and may prove useful in developing programming to motivate caregivers' supervising closely. Because parents prefer parenting information in a video format[95,96] and this standardizes message delivery, the investigators used this approach to present different types of messages and evaluate parental reactions to each.[97] The 20-minute video comprised 3 phases and incorporated different messaging strategies into each. As shown in Table 1, the different messages elicited distinct cognitive and emotional reactions that promoted a readiness to change and culminated in parents committing to changing their supervisory patterns and more closely attending to their child when at home. Interestingly, there was one aspect of the video that parents reacted against and advised it be removed: the message that "injuries are not accidents" was interpreted as blaming parents and evoked defensiveness. Parents also suggested that a message be added to acknowledge the pressure they feel to do chores and clean and to advise against having this interfere with closely supervising. A variety of messaging approaches, therefore, may be used effectively to affect parental supervision.

Conclusion and Future Directions

Realization that young children experience many injuries in the home[98] highlights the potential role that supervision can play to moderate risk. Increasing evidence is now accumulating to confirm what many have assumed for years—namely, closer supervision can reduce the frequency of children's injuries. Indeed, several studies provide evidence supporting the relationship between level of supervision and frequency of children's injuries.[34,77,78] However, several important issues remain unaddressed. First, interpretation of findings is complicated by the fact that not all children who receive reduced supervision incur injuries,[43] suggesting that child behavioral attributes interact with contextual characteristics to influence risk and, therefore, the need for supervision. There is some evidence to suggest that close supervision can serve a protective function with children who have certain high-risk attributes (eg, high-intensity behavior) but not other attributes (eg, sensation

Table 1.

Messaging Approach and Influence on Cognitive/Emotional Processes Leading to Intentions to Change Supervisory Behaviors

Video Phase	Aim of Message	Messaging Approach	Cognitive and Emotional Targets	Sample Quotes From Viewers
1	Educate about unintentional injuries (ie, falls, drowning, burns, and poisonings) and evoke interest in knowing more	• Injury statistics • Injury images • Long-term consequences of injury • Mood-inducing sound effects	Increase fear and perception of child's vulnerability for injury	*It's not only what can happen but what has happened!*
		• Discuss unique hazards	Increase attention to and interest in safety information	*I started thinking now of how I had overlooked and missed things and I realized I need to pay more attention here.*
		• Parent testimonials • Questions posed to viewer	Recognize similarity between parent on video and self Increase realization that parent could more closely supervise to minimize risk	*Oh my, I've done that, that's me! Now I'm starting to think "what if."*
2	Empower parent	Reinforce that • Children depend on their caregivers to keep them safe • Do not ignore "doubts" about leaving a child alone • Parents have many positive characteristics, but no one is perfect • Most parents are capable of making even better choices about supervising their children	Increase readiness for change by increasing motivation and self-efficacy	*Oh I've had that feeling, and you try to ignore it, but it's there and you're wondering, "Should I go do this and leave him or not?"* *No parent is perfect. We all can do a better job supervising, at least some of the time.*
3	Acknowledge potential barriers to behavior change and suggest strategies to address these and encourage viewers to problem solve too	• Suggest solutions to common barriers • Normalize parental concern about injuries and emphasize each parent's need to problem solve to more closely supervise	Acknowledgment of ability to improve supervision to decrease child injury risk Reflecting on one's own barriers to supervision and developing solutions	*There are some things that I am going to change in my day-to-day life and the way that I take care of him . . .* (examples cited) *Just leaving children in the room with . . . I'm going home tonight for sure and change that habit.*
			Behavior change intentions	*After seeing this video, I'm going to change my habits!*

seeking).[80,81] These findings make it difficult to prescribe a fixed set of guidelines for what constitutes adequate supervision. Another challenge arises from research on pediatric farm injuries, which suggests that increased proximity does not always lead to decreased injury risk. Thus, any definition of adequate supervision may need to vary for high- versus low-risk environments.[26]

A final gap exists in our knowledge concerning supervisors other than mothers—notably, fathers and older siblings. A few studies have compared mothers' with fathers' beliefs about the need for supervision of their young children,[99] as well as reactions to their toddler's risk-taking behaviors,[100] and found no differences. Nonetheless, school-age children report that fathers are more likely than mothers to tolerate risks when supervising children.[101] Thus, it may be that differences in supervision styles between mothers and fathers emerge as children develop and become increasingly independent. Longitudinal research is needed to address this important issue. Similarly, despite the relative frequency of sibling supervision and evidence that this increases risk of injury for younger children, to date, only 1 study has examined this issue directly.[85] Additional research is warranted to understand why injury risk increases when older siblings supervise younger ones.

Obviously, gaining a solid understanding of the role of supervision in child injury risk has important implications for clinical practice in anticipatory guidance. Helping parents and supervisors implement "best practices" could save lives. The development of effective programs and appropriate counseling strategies to improve supervision of children is critical, especially because most caregivers do not provide continuous, proximal, and focused attention to their child at all times. It is hoped that the recent identification of effective messaging approaches to achieve this aim will lead to the development of specific evidence-based approaches that can be adopted by lifestyle medicine and family practitioners, as well as in prenatal classes, to reduce childhood injuries.

Acknowledgments

Preparation of this article was supported by grants to the first author from the Social Sciences and Humanities Research Council of Canada and the Centers for Disease Control and Prevention, as well as by a scholarship to the second author from the Social Sciences and Humanities Research Council of Canada. AJLM

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