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Impact of multiple children on parental supervision practices, parental developmental competence, and unintentional injury risk

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ABSTRACT

Unintentional injury is the leading cause of childhood mortality and morbidity in the United States. The effects of injury on children, families and society encompass physical, mental, emotional, and financial consequences. The highest injury rates are among preschool age children, a particularly injury vulnerable population. Injuries are even more frequent for preschool children who have siblings. Child injury prevention strategies can reduce the rates of childhood unintentional injuries and minimize the burdens to children, families, and society created by these injuries. To design and implement effective child injury prevention strategies, further investigation is needed to understand the relationship between the variables influencing the occurrence of child injuries. The specific aim of this study was to describe relationships between the injury variables of sibling presence, parental supervisory beliefs and practices, parental developmental competence and implementation of home safety modifications.

This descriptive study included 130 parents of preschool children between the ages of 30 months and 59 months. Parents completed a self-report questionnaire collecting data regarding parent developmental competence, beliefs about supervision, supervisory attributes, home modification behaviors, child injury history, and child and parent demographic information.

Based on higher child injury rates within multiple child families, it was hypothesized that significant relationships existed between the presence of siblings and parental developmental competence, parent supervisory beliefs and behaviors, and home modification behaviors. Analysis of the questionnaire data revealed no significant relationships between the presence of a sibling and parental developmental competence, beliefs about supervision, supervisory attributes, and home modification behaviors.

The lack of significant relationships between the study variables suggests that the causes posited for the increased rates of child injury in multiple child families are not significant contributors to the increase in injury risk. The lack of demographic variability in the study could be a contributing factor to the non-significant results. Further research is needed to sample a more diverse population and investigate the injury variables impacting higher injury rates among children. The most important finding of this study is the overwhelming lack of parental developmental competence which will be investigated further for a relationship to injury risk among all preschool age children. Effective injury prevention strategies for this vulnerable population depend on an evidenced based understanding of child injury variables and parent education aimed at decreasing child injury risks.

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CHAPTER I

Introduction

Unintentional injury is the leading cause of childhood mortality and morbidity in the United States (Borse et al., 2008). Every day, 20 children die from unintentional injury events, which is more than all disease causes combined. Annually, 12,175 children below the age of 19 die from an unintentional injury and 9.2 million children are treated in the Emergency Department for an unintentional injury. Medically attended non-fatal injuries affect 20 million children annually, restricting mobility, growth and development (Borse et al., 2008). Childhood unintentional injury affects children, families, health care providers, and society. Research into the interaction of predictable factors leading to childhood injury is needed to inform the development of effective injury prevention strategies and reduce the rates of childhood unintentional injuries.

Childhood Unintentional Injury

Childhood unintentional injuries result in medical, physical, and social burdens that directly impact children and their families. Lifetime medical costs of injuries, which are predominately medical costs associated with post-injury treatment, totaled an estimated $11.9 billion for children 0 to 14 years of age in 2000 (Finkelstein, Corso, Miller, & Associates, 2006). This figure excludes the indirect costs associated with childhood unintentional injury, including non-medical expenditures and quality of life and productivity losses to children for the remainder their lives. Lifetime productivity losses for injuries among children ages 0 to 14 years were estimated at $38.6 billion in

2000 (Finkelstein et al., 2006). For children, the greatest impact of injury is the lifetime loss of productivity. Osberg, Kahn, Rowe, and Brooke (1996) note that this figure also excludes the costs to the child's family including parents' lost productivity time at work and the strain to family finances. Depending on the severity of the injury event, injuries represent the loss of quality-adjusted life years for the affected child, as well as financial and productivity losses to the child's family and society.

In the United States, unintentional injury is responsible for higher rates of morbidity and mortality among children than all other causes combined (Borse et al., 2008). In addition to the pain and suffering of children and families, medical costs, societal costs, and family costs are a huge health burden in the United States. Prevention of unintentional childhood injuries is a goal for injury researchers and health care providers. Philippakis et al. (2004) reviewed unintentional injury rates and trends noting that with current technologies, one-third of unintentional childhood injuries are preventable. Multiple injury prevention strategies have been implemented and researched for effectiveness in decreasing child injury rates. Despite the research and resources dedicated to preventing childhood unintentional injuries, unintentional injury remains the leading cause of childhood morbidity and mortality.

Scope and Significance of Problem

Preschool age children, who are one to four years of age, are particularly vulnerable to unintentional injury events. Borse, et al. (2008) reviewed data from medically attended injury events in the United States reporting an unintentional injury incidence rate for preschool age children of 12,873 injuries annually per 100,000 children from 2001 – 2006. At this rate, almost 13% of preschool age children have an

unintentional injury event each year. The leading identified causes attributed to medically-attended injury events were falls and being struck by/against an object. In the five year period between the years 2000 – 2005, 10,203 preschool age children died in an injury event. The leading causes of injury deaths were attributed to drowning, pedestrian related injuries, and fires/burns. The majority of injuries to preschool age children occur in the home environment, which is the primary focus of preschool injury research (Baker, O'Neill, Ginsberg, & Li, 1992). Home safety modifications, such as fitted stair gates, safe storage of sharp objects, restricted access to cleaning products, and functioning smoke detectors, have been designed to decrease injury events. While some of these injury prevention strategies have demonstrated effectiveness, further injury event research and prevention strategies are needed as preschool injury rates continue to remain high.

In addition to investigating prevention strategies, injury researchers focus attention on the child, parental, and family attributes that interact in an injury event. The complex interaction of factors requires injury researchers to consider not only each individual factor's influence on child injury risk, but also how those factors interact and effect injury risk (Simpson, Turnbull, Ardagh, & Richardson, 2009). For example, injury rates among children in single child households are lower than injury rates of children in multiple child households but there is no research investigating this difference (Scholer, Mitchel, & Ray, 1997). Injury prevention strategies aim to reduce the child's injury risk exposure by targeting one or more of the injury variables, but have limited effectiveness depending on the variable the strategy targets. The potential for reducing child injury rates lies in understanding the complex interaction of variables for the vulnerable child

population and then modifying those variables to change key interactions, ultimately reducing injury rates. Unintentional injury remains the leading cause of morbidity and mortality in children with preschool age children having the highest rates of all groups. Further research is merited to understand the variability of the injury rates and what predisposes preschool children to higher levels of injury risk, with the ultimate goal of decreasing injury rates.

Research Questions and Assumptions

Despite the efforts of child injury researchers and health care providers to understand injury events and implement effective injury prevention strategies, preschool age children continue to have high rates of fatal and non-fatal preventable injuries. The complex interaction of child, family, and environmental factors predispose preschool children to injury risk at higher levels than other children. Developmentally, preschool children are changing and growing physically, cognitively, and emotionally. Parents are the major influence on the child's family and environment. Parents' knowledge of child development is learned from a variety of resources and informed by life experience. Parental developmental knowledge is assumed to affect parenting style, supervision, supervisory practices and injury prevention home modification. Research is needed to understand whether a relationship exists between injury risk and parental developmental competence, or knowledge. The concept of parental developmental competence, as a mediating factor in preschool injury risk, is being investigated in a larger study of which this research is involved. This study adds to the larger study by investigating whether a relationship exists between parental developmental competence, supervisory beliefs and behaviors, home modification practices, and the presence of siblings. This study was

built on the assumption that there is a relationship between parenting style, parental supervision, home modification and parental developmental competence. The specific aim of this study was to describe the impact of sibling presence on parental supervisory beliefs and practices, parental developmental competence and implementation of home safety modifications. Sibling presence has been demonstrated to increase child injury risk and this research seeks to determine if differences related to injury risk exist in supervision, supervisory practices, developmental competence, home modification behaviors, and demographics between households with single children compared to households with multiple children. The specific aim of the study is reflected in the following research questions:

1. Do parents of a single child household have different beliefs about supervision and supervisory practices than parents of a multiple child household?
2. Do parents of a single child household have different beliefs about development than parents of a multiple child household?
3. Do parents of a single child household have different home modification practices intended to prevent child injuries than parents of a multiple child household?
4. Are selected demographic characteristics a significant predictor of the sub-scale scores on parental supervision, supervisory practices, beliefs about development and home modification practices?

CHAPTER II

Review of Literature

Unintentional injury is the leading cause of childhood mortality and morbidity in the United States. Considering children 14 years of age and younger, children from one to four years of age have the highest rate of childhood injury events. Between 2000 and 2005, 10,203 children between one to four years of age died related to an unintentional injury event (Borse et al., 2008). Nonfatal injuries to children ages one to four years old occurred at an annual rate of 12,873 per 100,000 children for the five year period between 2001 and 2006. The preschool age group represents the highest injury rate among all children 14 years of age and younger. For the same time period, children below the age of one year had a nonfatal injury rate of 5,870 per 100,000 children, children between the ages of five to nine years had a nonfatal injury rate of 9,311 per 100,000 children and children from 10 to 14 years had a nonfatal injury rate of 11,220 per 100,000 children. Researchers have dedicated resources to understanding and reducing childhood injury morbidity and mortality. However, these injuries remain a large public health burden. This chapter presents the conceptual framework for this study and review current childhood injury literature.

Conceptual Framework

Children can be injured in intentional and unintentional injury events. This research study focuses on unintentional child injury events. Intentional injuries result from the "planned, premeditated intentional conscious desire to wound or inflict trauma" (Sommers, p. 315, 2006). Examples of intentional injuries are homicide, assault, and child abuse and neglect and are not discussed as a part of this review of literature.

Unintentional injuries result from "sudden, unanticipated traumatic events" (Sommers, 2006, p. 315). Examples of unintentional injuries are what many have considered as accidents such as falls, drowning, pedestrian related injuries and motor vehicle collisions. Unintentional injury events are not viewed as accidents, but rather as events with a predictable interaction of phases and factors.

Epidemiology is the modern scientific approach for understanding injuries. In the early stages of injury research, injuries were thought of as accidents caused by the weaknesses of the person (DeHaven, 1942). In 1942, DeHaven published a classic paper describing injuries as the result of forces exceeding the body's injury threshold through the dissipation of energy during an injury event. Studying persons surviving falls from heights greater than seven stories, DeHaven concluded that these falls were survivable when structures redistributed the mechanical energy away from the person. DeHaven (1942) found environmental modification decreases the severity of injury events.

Haddon (1968, 1972) further elaborated this idea into the Haddon matrix, thus providing a conceptual framework for injury research (Barnett et al., 2005). Today, the United States Department of Transportation identifies the Haddon matrix as the ideal framework for injury prevention research (Department of Transportation, Bureau of Transportation Statistics, 2002). The matrix is simple, yet comprehensive and applicable to various injuries. It provides a framework for considering phases, injury causes, and injury prevention policy opportunities. Table 1 is an illustration of preschool child unintentional injury within the Haddon Phase-Factor matrix.

Table 1.

Haddon Phase-Factor Matrix for Preschool Unintentional Injury

Factors / *Phases*	**Host - Child Factors**	**Energy Agent**	**Environmental/Family Factors**
Pre-injury	• Gender • Age • Cognitive development, comprehension of safety rules • Physical developmental abilities • Risk taking behaviors	• Mechanical and physical forces that cause damage to body • Varies with mechanism of injury. For example, in falls- height of fall, landing surface, Body position after fall	• Parental supervision • Parenting style/ attributes, presence and enforcement of safety rules • Sibling presence • Parental developmental competence • Socioeconomic status • Home hazard exposure

Haddon (1968) defined the phases of an injury as "pre-crash, crash, and post crash". These correspond to primary, secondary and tertiary prevention. The pre-crash, or pre-injury, phase refers to the time before an injury and includes interactions between the child, energy agent, and environment. The crash, or injury, phase is when the energy transfer occurs, exceeding the physical capacity of the person and resulting in injury. Events occurring after an injury are part of the post crash, or post injury, phase. The terminology of crash was originally developed to explain the variables in a motor vehicle collision, but the concept of crash can be applied to the energy forces involved in any injury event. This research focuses only on the pre-injury phase of the Phase-Factor Matrix as indicated in Table 1.

The factors or concepts associated with injuries are similar to the epidemiologic concepts of host, agent, and environment in disease epidemiology (Haddon, 1972). Human factors are those that characterize the person who may be injured. For this research study, the human factors are termed child factors. The child factors associated with preschool unintentional injury include gender, age, cognitive development, physical developmental abilities, and risk taking behaviors. Boys are injured at rates greater than girls. As already discussed, preschool age children have higher injury rates than any other child age group. Cognitively, preschool children have not developed the ability to process and assess risk and are therefore at greater risk of engaging in injurious scenarios even if the parent has established safety rules for behavior. A preschool child's physical development includes developing balance, running, jumping, and other gross and fine motor skills. The more risk taking behaviors a preschool child demonstrates, the greater the injury risk for that child. Energy factors for injury events vary depending on the mechanism of the injury. Falls will be discussed as an example in this review of literature. Environmental and family variables encompass all of the factors surrounding the child. Parents are the largest influence on a preschool child's environment. Parental supervision, parenting style, sibling presence, and parental developmental competence all impact the child's injury risk. The home environment, including home hazard exposure and home safety modification, and socioeconomic status also impact a child's injury risk. Each of these factors will be discussed in greater detail later in this review of literature. By applying Haddon's phase-factor matrix, researchers are able to identify the dynamic processes and variable interactions occurring during injury events and provide definitions

to these factors and phases that provide researchable context for what used to be considered as accidents determined by fate.

Complex Interaction of Variables

Child injury is a complex interaction of variables including child factors, energy factors, and environmental factors that will be discussed throughout this review of literature. To understand the interactions of these variables, Figure 1 illustrates the interactions of the variables as well as the impact on the pre-injury phase of an injury event and child injury risk.

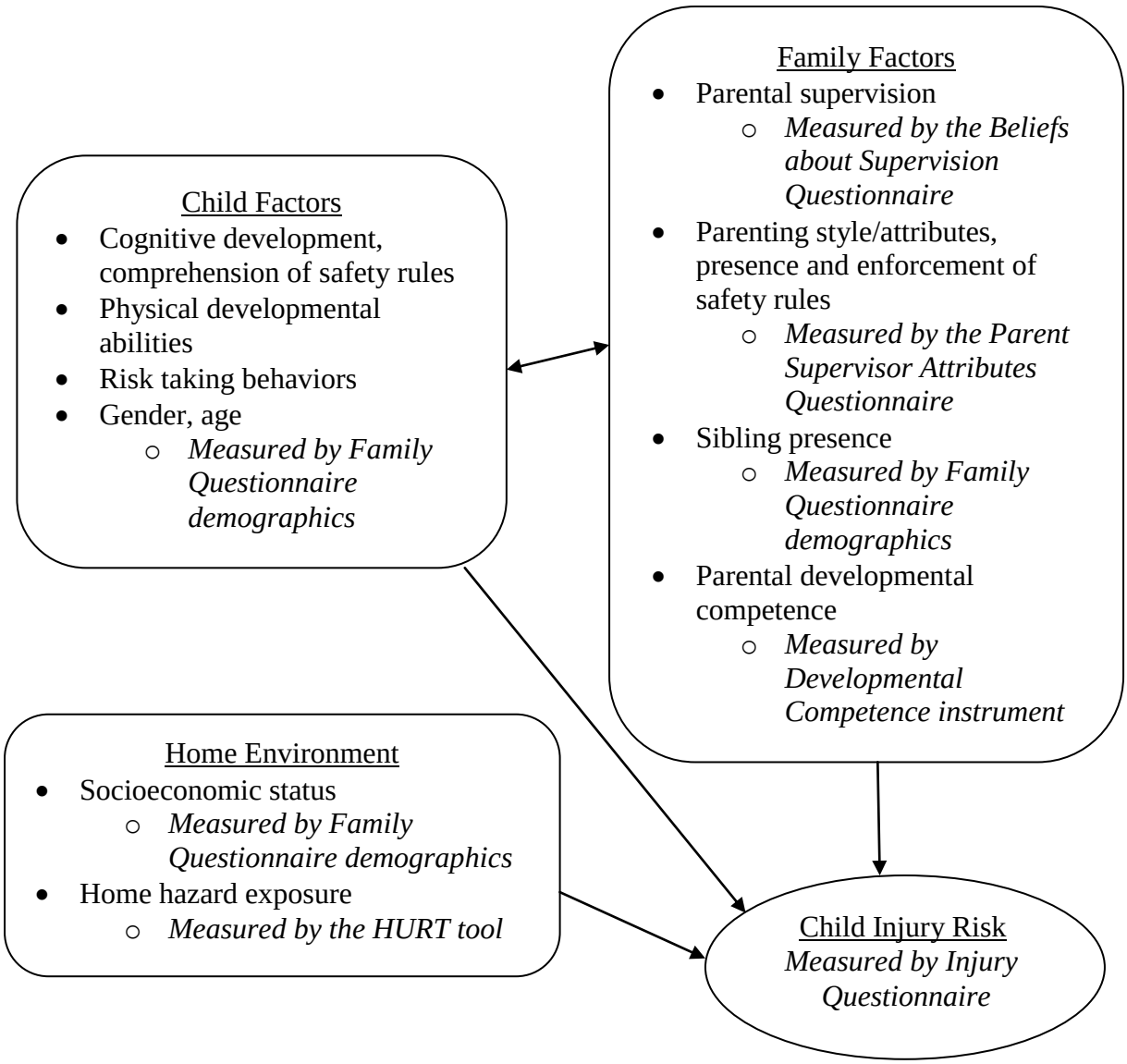

Figure 1 – Pre-Injury Preschool Child Unintentional Injury Factors

The focus of injury research is the development of an understanding of the factors that increase a child's risk for injury. However, much remains to be studied about how these variables impact one another and how that interaction affects child injury risk.

Epidemiology of Childhood Injury

The focus of injury research has been directed at factors hypothesized to have the greatest impact on reducing the rate and severity of injuries. For this literature review, a literature search was conducted utilizing the *CINAHL, Medline*, and *PsychInfo* electronic databases. The databases were searched with the terms *child, preschool child, toddler child, injury prevention, injury, and wounds and injuries.* The results were limited to articles from 1995 to the present. SafetyLit, an electronic list service of injury literature, was also used to locate articles under the categories of *infants and young children* (Center for Injury Prevention Policy and Practice at San Diego State University and the World Health Organization, 2010). Additional articles were found through manually searching the bibliographies of the articles reviewed during the initial article collection process. Inclusion criteria were methodological quality of the research, such as adequate power and statistical significance, publication in a peer-reviewed journal, and applicability to this selected topic.

Child Factors and Childhood Injury

The CDC Childhood Injury Report identifies a variety of causative mechanisms for injury events in children one to four years of age (Borse et al., 2008). From 2000 to 2005, the leading causative mechanisms for injury related deaths among children one to

four years of age were transportation related injuries (4.2 per 100,000 children), drowning (3.0 per 100,000 children), and fires/burns (1.5 per 100,000 children). The leading causative mechanisms for nonfatal injuries from 2001 to 2006 for children one to four years of age were falls (5,531 per 100,000 children), struck by/against an object (2,411 per 100,000 children), and bites/stings (1, 116 per 100,000 children). Other leading causative mechanisms for nonfatal injuries were transportation related injuries, which includes pedal cyclist and pedestrian mechanisms, foreign body related injuries, and cut/pierce injuries. Each of these causative mechanisms represents a unique interaction of energy forces that leads to a childhood injury.

The childhood injury literature identifies multiple child risk variables that are associated with increased risk and incidence of childhood injury events. Age is an injury risk factor for toddler and preschool age children. From 2001 to 2006, children one to four years of age had an injury rate of 12,873 nonfatal injuries per 100,000 versus an overall injury rate of 11,272 per 100,000 for all children 0 to 19 years of age (Borse et al., 2008). Multiple developmental and cognitive factors predispose toddler and preschool age children to injury and these will be discussed here.

Biophysical Development. Children in the later toddler and preschool stages of development are continuously building and advancing fine and gross motor skills. Physical development is a continuous process that evolves throughout childhood. The toddler stage of development includes children from 12 to 36 months (Murray, Zentner, & Yakimo, 2009). During the late toddler stage, children from 30 to 36 months increase gross motor coordination. Typical developmental milestones in the late toddler stage include ability to balance on one foot, climb and descend stairs with alternating feet,

assemble puzzles, draw, and paint. During this stage of development, visual acuity improves but depth perception remains immature. Fine motor skills remain challenging for late toddlers due to poor muscle control and a lack of patience and judgment skills.

Children from 36 to 59 months are considered to be in the preschool stage of development (Murray et al., 2009). During this stage, fine and gross motor development continues with improved visual discrimination and eye-hand coordination. During the third year, children are typically able to pedal a tricycle, walk backwards, climb stairs with alternating feet, and hop. By the fourth year, children can run with coordination, skip clumsily, hop on one foot, climb stairs without holding onto handrails, and dress and undress self, including clothing with buttons and zippers. In the fifth year, children are typically able to run with speed and agility as well as come to abrupt stops while running. Other developmental milestones in the fifth year include agility maneuvering rocky inclines, jumping rope, hopping and skipping on alternating feet, and kicking a rolling ball. As with all development, a child's fine and gross motor skills are acquired according to the individual abilities of a child and children do not achieve these milestones at the same pace. It is important for parents and health care providers to understand each child's abilities and limitations and not underestimate or overestimate a child's motor development when engaging the child in play and other activities.

Gender and Age. In the preschool age population, gender and age are identifiable risk factors for unintentional injury. Boys have greater injury rates than girls and the preschool age group has a higher injury rate than any other child age group. For the five years from 2001 to 2006, the CDC reported an injury rate of 14,444 per 100,000 among boys age one to four years versus an injury rate of 11,228 per 100,000 for girls

age one to four years (Borse et al., 2008). Multiple descriptive research studies found similar increases in injury rates for boys versus girls. In South Carolina, Dal Santo, Goodman, Glik, and Jackson (2004) conducted 159 in-home interviews and safety observations with mothers of toddler and pre-school age children regarding the child's injury patterns. Regression analysis of the descriptive data revealed preschoolers over 2.5 years of age were 2.6 times more likely (B = 0.934, 95% CI, 1,448, 4,473) to suffer a serious injury than younger children. Khambalia et al. (2006) conducted a review of literature for childhood falls and synthesized the results of 14 studies. The data analysis revealed that age, gender, and low socioeconomic status were the most consistent risk factors for injury events. Falls are the leading cause of unintentional injury among toddler and preschool age children (Borse et al., 2008). Energy factors and injury mechanisms will be explored later in this review of literature. Young children between the ages of zero to six years were found to have the greatest risk of injury from falls. Boys have consistently higher rates of injuries than girls. Additionally, children from lower socioeconomic backgrounds have higher risk for fall-related injury.

Cognitive Development. Preschool age children are in the preoperational stage of cognitive development (Wadsworth, 1989). During this stage of development, a child progresses from sensori-motor to the ability to conceptually represent objects and events through internal thought. The sensori-motor stage of development occurs over the first two years of life and is characterized by the child's exploration of the world through senses, such as taste and touch. Thinking at this stage is carried out through actions and movement produces thought. As children move from the sensori-motor to the pre-operational stage of cognitive development, symbolic play, drawing, mental imagery, and

spoken language develop as mechanisms for representing objects and events (Wadsworth, 1989, p. 59). Children are able to think through representational thought and are not restricted to thoughts only through actions. Throughout the preoperational stage of cognitive development, children are continuing to evolve towards the next stage of cognitive development. Concrete operational thought, characterized by a child's ability to engage in logical thought, is the stage that follows preoperational thought. Cognitive development does not occur all at once, it evolves over time and as with all development, not all children follow the typical age and abilities parameters set forward as typical cognitive milestones.

Preschool age children in pre-operational development are restricted from logical, concrete thought by a variety of characteristics including egocentrism and inability to conceptualize reversibility (Wadsworth, 1989). With an egocentric perspective, a preschool child cannot consider the viewpoint of others and sees only his/her thoughts as logical and correct. They do not realize how actions impact one another and how their behaviors can put themselves and others at risk for injury. Reversibility is the ability to reverse an event and follow the line of thought or reasoning back to where the event began (Wadsworth, 1989, p. 72). Being unable to consider an action back to its source leaves a preschool age child unable to consider the steps leading up to an injury event and the danger of a situation even after the injury occurred.

After a child has evolved through the preoperational stage of cognitive development, he or she enters the concrete operational stage. Children typically do no enter this stage until age 7 years old (Wadsworth, 1989). During the concrete operational stage, children develop systematic reasoning skills that allow them to analyze situations

and structure the environment into meaningful context based on previous experiences. The ability to reason through a situation and apply the concept of reversibility is how a child can assess the risk of a situation to understand the cause and effect of hazardous situations. The following of safety rules prior to this stage of cognitive development occurs only through memorization and repetition, not an assessment of risk. Not having reached the concrete operational stage of cognitive development, the typical preschool child is not able to associate cause and effect in a consistent way that produces a logical understanding of safety rules and behaviors.

Safety Rule Cognition and Preschool Injury. Child-based injury prevention strategies have limited success among the toddler and preschool age populations. As discussed, the cognitive developmental level of young children does not provide for consistent comprehension, recall, and application of safety rules. The child factors discussed in this review of literature such as age, gender, and risk-taking behavior cannot be directly modified, but are important considerations in the utilization of environmental modification and supervision discussed later in this review of literature. Safety rules and maternal enforcement of safety rules are examples of child-based injury prevention strategies. The presence of safety rules is an environmental variable related to parenting style, including creation of safety rules, will be discussed later in this review of literature as an environmental variable.

In a study of four to six year old children, Morrongiello, Midgett, and Shields (2001) found children were able to spontaneously recall only 46% of home safety rules indicated by their parents. Children who behaved in ways that complied with home safety rules experienced fewer injuries ($r = -0.34$, $p < 0.01$) but with such inconsistent

recall, child safety rules did not provide a significant prediction of childhood injuries. The results indicate parental assumptions about a 4 year old child's ability to recall and apply safety rules are not valid, hence safety rules do not provide a consistently reliable injury prevention strategy for young children.

To further examine the relationship between pre-school children's injury risk and safety rules, Morrongiello, Corbett, Lasenby, Johnston, and McCourt (2006) examined teaching strategies and parenting styles of mother's of 24 to 42 month old children. During a structured interview, mothers provided information on parenting styles, teaching strategies for home-safety rules and any medically attended injuries for her child. Mothers with a permissive teaching style were more likely to apply fewer safety rules and rely on explanations as a strategy for teaching safety behaviors. A logistical regression of the data revealed that a permissive parenting style was a significant predictor of medically-attended child injury with an odds ratio of 2.7 times greater injury risk for every one standard deviation increase in permissiveness ($M = 25.53$, $SD = 5.15$). The effect of parenting style was still a significant predictor of injury even after controlling for the risk factors of child age and gender. The results of the study indicated safety rules can positively impact child injury risk, but the authors suggested that further investigation of the relationship between parenting style, safety teaching strategies and safety rule enforcement was indicated to better understand the impact on child injury risk.

Risk-taking behaviors. Risk-taking behavior is a risk factor for injury. Canadian researchers Morrongiello, Ondejkio, and Littlejohn (2004) conducted a descriptive study of parental injury report and found boys had higher injury rates than girls. The researchers completed an ANOVA with sex as a between-subject factor for injury and the

results indicated that boys experienced more injuries for the 6 month period preceding the study ($F = 34.09$, $p < 0.001$) as well as more serious injuries. Boys were also found to have a higher sensation-seeking score than girls (Morrongiello et al., 2004). Sensation seeking is associated with daring and thrill-seeking behaviors and the need for risk exposure (Morrongiello & Sedore, 2005). Higher sensation seeking scores are positively associated with increased risk taking behaviors, suggesting that those children are more likely to engage in higher risk behaviors. Hierarchical regression analysis of the data was conducted to determine the most significant predictors of childhood injury. Gender ($\beta = -0.20$, $p < 0.001$), risk-taking behavior ($\beta = 0.81$, $P < 0.001$), and parental protectiveness characteristics ($\beta = -0.31$, $p < 0.001$) accounted for 64% of the variance in injury rates (Morrongiello et al., 2004).

Socioeconomic and Demographic Variables. As with all health outcomes, a child's socioeconomic status has an impact on injury risk. In the *World Report on Child Injury Prevention* sponsored by the World Health Organization and UNICEF, socioeconomic variables regarding economic status, social status, family structure, and housing were all indicated as influences on child injury risk (Peden et al., 2008). Parents in poor households may not be able to afford safety modifications and equipment or be able to provide proper supervision for children when the children are not in the care of the parents. Children in poor households may be exposed to environmental hazards such as unsafe structures, inadequate areas for safe play, and close proximity to traffic. Parents and children living in poor areas may not have ready access to quality medical care which has implications for injury prevention and treatment. Family structures such as single parent households, maternal age, number of members of the household, and the

number of siblings also have influence on a child's injury risk. Housing structures and location play a role in injury risk relative to neighborhood safety and overcrowding. Children throughout the world living in deprived socioeconomic conditions are at greater risk for unintentional injury than their peers.

Scholer, et al. (1997) conducted a retrospective study of 803 Tennessee child injury deaths from 1985 to 1994 to investigate maternal and child characteristics associated with injury risk. Child injury deaths were found by comparing birth certificates of children between zero to four years of age during the study period with death certificates and isolating those deaths coded as injury related. In the multivariate data analysis, maternal education had a strong inverse relationship with injury risk. Children whose mothers had less than a high school education had a relative risk of injury death of 2.88 (95% CI, 1.92, 4.34) as compared to children whose mothers had a college-level or higher education. When compared with children born to mothers 30 year of age or older, children with mothers 20 years of age and younger had a relative risk of injury death of 2.42 (95% CI, 1.76, 3.31). The other significant predictor of preschool age injury death was the presence of two or more siblings in the household. When risk assessments were calculated considering a child with two or more of the risk factors of low maternal age, low level of maternal education, and sibling presence, the risk of death increased significantly. Injury mortality rates for a child age one to four years with a college educated mother who was 30 years old or older and had one or no siblings was 5.7 deaths per 100,000 child years. Injury mortality rates for a child age one to four years with a mother who had less than a high school education who was 20 years of age or younger and had two or more siblings was 74.8 deaths per 100,000 child years.

In a cohort study of birth and death certificate data, Hong, Lee, Ha, and Park (2010) studied the socioeconomic status of parents and the influence on injury death rates of young Korean children and found similar socioeconomic indicators of injury risk. Preschool age children from one to four years of age had significantly higher rates of injury deaths when the mother was younger than 20 years old (Hazard Ratio = 1.5, 95% CI = 1.00 - 2.25), the father had a low level of education (HR = 1.5, 95% CI = 1.13 - 1.95), the mother had no or elementary level only education (HR = 1.4, 95% CI = 1.00 - 1.85), and/or the father had a manual level job or was a farmer (HR = 1.3, 95% CI = 1.07 - 1.63). This study expanded on the results of Scholer et al. (1997) by including family socioeconomic indicators, not just maternal socioeconomic indicators. The socioeconomic demographics of a child's family, especially the mother, play a significant role in determining child injury risk.

Energy Factors and Childhood Injury

In an injury event, the energy factors are the mechanical properties and forces that interact with the child to produce injury. For example, in a bicycle injury event, the bicycle, the speed of the bicycle, and the impact surface the rider strikes represent the energy forces. In a fall related event, the energy force of gravity acts on the child with the interaction of gravity and the impact surface producing injury to the child. The mechanical force of gravity on the child is influenced by the weight of the child, the height of the fall, and the speed of descent. The position of the child upon landing will also impact the injury outcome. Younger children have a larger head to body ratio tending to fall head first, producing greater risk of head and brain injuries. The mechanical properties of an injury mechanism, such as cut or pierce by a sharp object,

also contribute to injury risk. Walking with or playing with a sharp object places a young child at risk for injury. To minimize injuries, young children should have limited exposure to energy factors that place the child at risk for injury. Product design changes are a very effective intervention to minimize the preschool child's interaction with injury energy factors and decreasing injury rates (Towner, Dowswell, & Jarvis, 2001). In addition to product design changes, parent education to identify and modify risk exposure is effective at reducing preschool child injury rates.

Environmental Factors and Childhood Injury

Risk factors for childhood injury events also include an exploration of the child's environment and, in particular, the home environment. For a preschool child, parents are the major influence on the child's environment and parenting behaviors are a primary focus of injury research (Wadsworth, 1989). Parents serve as risk identifiers for preschool age children who are unable to accurately assess injury risk situations.

Home Hazard Exposure and Safety Modifications. The majority of childhood injuries occur in the home (Baker et al., 1992). Home safety modifications, such as fitted stair gates, safe storage of sharp objects, restricted access to cleaning products, and functioning smoke detectors decrease a child's exposure to the energy, or the causative factor of an injury event. Multiple research studies determine a relationship between the implementation of home safety modifications and the reduction of child injury rates. King et al. (2001) conducted a randomized controlled trial of 1,172 households with children 8 years and younger to assess the effectiveness of a home visit at improving implementation of home safety modifications and decreasing injury rates. Interventional and control households were assessed for home hazards. After the baseline data were

gathered, the interventional group received a home visit including safety information and instructions on home-specific safety measures. After one year, a second home hazards assessment was completed on both groups. The data analysis demonstrated a statistically significant improvement in the intervention group in only 2 of the 16 home safety modifications measured. However, there was a statistically significant decrease in the injury rates. At the end of the study period, the interventional group had a medically attended injury rate of 0.23 per patient year (95%CI: 0.19, 0.29) compared to the control group medically attended injury rate of 0.31 per patient year (95%CI: 0.27, 0.37). King et al. (2001) did not show a significant change in implementation of home safety modification, but the significant decrease in injury rates suggests a relationship between home modification education and injury protective behaviors which requires further exploration.

In a similar randomized control trial, Watson et al. (2004) investigated the home safety behaviors of 3,428 families with children ages five years and under. The interventional families received a home safety consultation and free or low cost home safety equipment. All families received one and two year follow up questionnaires regarding safety behaviors and child injury events. At the two year follow up, the interventional families had statistically higher rates of safety behaviors for stair gates ($p=0.00004$), smoke alarms ($p=0.00002$, fitted window locks ($p=0.03$), and safe storage of sharp objects ($p=0.0005$) and cleaning products ($p=0.0006$) than the control families. Analysis of medically attended injury rates did not show a statistically significant difference between the control and intervention groups. In the results discussion, Watson et. al. suggested that the lack of impact on injury rates could be related to risk

compensation of the parents with the safety modifications in place but further investigation is indicated to research the relationship between the variables.

A cohort study in England of 1,717 families investigating the relationship between home safety behaviors and childhood injury rates found similar results with a decrease in overall injury rates, but limited significant difference regarding specific home safety behaviors (Kendrick, Watson, Mulvaney, & Burton, 2005). Families with fitted and working smoke alarms (95%CI : 0.51 (0.30 – 0.89)) and indicated safe storage of sharp objects (95%CI: 0.50 (0.27 – 0.93) had significantly lower hospital admission rates for injury. The research indicated a confounding relationship between safety behaviors and injury related hospital admission rates, with the more safety behaviors engaged, the lower the injury related hospital admission rates. Home safety behaviors were also predictive of hospital admission for injury with children in families not safely storing sharp objects having a 4.8 greater chance of hospital admission (95% CI 1.10 – 20.7). Kendrick et al. (2005) suggest that families engaging in home safety behaviors are more likely to engage in other safe behaviors which could provide an explanation to the overall decrease in injury rates, but such a relationship would require further investigation. Home safety modifications are designed to decrease medically attended injury rates, but research does not show a direct positive impact on overall injury rates with home modification. Further investigations are needed to understand the complex interactions of variables involved in childhood injury and home modification to provide anticipatory guidance to parents and health care providers.

Parental Supervision. Parents play an important role in a preschool child's injury risk, especially in the form of supervision. Supervision is commonly measured

according to the supervisor's attention to the child's behavior, proximity to the child, and continuous nature of the supervision (Schwebel & Kendrick, 2009). Supervision patterns vary over a variety of factors including age of child, gender, and social context. Morrongiello, Corbett, Lasenby, McCourt and Johnston (2006) investigated home supervision patterns for children two to three years of age and children four to five years of age. Children in the younger age group were found to be supervised 99% of the average 6.5 hours they were awake and at home, with 84% of the supervision in view of the designated supervisor. Children in the older age group were supervised 92% of the 6.54 hours they were at home and awake and 76% of that supervision was in the direct view of the supervisor. Boys were not as closely supervised as girls. Contextually, children were left unsupervised in living and family room areas as opposed to bedrooms, kitchens, bathrooms and play areas.

Morrongiello, Ondejko, and Littlejohn (2004) conducted a longitudinal study to examine the relationship between parental supervision and child injury rates for children between two to three years of age. The researchers defined supervision in terms of parent's knowledge of the child's location and consistency of parental monitoring of the child's activities. Supervision was then measured on a continuum from no supervision for at least five minutes to direct visual supervision of the child. Children left unsupervised had the highest rates of injuries (Morrongiello et al., 2004). Gender was found to be an unexpected intermediary variable with boys experiencing higher injury rates than girls especially during periods of intermittent supervision and "listening in" ($p < 0.05$). The researchers suggested that intermittent supervision was not as effective for deterring risk taking behavior which was correlated with boys in earlier research and

could explain the increase in injury rates. Further investigation into the relationship between gender and supervision is indicated (Morrongiello et al., 2004).

A case-control study of 35 matched child pairs between the ages of two and six and one half years of age also indicated a protective relationship between parental supervision and injury events (Morrongiello, Corbett, & Brison, 2009). Cases were 35 children who had a medically attended injury. The controls were non-injured children matched to the cases. The researchers interviewed case and control parents regarding supervisory practices. Control group parents were found to have higher scores for the all measurements of supervision including watching, listening, proximity, and overall supervision ($p = 0.001$). In addition, parental attitudes of protectiveness, vigilance and worry ($p = 0.001$) were all significantly higher in the control group. A series of logistic regressions was conducted to determine predictability of injury status based on supervision practices and as supervision increased by one standard deviation, the odds of being in the control, or uninjured group, were 5.38 times greater for each of the cases. This analysis showed a strong, significant, protective relationship between supervision and injury prevention. To assess for confounding variables, the cases and controls were analyzed according to the variables of sensation seeking, behavioral attributes, and demographics finding no statistically significant differences between the groups.

Child Attributes, Parent Attributes. In the discussion of child factors related to injury risk, child attributes such as risk taking, sensation seeking, and temperament were associated with increased risk of unintentional injury. To investigate the interaction between child injury rates, child attributes, and parenting attributes, Morrongiello, Klemenicic, and Corbett (2008) conducted a descriptive study of 124 mothers of children

ages two and one half to five years. Mothers were asked to track information regarding daily activities, parenting characteristics, child characteristics, and injury events over a three week period of time. Regression analysis of the data showed children with higher risk behaviors experienced significantly more medically attended injuries during lower intensity supervision, but not while parent's were closely supervising. Positive parenting behaviors, such as high levels of supervision can mediate child unintentional injury risk even in a high risk child. Morrongiello et al. (2008) discuss the complexity of childhood unintentional injury suggesting further research focus on investigating the interactions of child, parent, and environmental variables and the impact on injury rates.

Parental Developmental Competence. As part of a larger study, this research project is investigating the concept of parental developmental competence and preschool unintentional injury risk. Developmental competence is a parent's understanding of his or her child's developmental level (D. L. Garzon, personal communication, September 29, 2010). The concept is being investigated as a mediating variable to explain a child's risk for injury. If a parent does not understand the developmental level of his or her child, the child will be at greater risk for injury by engaging in activities that are not developmental appropriate. Cognition of safety rules was discussed earlier as a child variable, but the presence of safety rules and the impact of those rules on modifying behavior is a parent or environmental factor. Parents must create the safety rules, but parental developmental competence informs the parent's understanding of whether or not a child's cognitive development allows the child to comprehend and follow those safety rules. A parent who expects and depends on a three year old child to follow a safety rule that is beyond that child's cognitive ability would be exposing that child to greater injury

risk. The larger study is investigating the average age parent participants consider safe for a child to engage in activities that have injury risk. This research study adds to the larger study by investigating whether a relationship exists between sibling presence and parental developmental competence. In the complex interaction of variables that place a child at injury risk, the accuracy of a parent's assessment of development is hypothesized to have a direct impact on a child's injury risk.

The continuum of parental supervision also includes a parent's decision regarding the appropriate age for a child to engage in an activity while unsupervised. As discussed earlier in this review of literature, a child achieves physical and cognitive developmental milestones at varying times depending on the individual child's characteristics and abilities. Porter et al. (2007) conducted a telephone survey of 945 Colorado households with children ages one to fourteen years to explore parent beliefs about supervision. Parents were asked about the appropriate age for a child to take a bath without an adult in the room, cross a busy street without holding hands, and bicycle on a busy street without an adult. The mean age for taking a bath without an adult present was 6.7 years with a range of two to fifteen years. The mean age for crossing a busy street without holding hands was 9 years with a range of three to sixteen years. The mean age for riding a bicycle on a busy street without an adult was 12.2 years with a range of six to twenty-one years. Developmentally, children typically begin riding a bicycle with training wheels at age five and without training wheels by age seven (Murray et al., 2009). Cognitively, children are not able to begin processing the concept of risk until entering the concrete operational stage of development which typically occurs between seven to eleven years of age (Wadsworth, 1989). To assess the risk of crossing a busy street or riding a bicycle

on a busy street, a child must have concrete operational thought to understand the cause and effect of risk. Data was also gathered on risky behaviors such as riding with an impaired driver, riding with a speeding driver, and risky drinking. Increased parent report of risky behaviors was associated with younger child ages for unsupervised activities, suggesting an association between decreased parental supervision and other risky behaviors. Porter et al. (2007) suggested the association between younger ages for unsupervised behaviors and increase in risky behaviors indicates a parental lack of understanding of safe, appropriate developmental behaviors. The authors also discussed the large range of parent opinions regarding age appropriate supervision and suggested further research to investigate parental understanding of child development and age appropriate behaviors and subsequent impact to child injury risk.

Sibling Presence in the Home. For preschool age children, unintentional injury events occur primarily in the home. A variety of factors influence the home environment and therefore a child's injury risk. Sibling presence is a family variable that has been demonstrated to influence child injury rates. As previously discussed in this review of literature, Scholer, et al. (1997) conducted a retrospective study of 803 Tennessee child injury deaths. Within their multivariate analysis, the presence of two or more siblings was found to increase the relative risk of injury death by 2.97 (95% CIs [2.29, 3.85]) when compared to singleton children. The researchers suggested decreased levels of parental supervision with increased numbers of children as a possible explanation, but further research is needed to determine if such a relationship exists.

In Washington state, Nathens, Neff, Gross, Maier, and Rivara (2000) conducted a case-control study of investigating the impact of siblings and birth order on child injury

rates. Cases were defined as children age six years and under whom had an injury related death or hospitalization. Controls were randomly selected non-injured children and matched to cases by birth year. Among the 3,145 cases, 66% had an older sibling while only 58% of the 8,514 controls had an older sibling. After statistically adjusting for maternal and socioeconomic factors, the adjusted odds ratio for injury risk in children with an older sibling was 1.50 (95% CI, 1.37 - 1.65). Additional analysis revealed an adjusted odds ratio for injury risk of 1.69 (95% CI, 1.44 - 1.97) for children with three or more older siblings. Analysis of birth order revealed that children with two or less years of separation in birth interval had an adjusted odds ratio of injury risk of 1.64 (95% CI, 1.44 - 1.85). The results indicate the more siblings present and the shorter the interval between sibling births, the greater the risk for child injury. Nathens et al. suggest impaired or distracted parental supervision, younger child attempting to keep up with older child beyond developmental abilities, or inadequate supervision of younger child by an older sibling as possible explanations for the increase in child injury risk and indicate the need for further investigation.

Lowell, Quinlan and Gottlieb (2008)conducted a descriptive study of children below the age of five years admitted to a Midwestern United States burn center for significant scald burns. Chart review indicated 140 children were eligible for the study and of those, 118 had unintentional scald burns. The results found 17 of the cases studied (16.3%) occurred while an older sibling between the ages of seven and fourteen years was cooking or carrying a scalding liquid and/or supervising the younger child. Descriptions of the injury events indicated a younger child was more commonly injured by an older child supervisor spilling the hot liquid than if the child were supervised by a

parent or other adult. The researchers suggest the older siblings have less developed motor coordination and risk perceptions than do older supervisors placing the younger child at a greater risk of injury. The study results reinforce previous researchers' findings that younger ages of supervision pose an increase in injury risk for young children.

To evaluate the impact of older sibling supervision on injury rates of younger siblings, Morrongiello, MacIsaac, and Klemencic (2007) conducted a descriptive study of 205 mother's reports of child injury and sibling supervision in the home. In the study, younger children, with an average age of two years, were supervised by older siblings, with an average age of six years, about 11% of the time while they were home and awake. Minor and moderate injuries were significantly associated ($p < 0.01$) with increased sibling supervision, but medically attended injury rates were not significantly affected. Hierarchical regression analysis of the data revealed that non-compliance of the younger child to the older sibling supervisor was a stronger predictor of minor injury ($B = -0.51$, $t = -3.04$, $p < 0.01$) and moderate injury ($B = -0.67$, $t = -4.25$, $p < 0.01$) than the amount of older sibling supervision. Non-compliance accounted for 20% of the variance in minor injury rates and 24% of the variance in moderate injury rates. Morrongiello et al.(2007) suggest further investigation into the parental decisions regarding sibling supervision as well as the interaction between older sibling supervisor and younger child supervisee to further understand the impact on injury rates.

To compare the supervision practices of mothers and older siblings of a child, Morrongiello, Schell, and Schmidt (2010) conducted an observational study of supervisor behaviors in a contrived risk setting. Mothers and older siblings were separately observed supervising the behaviors of a younger child or sibling. The participants were

observed for supervisor reactions to hazards for the young child and level of supervision as measured by not watching, moderate watching, or continuously watching. "Not watching" occurred more frequently with older sibling supervision versus maternal supervision. Older sibling supervisors modeled more risky behaviors when interacting with the hazards (M = 1.14, SD = 2.63) than did maternal supervisors (M = 0.06, SD = 0.32). Chi-square analysis of the data demonstrated an association between the older sibling interaction with the hazard and a subsequent interaction with the hazard by the supervisee suggesting a modeling of the hazardous behavior by the younger sibling. Morrongiello et al. (2010) suggest the results of this study highlight the interaction of supervisor and supervisee behavior in contributing to injury risk and both of these factors must be considered when designing effective child injury prevention programs.

Implications for Research

Injury researchers have focused a lot of attention on understanding the child, maternal and family factors associated with childhood injury. While the results of these research endeavors has produced a better understanding of the individual factors influence on child injury risk, there is a limited understanding of how these factors impact one another. The complexity of the factors interacting in a child injury event indicate a need for further investigation into how these factors come together to impact child injury risk. Morrongiello, et al. (2010) discuss the apparent injury protective effect of parental supervision but point out that child behavioral attributes and environmental characteristics impact the quality and consistency of parental supervision which changes the protective effect of supervision on child injury rates. Children who receive lower

levels of supervision do not all have injuries, which suggests other influences, such as child behavior and risk-taking, impact injury risk along with levels of supervision.

Many research questions remain unanswered in preschool unintentional injury research, especially regarding the definition of adequate supervision. Researchers need to investigate how child attributes impact the definition of adequate supervision. Parents who indicate a lack of understanding of appropriate developmental milestones have children with increased injury risk but no relationship between the two variables has been explored. Further investigation is needed regarding the impact of parental knowledge of child development on the definition of adequate supervision. Low risk environments and high risk environments impact injury risk, but the question remains what level of supervision is appropriate and protective in these environments. Further study is needed into the relationship between environmental risk and the definition of adequate supervision. Family characteristics, such as sibling presence and who is supervising, have been demonstrated to impact preschool child injury risk. Sibling presence increases injury risk, but further investigation is needed into whether adequate supervision is related to who is fulfilling the role of supervisor. The relationship between parental supervision, child behavior attributes and environmental factors is complex and needs further investigation to provide guidance on adequate supervision to mediate child injury risk.

Implications for Nursing Practice

Childhood injuries are the leading cause of morbidity and mortality among children in the United States. With the social, financial and personal burdens created by childhood injuries, nurse researchers have a professional responsibility to contribute to

the injury body of knowledge (Sommers, 2006). Potential areas for inquiry in nursing research include "developing models to explain the association between risk taking and injury" (Sommers, 2006, p. 319). Considering the cognitive developmental level of preschool age children, parents are included in the consideration of risk-taking behaviors as care providers for the child. Investigating preschool injury risk includes parental attributes as well as child attributes.

Childhood injuries and the suffering and costs associated with those injuries are preventable. Garzon (2005) discusses the important role of nursing in incorporating injury prevention into the care of children, families and communities. The most effective anticipatory guidance given to parents includes aspects of targeted injury prevention education, environmental safety modifications, and behavioral modifications. Nursing guidance must be based on a solid foundation of research to achieve effectiveness at reducing preschool child injury risk. Parental supervision has been demonstrated to have a positive impact on decreasing preschool child injury rates, but providing specific anticipatory guidance to parents regarding appropriate supervision includes a multifaceted understanding of all of the variables interacting with supervision. This research study investigated the existence of a relationship between parental supervision beliefs and practices, home modification practices, parental developmental competence, preschool child injury rates and the presence of siblings in the home. Describing these relationships will further the science of injury prevention and eventually impact anticipatory guidance nurses are able to provide parents to prevent unintentional preschool injury events. With limited human and financial resources for health care and health promotion, it is imperative that nurses research the phenomenon of injury to

understand the epidemiology of injury and develop theoretically sound interventional strategies focused on reducing childhood injury rates.

CHAPTER III

Methods

The purpose of this chapter is to describe the design of this research study, including the sample, setting, and conceptual and operational definitions. The chapter also includes the methods and procedures utilized in the data collection and analysis process and consideration of human subjects protection.

Statement of Purpose

The injury prevention literature demonstrates an increased child injury risk for children living in a household with at least one other child. Researchers have posited possible explanations for the relationship between multiple child households and increased injury risk, but no definitive studies have investigated the possible relationships between multiple child households and supervision and supervisory practices, home modification practices, and parental developmental competence. As part of a larger study investigating the concept of parental developmental competence as a mediator of childhood injury, the purpose of this preliminary descriptive study is to determine whether a relationship exists between sibling presence and the variables parental developmental competence, parental supervisory beliefs and practices, parental developmental competence and implementation of home safety modifications. The investigation of the relationship between the study variables answered the following research questions:

1. Do parents of a single child household have different beliefs about supervision and supervisory practices than parents of a multiple child household?

2. Do parents of a single child household have different beliefs about development than parents of a multiple child household?
3. Do parents of a single child household have different home modification practices intended to prevent child injuries than parents of a multiple child household?
4. Are selected demographic characteristics a significant predictor of the sub-scale scores on parental supervision, supervisory practices, beliefs about development and home modification practices?

Research Design

A cross sectional descriptive study was conducted to assess parental supervision, home modification practices, parental developmental competence, number of children in the home and unintentional injuries. Children in single child households were compared to children in multiple child households.

Sample and Setting. Study participants were recruited from ten early childhood care centers in the greater St. Louis metropolitan area. Families with children age 30 to 59 months were recruited for participation. The parents/guardians at the early childhood care centers were notified of the research and asked to consent to research participation and completion of the research instruments. The recruitment of the research participants was coordinated with the directors of the early childhood care centers. Additional study participants were recruited through snowball sampling of participant referrals to the investigators by parents at the early childhood care centers and community members who were aware of the research study.

Subject inclusion criteria included: families with a child age 30 to 59 months and the parent's ability to read and understand the English language. The parent was

instructed to base responses only the preschool child and any siblings residing together in the same household. Data was only collected on one child in each eligible family. If a family had two children in the eligible age range for the study, parents were instructed to complete the questionnaire based on the youngest child. If the two eligible children in a household were twins, the family was excluded from the study.

Conceptual and operational definitions

Childhood injury is defined as "damage to the body caused by exchanges with the environmental energy that are beyond the body's resistance" (Robertson, 1983, p. 1). Examples of injury include falls, lacerations, broken bones, burn, and accidental poisonings or ingestions.

Unintentional injury is defined as an injury that results from "sudden, unanticipated traumatic events" (Sommers, 2006, p. 315).

Preschool child is defined as a child between the ages of 30 to 59 months of age.

Developmental competence is a parent's understanding of his or her child's developmental level (D. L. Garzon, personal communication, September 29, 2010).

Supervision of a child is the act of critical watching and directing activities or a course of action (Merriam-Webster). The adequacy of supervision is measured according to the supervisor's attention to the child's behavior, proximity to the child, and continuous nature of the supervision (Schwebel & Kendrick, 2009).

Procedure

Ten childhood care centers in the greater St. Louis metropolitan area agreed to allow participant recruitment at their facilities. Pre-existing classroom-based communication channels were utilized to contact parents with study information and

informed consent materials. The study materials were distributed to parents/guardians in a sealed envelope. Parents/guardians of children ages 30 to 59 months were provided with an explanation of the study and the study instrument, the Family Questionnaire. Classroom teachers were asked to send the materials to the parents/guardians with the child's daily report sheet that is sent home each day for parental/guardian review. Parents/guardians were instructed to return completed questionnaires in the separate sealed envelope enclosed with the study materials. Parents/guardians who declined to participate were instructed to return blank questionnaires as well so there was no ability for the child care provider or center to know who did and did not participate. No identifying information was collected with the questionnaire.

The primary investigator coordinated with the childcare center directors and the classroom teachers to gather the returned surveys. Two to three weeks after the initial data collection, the same materials were sent home again to the parents of 30 to 59 month old children with another invitation to participate in the research study. No identifying information was collected, so the investigator, classroom teacher and childcare center director were not able to determine who had and had not participated in the research, hence the materials were distributed again to all parents with children in the eligible age range. In addition to the questionnaire distribution at the daycare centers, the investigator recruited participants through snowball sampling. Snowball sampling occurred through referrals from parents of the children at the daycare centers, the directors of the daycare centers, and community contacts. Due to the anonymity of the survey responses and the multiple distributions of the survey instrument, surveys were analyzed to determine if a family submitted more than one instrument. The numbers of children in the family and

child birthdates were utilized to assess if a family completed more than one instrument. One duplicate was discovered and the instrument submitted first was included in the data analysis and the duplicate Family Questionnaires was not.

To increase the quality and quantity of data gathered through the questionnaires, the Dillman tailored design approach was utilized for designing and distributing the child questionnaires (Dillman, 2000). The Dillman approach is a scientifically valid technique for reducing sampling, coverage, measurement and nonresponse errors that are inherent to self-administered survey methodology. With this approach, the follow up distributions of the questionnaire increased the instrument return rate and strengthened the quality of the data collected. Due to the anonymity of the study, the investigator was not aware of who the non-responders were, therefore all eligible parents/guardians were given a second opportunity to participate in the research. The results of the questionnaires were analyzed to determine the existence of a relationship between parental supervision beliefs and practices, home modification practices, parental developmental competence, presence of siblings in the home, demographic variables and child injury events.

To incentivize parent participation in the research and thank participants for consenting to participate, gift cards to a local grocery store were offered. Participants voluntarily entered a drawing for one of three $50 grocery gift cards by providing name and contact information with returned survey instruments. The participant name and contact information were collected separate from the research instruments and the participants' responses remained anonymous to the investigator. After the data collection was completed, the winners were randomly selected and were contacted directly and awarded the grocery gift card.

Instrumentation

The survey instruments utilized for this research study are the Developmental competence questionnaire, Beliefs about supervision questionnaire (BASQ), Parent supervision attributes profile questionnaire (PSAPQ), Home unintentional risk tool (HURT), and Injury event questionnaire. In addition to the survey instruments, socioeconomic and demographic data were gathered. For the ease of the parent participants, all of the instruments were combined into one Family Questionnaire for the parent participant to complete. The creation of the Family Questionnaire was intended to facilitate parent completion of all survey instruments and provide a more efficient mechanism for data collection. Each section of the Family Questionnaire represented the individual survey instruments utilized in this research study. The instructions for the completion of each survey instrument were included in the instructions at the beginning of each section of the Family Questionnaire.

Developmental competence instrument. The research questions in this research study are a component of a larger study testing the concept of parental developmental competence as a mediating variable for preschool child injury risk. To measure parental developmental competence, this researcher-developed instrument assessed parents' knowledge of typical child gross motor, fine motor and cognitive development for twenty-six developmental milestones, or developmental tasks. Parents were instructed to estimate the age each developmental milestone is accomplished by a typical child. The second part of the instrument instructs parents to consider his or her own child and indicate the age his or her child achieved the milestone or estimate the age the parent expects his or her child to achieve the developmental milestone. The instrument lists

child age categorically allowing parents to estimate an age from 1 to 6 ½ years with increments every 6 months. Parent responses were compared to the normative standards for child development. Normative developmental milestone achievements were selected from well-established growth and development texts (Murray et al, 2009). Criterion referenced validity for the developmental competence instrument was established through the utilization of an established and respected human development textbook. The developmental milestones selected for the assessment include a range of ages for normative achievement and at least one falls in each of the ten age categories. Examples of developmental milestones included on the instrument are "climb the stairs placing both feet on each step before going to the next step," "use a crayon to draw, color, or scribble," ride a bike with training wheels", and "know and be able to follow safety rules." Face validity of the instrument was evaluated by asking three mothers and fathers to complete the instrument to assess the quality of the parent instructions, clarity of the questions and format of the responses.

The developmental competence questionnaire was developed for this research study. The measurement of parental developmental competence in other children had good internal consistency (Cronbach's $\alpha = 0.836$). Similarly, there was good internal consistency for the measurement of parental developmental competence of own child development($\alpha = 0.811$). Further testing and validation of this instrument is necessary in future research studies.

Belief about supervision questionnaire. The Beliefs About Supervision Questionnaire was designed to measure a parent's beliefs about the youngest age at

which children could engage in behaviors without constant supervision for at least ten minutes (Morrongiello & Hogg, 2004). The instrument consists of thirty scenario descriptions of a child engaging in a situation or behavior that involve an injury risk and an opportunity for the parent to intervene or assert a behavior rule to potentially minimize the injury risk. The parent indicated the appropriate age for a child to engage in the specified activity without constant supervision for more than ten minutes. Scenario examples from the instrument include playing with toys in a fenced yard, playing with toys on the floor of his/her bedroom, playing on playground equipment (swings, slide) in a fenced yard, going to the neighbourhood playground with some friends in the park behind your house, playing with toys in the kitchen where a cup of hot chocolate has been left on the table, and watching TV or videos with friends at your home. Parents indicated the appropriate age for each activity with the responses in 6 month intervals from 1 to 6 ½ years. The scenarios are matched by various types of injury risk situations and paired according to low injury risk and high injury risk situations. An example is the fall injury risk scenarios. In the low risk fall scenario a child is playing on the floor and in the high risk fall scenario a child is playing on the top bunk bed of a bunk bed. The situation of a child playing is the same with one scenario having a much higher fall risk than the other scenario thereby theoretically only manipulating and assessing the parent supervision beliefs regarding fall risk. During the data analysis, parent responses to the low risk and high risk scenarios were matched to calculate a mean score of parent beliefs about supervision in each type of injury risk scenario.

To measure parents' supervision beliefs, the Beliefs About Supervision Questionnaire has been utilized with other research instruments in the study of parents,

children and injury risk. As one would expect, parents indicate older ages for children engaging in the scenarios with no supervision (Morrongiello, Ondejko, & Littlejohn, 2004). In a study of 50 mothers, the questionnaire demonstrated a positive correlation between increased injury risk and the younger the age indicated as adequate for engaging in the scenario activity without constant supervision and the more infrequent the "checking in" on the child (Morrongiello & Hogg, 2004). The study also tested the ecological validity of the scenarios in the questionnaire by assessing the mother's response to the question of adequate age for discontinuing constant supervision for her child as compared to a typical child. An ANOVA calculation indicated the situations were very typical for children in general ($M = 4.68$, $SD = 0.47$) and for her child in particular ($M = 4.50$, $SD = 0.68$). Mothers did not have difficulty imagining themselves and their own child in the scenario. Cronbach's alpha was $\alpha = .944$ indicating a high level of internal consistency for the BASQ in this study sample.

Parent supervision attributes profile questionnaire. The Parent Supervisor Attributes Profile Questionnaire (PSAPQ) was designed to measure the level of parental supervision (Morrongiello & Corbett, 2008). The 29 item questionnaire was developed to assess the underlying parental attributes of supervision, protectiveness, risk tolerance and fate that influence supervisory behaviors rather than asking directly about the behaviors. In completing the questionnaire, parents were instructed to respond to each of the statements regarding supervision and select a response that indicates how frequently the parent would describe their actions or thoughts regarding supervision. The responses were categorized as never, some of the time, half of the time, most of the time or all of the time. The statements focus on each of the four supervisory attributes being measured.

Protectiveness was measured through parent responses to statements such as "I think of all the dangerous things that could happen", "I feel fearful that something might happen to my child", and "I keep an eye on my child's face to see how he/she is doing". Supervision was measured through parent responses to statements such as "I have my child within arm's reach at all times", "I keep a close watch on my child", and "I make sure I know where my child is and what he/she is doing". Risk tolerance was measured through parent responses to statements such as "I encourage my child to try new things", "I let my child do things for him/herself", and "I encourage my child to take risks if it means having fun during play". Fate was measured through parent responses to statements such as "When my child gets injured, it is due to bad luck" and "Good fortune plays a big part in determining whether or not my child gets injured". Protectiveness, supervision, and risk tolerance each have eight to nine items on the PSAPQ. Fate has only three items of measure on the PSAPQ. Parent responses were analyzed to create sub-scores for each of the attributes according to the PSAPQ scoring rubric.

To assess the psychometric properties of the Parent Supervisor Attributes Profile Questionnaire (PSAPQ), 192 parents of children 2 to 5 years of age were asked to complete the questionnaire twice with a one month interval between the two responses (Morrongiello & Corbett, 2008). Pearson correlations found good levels of test-retest reliability of the measures of supervision ($r(72) = 0.76$, $p < 0.001$), protectiveness ($r(72) = 0.72$, $p < 0.001$), risk tolerance ($r(72) = 0.76$, $p < 0.001$), and fate ($r(72) = 0.80$, $p < 0.001$) over the study interval. Internal consistency was assessed utilizing Cronbach's alpha and was found to be good for supervision ($\alpha = 0.77$), protectiveness ($\alpha = 0.78$), fate ($\alpha = 0.78$), and risk tolerance ($\alpha = 0.79$). The four attributes demonstrated good model fit

through the goodness of fit (GFI > 0.90) and comparative fit (CFI >0.95). In addition, high levels of discriminate validity was demonstrated between the four attributes as well as convergent validity of the correlated attributes of protectiveness and supervision ($r(192) = 0.62$, $p < 0.001$). Considering the relationship of both attributes to the parental motivation to reduce harm, such a correlation would be expected. Risk tolerance was negatively correlated with both supervision ($r(192) = -0.55$, $p < 0.001$) and protectiveness ($r(192) = -0.37$, $p < 0.001$), which was not unexpected based on the relationship of those attributes in parental supervision. The study presents the PSAPQ as a psychometrically sound measure of caregiver supervision beliefs and behaviors relative to child unintentional injury risk. . The PSAPQ had good internal consistency in this sample ($\alpha = .738$).

Home unintentional risk tool. The Home unintentional risk tool (HURT) was developed to assess parents' self-reported utilization of home safety measures designed to decrease injury risk (Garzon, Lee, & Homan, 2007). The 24-item questionnaire inquired about home safety practices regarding falls, burns, poisonings, ingestions, choking and gunshots. Parents selected categorical responses related to the questions. An example of an item included in the HURT is "Do you have a smoke alarm in your home?" with the responses of "Yes", "No" or "I Don't Know". Another question example is "Are your cleaning supplies locked up?" with the responses of "All are locked", "Some are locked", "None are locked", or "I don't know". Parent responses are then coded to determine the injury risk associated with the response. The lower the score on the HURT, the greater the injury protective behaviors implemented by the parents for the child.

A study involving 100 parent participants completing the HURT yielded a Cronbach's alpha of 0.72 establishing internal consistency and reliability of the instrument (Garzon et al., 2007). Parent/guardian responses to the HURT items were scored according to the sub-scale scores established specifically for the instrument. Based on the HURT scores, parents were assigned to the categories of high protectiveness, moderate protectiveness, and low protectiveness.

Injury event questionnaire. For the child's most recent medically attended injury event, parents were asked to complete an Injury Event Questionnaire developed by the investigator. Parents were also asked to complete the Injury Event Questionnaire for any injury event that resulted in the child being hospitalized for treatment. The questionnaire defined a medically attended injury as an injury that resulted in the parent calling a medical person for advice, or seeking health care for his/her child in a doctor's office, emergency room, urgent care or hospital. The parents were asked to provide the child's age at the time of the injury, mechanism of the injury, location of the injury, type of injury, and the context of injury. Age was categorized according to 6 month intervals between the ages of birth to 60 months. The mechanism of injury question included the responses of fall, cut or pierce, burn, ingestion, or stuck by an object. Parents were given a category of other and an opportunity to indicate an alternate mechanism not encompassed by the choices provided. The location of the injury question included the responses of home, preschool/daycare, public setting, and other home such as a friend or family member. Parents were given a category of other and asked to specify the location where his/her child was injured. To describe the child's injury, parents were asked to indicate the injury outcome or diagnosis. Responses to this question included burn,

minor cut or bruise, serious cut requiring stitches or glue, broken bone, sprained muscle, head injury or concussion, tooth/mouth injury, swallowing of poisonous substance, choking, as well as the category of other for parents to specify an injury not otherwise indicated. The final question in the injury event questionnaire focused on the context of the injury event and asked a series of questions regarding the supervision and the supervisor at the time of the injury directed at measuring the supervisor's attention to the child's behavior, proximity to the child, and continuous nature of the supervision.

Socioeconomic and demographic data. As identified in the review of literature, socioeconomic status and demographics are risk factors for unintentional child injury. Parents were asked to provide information regarding gender, parental age, marital status, parent's level of education, employment status, ethnicity, and household income. Parents were also asked to indicate the zip code for the family's residence. As part of the data analysis, information on these socioeconomic and demographic variables was analyzed using descriptive statistics as well as analyzed for significant relationships with the study variables.

Data analysis

Descriptive and non-parametric statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) Version 19.0 software package. Reponses from the Family Questionnaire were entered into SPSS and then analyzed for descriptive statistics, such as mean, median, and frequency, and non-parametric statistics, such as chi-square and Mann Whitney U. All data were double-entered and cleaned prior to data analysis. For the data analysis, the independent variable was singleton child household versus multiple children household. Eligible children in singleton child

households were statistically compared to eligible children in multiple child households. Data collected from the Developmental competence instrument, Beliefs about supervision questionnaire, Parent supervision attributes profile questionnaire, Home unintentional risk tool, Injury event questionnaire, and participant demographics are reported at a nominal, or categorical level and were analyzed for significant relationships to the independent variable utilizing the non-parametric chi-square test and Mann Whitney U. To answer research question one, the responses to the Beliefs about supervision questionnaire and the Parent supervision attributes profile questionnaire were analyzed utilizing a Mann Whitney U test grouped according to the independent variable as well as a frequency crosstab analysis. The Mann Whitney U tested for significant relationships between the independent variable and parental beliefs about supervision and supervisory practices. To answer research question two, the responses to the Developmental competence instrument were analyzed utilizing a Mann Whitney U test grouped according to the independent variable as well as a frequency crosstab analysis. The Mann Whitney U tested for a significant relationship between the independent variable and parental developmental competence. To answer research question three, the responses to the HURT were analyzed utilizing a chi-square grouped according to the independent variable as well as frequency crosstab analysis. The chi-square results assessed for a significant relationship between the independent variable and home hazard exposure and home modification practices. To answer research question four, the responses to the Family Questionnaire demographics were analyzed utilizing a chi-square according to the independent variable as well as frequency crosstab analysis. The chi-square results were utilized to determine if the demographic variables were a significant

predictor of the sub-scale scores on parental supervision, supervisory practices, beliefs about development and home modification practices.

To ensure adequate power for the proposed study and to decrease the risk of Type II errors, an estimate of adequate sample size was completed. The significance level for the study was $\alpha = .05$, the standard for nursing science. The power of the study $(1 - \beta)$ was set at 0.80, the conventional nursing science standard for power. This allowed for a 20% chance of Type II error. The estimated effect size of the study (γ) was .50 which is equivalent to a moderate effect. A moderate effect was appropriate considering the descriptive purpose of the study and exploration of the existence of relationships between the study variables and sibling presence. In *Nursing research, principles and methods*, Polit and Hungler (1999) provided tables with the approximate sample size necessary to achieve a selected level of power. To achieve a significance of $\alpha = .05$, a power of .80 and an estimated effect size (γ) of .50, an N of 63 participants was required for the families with singleton children and an N of 63 participants for families with siblings. The total N for the study was 130 participants with 63 single child families and 67 multiple child families.

Protection of Human Subjects

Prior to the beginning of the recruitment process, the administrators of the early childhood care centers utilized for this study granted approval for the investigation. The investigator contacted the directors of the early childhood care centers to explain the research study and obtain consent for site participation in the study. The data collection process began after the appropriate approvals were obtained.

Families were notified of the research study and invited to voluntarily participate. Families who completed the study packet consented to participate in the study by completing and returning the survey instruments. Study participation was voluntary and participants were able to withdraw at any time by not returning the survey instruments. No identifying information was collected with the survey instruments and no individual results were reported. The study packet materials, including a description of the research study, study instruments, invitation to participate and process for participation is included in the appendices along with the statement of approval from the Human Subjects Committee.

CHAPTER IV

Results

Subjects were recruited through ten early childhood care centers and through snowball sampling referrals of families to the investigator. The directors of each of the early childhood centers consented to the research process and surveys were distributed to all families with children in the eligible age ranges of 30 to 59 months. A total of 491 families were invited to participate via study packet distribution and 138 questionnaires were returned for a survey return rate of 28.1%. Seven returned questionnaires were eliminated that did not meet inclusion criteria and one returned questionnaire was identified as a duplicate from the same family and the second packet from the family was eliminated. Thus a final sample of 130 families was included for data analysis.

The research questionnaire was comprised of five different research instruments and a set of demographic questions. These were collapsed into one survey packet to facilitate the completion of all the study materials by parents or guardians. The data analysis was then completed on each of the individual research instruments included in the family questionnaire and are reported in this chapter. The questionnaires were lengthy, but Family Questionnaires were returned with all of the research instruments completed with only a few instruments returned with blank sections. Any incomplete instruments were not analyzed.

Demographic Data

A total of 130 parents of preschool children were enrolled in the study. Sixty-three of the children were from single child families and 67 of the children were from multiple child families. In the study, 68 (52.3%) of the children were girls and 62

(47.7%) were boys. The mean age of the children enrolled was 47.8 months or 3 years, 11 months. The majority of the children were parent identified as Caucasian (81.5%). Further child demographic details are found in *Table 2*.

Table 2

Child Demographic Characteristics according to Sibling Presence (n=130)

Variable	Number	Percent of sample			
Presence of Siblings					
Single Child Family	63	48.5%			
Multiple Child Family	67	51.5%			
		Single Child (n = 63)		Multi-Child (n = 67)	
Child Gender					
Male	62	29	46%	33	49.3%
Female	68	34	54%	34	50.7%
Child Age (Months)					
30 - 36 Months	16	9	14.3%	7	10.4%
37 – 42 Months	19	11	17.5%	8	11.9%
43 – 48 Months	32	13	20.6%	19	28.4%
49 – 54 Months	30	15	23.8%	15	22.4%
55 – 60 Months	33	15	23.8%	18	26.7%
Mean Age	47.8 months	37 months		49 months	
Child's Race					
African American	9	5	7.9%	4	6%
Hispanic	3	2	3.2%	1	1.5%
Asian	3	1	1.6%	2	3.0%
Caucasian	106	48	76.2%	58	86.6%
Bi-Racial	8	7	11.1%	1	1.5%

There were no statistically significant differences between the parents reported demographic child variables of gender, age and race for the two groups. Child age and sibling presence yielded a chi-square statistic = 33.133 (df = 28, p = .231). The chi-

square statistic for child gender and sibling presence was chi-square = .135 (df = 1, p =.713). Child race and sibling presence resulted in a chi-square = 6.155 (df = 4, p = .188).

The parents/guardians responding to the survey predominantly self-identified as mothers, married, educated at the college level and Caucasian. Mothers were the largest family questionnaire respondents representing 117 or 90%, of the included surveys. Family size varied from 11 two person families (4.7%) to 13 families with six or more members (10%). The family size median and mode was four members representing 45 (19.1%) of the families. The majority of the families surveyed reported a married family dynamic with 105 (80.8%) indicating they were married. Parent/guardian respondents reported a high level of education background with 51 (39.2%) indicating achievement of a college degree and 43 (33.1%) indicating a graduate degree. The median family income was between $60,000 and $79,999. Further family demographic data is summarized in *Table 3*.

Table 3

Family Demographic Characteristics according to Sibling Presence

Variable	Number	Single Child (n = 63)	Multiple Child (n = 67)
Parent/Guardian			
Mother	117	54	63
Father	5	2	3
Grandparent	8	7	1
Family Size (Number of Members)			
Two	11	11	0
Three	32	32	0
Four	45	12	33

Five or More	42	8		34	
Parent/Guardian Age	34.5 years	Mean Age = 34.7 years		Mean Age = 34.3 years	
Marital Status					
Single	14	10	15.9%	4	6.0%
Married	105	43	68.3%	62	92.5%
Divorced	7	6	9.5%	1	1.5%
Separated	2	2	3.2%	0	-
Widowed	2	2	3.2%	0	-
Parent/Guardian Education					
Grade/Middle School	2	1	1.6%	1	1.5%
High School	7	3	4.8%	4	6.0%
GED	4	4	6.3%	0	-
Some College	23	14	22.2%	9	13.4%
College Degree	51	23	36.5%	28	41.8%
Graduate Degree	43	18	28.6%	25	37.3%
Parent/Guardian's Race					
African American	8	4	6.3%	4	6.0%
Hispanic	5	4	6.3%	1	1.5%
Asian	3	2	3.2%	1	1.5%
Pacific Islander	1	1	1.6%	0	-
Caucasian	110	52	82.5%	58	86.6%
Bi-Racial	2	0	-	2	3.0%
No Response	1	0	-	1	1.5%
Family Income					
< $20,000	11	7	11.1%	4	6.0%
$20,000 - $39,999	5	5	7.9%	0	-
$40,000 - $59,999	16	13	20.6%	3	4.5%
$60,000 - $79,999	18	8	12.7%	10	14.9%
$80,000 - $99,999	23	9	14.3%	14	20.9%
>$100,000	49	19	30.2%	30	44.8%
No Response	8	2	3.2%	6	9.0%

Family variables of parent/guardian age, marital status, parent/guardian race, family income, and education level were compared for differences between singleton and multiple child families (*Table 3).* The family variables of marital status and family income were found to have a statistically significant difference between the two groups. Chi-square analysis of the remaining demographic variables revealed no further statistically significant differences between singleton and multiple child families (*Table 4*).

Table 4

Family Demographic Characteristics Analysis according to Sibling Presence

Demographic Variable	Chi-Square Grouped by Sibling Presence (n = 130)
Marital Status	**χ^2 = 13.471 (df = 4, p = .009)**
Parent/Guardian Education Level	χ^2 = 6.743 (df = 5, p = .240)
Parent/Guardian's Race	χ^2 = 5.394 (df = 5, p = .370)
Family Income	**χ^2 = 15.847 (df = 5, p .007)**

Developmental competence questionnaire

Assessment of parental developmental competence, or parental beliefs about child development, occurred through the developmental competence questionnaire. Parents were instructed to indicate the appropriate child age for a variety of gross motor, fine motor, and cognitive developmental tasks. Parent responses of ages for each of the developmental milestones were compared to the normative standard for the developmental milestones and parents predominately overestimated the developmental abilities of children. Parent beliefs about development scores were calculated based on whether parents overestimated, underestimated, or correctly indicated the developmental

level for each of the developmental tasks. A score of (-1) was given if the parent overestimated development and indicated an age that was too young for the developmental milestone. A score of (0) was given if the parent indicated the appropriate age for the milestone. A score of (1) was given if the parent underestimated development and indicated an age that was older than expected for the developmental milestone. Sub-scores were calculated for the areas of gross motor development, fine motor development and cognitive development. An overall score was calculated for each parent by summing each of the sub-scores and giving an overall belief about development score.

Parental developmental competence, typical child development. Parents responded to the developmental competence questionnaire twice. Parents first indicated their perception about appropriate ages for each developmental task for a typical child. Then parents indicated the age for each developmental task specifically for his/her own child. Therefore, parent knowledge of child development was reflected in the responses to the questionnaire regarding typical child development and his/her child's specific development.

Overall parental beliefs about development indicated a majority of parents are not able to accurately identify appropriate ages for child developmental milestones. Of the 63 singleton child families, 57 of the parent respondents overestimated child development, indicating an average age too young for the developmental tasks. Sixty-two of the 67 multiple child family parents also overestimated the age for the developmental tasks.

The possible score range for parental beliefs about development score was -26.0 to 26.0 based on the twenty-six items included in the developmental competence

questionnaire, with negative numbers indicating an overestimation of developmental ability and positive numbers indicating an underestimation of developmental ability. Parent developmental beliefs scores for the typical child development responses ranged from -20.0 to 8.0 with a median score of -11.0. The gross motor development score was based on thirteen developmental tasks with a possible score range of -13.0 to 13.0. The typical child gross motor development score had a median of -7.0 with a score range from -12.0 to 6.0. Fine motor development scores were based on five fine motor developmental tasks with a possible score range of -5.0 to 5.0. The typical child fine motor developmental score had a median of -1.0 and a score range of -5.0 to 4.0. Cognitive developmental beliefs were measured with eight items with a possible score range of -8.0 to 8.0. The typical child cognitive developmental beliefs score ranged from -8.0 to 3 with a median score of -2.0. *Table 5* and *Table 6* detail parental developmental knowledge scores for typical children and organize the responses according to the variable of singleton child family and multiple child family.

Table 5

Parental Knowledge about Development Scores – Typical Child, Descriptive Statistics

Development Task	Median (n = 130)	Mean (n = 130)
Gross Motor	-7.0	-6.45
Fine Motor	-1.0	-1.18
Cognitive	-2.0	-2.19
Developmental competence score	-11	-9.82
	Single Child Median Score (n = 63)	Multi-Child Median Score (n = 67)
Gross Motor	-8.0	-7.0
Fine Motor	-1.0	-1.0
Cognitive	-2.0	-2.0
Developmental competence score	-11.0	-11.0

Table 6

Parental Beliefs about Development – Typical Child

	Single Child (n = 63)		Multi-Child (n = 67)	
Overestimation of Development (too young for task)	57	90.5%	62	92.5%
Developmentally appropriate age	1	1.6%	1	1.5%
Underestimation of development (too old for task)	5	7.9%	4	6.0%

A Mann Whitney U analysis of the variables of sibling presence and typical child development scores yielded no statistically significant relationship. There were no significant differences in the gross motor, fine motor, cognitive, and overall typical development scores between singleton parents and parents of multiple children *(Table 7).*

Table 7

Parental Knowledge about Development Scores Analysis grouped according to Sibling Presence – Typical Child

Development Task	Mann-Whitney U (n = 130)
Gross Motor	U = 2079.5 (Z = -.146, p = .884)
Fine Motor	U = 2050.0 (Z = -.287, p = .774)
Cognitive	U = 2098.0 (Z = -.059, p = .953)
Developmental competence score	U = 2077.5 (Z = -.154, p= .878)

To analyze for the influence of confounding demographic variables in the typical child development scores, a chi-square analysis was conducted that grouped according to the variables child gender, child age, child race, parent education, and family income. The only statistically significant relationship was found between child race and typical child parental development beliefs (χ^2 = 147.245, df = 96, p= .001). Child gender (χ^2 = 21.441, df = 24, p = .613), child age (χ^2 = 650.575, df = 672 p = .717), level of parent

education (χ^2 = 95.952, df = 120, p = .948), and family income (χ^2 = 110.389, df = 120, p = .724) were not demonstrated to have a statistically significant relationship to parental beliefs about typical child development.

Parental developmental competence, own child development. Parental beliefs about their own child's development scores were also calculated. The own child development scores ranged from -26.0 to 7.0 out of a possible score range of -26.0 to 26.0 with a median score of -14.0. Negative scores indicated on overestimation of their child's developmental abilities and positive scores indicated an underestimation of their child's developmental abilities. The own child gross motor development scores ranged from -13.0 to 4.0 with a median score of -8.0. Own child fine motor development scores ranged from -5.0 to 5.0 with a median score of -2.0. Cognitive development scores for own child ranged from -8.0 to 3.0 with a median value of -3.0. *Table 8* and *Table 9* detail parental developmental knowledge scores for typical children and organize the responses according to the variable of singleton child family and multiple child family.

Table 8

Table Parental Knowledge about Development Scores - Own Child, Descriptive Statistics

	Median (n = 130)	Mean (n = 130)
Gross Motor	-8.0	-7.27
Fine Motor	-2.0	-2.0
Cognitive	-3.0	-3.38
Developmental competence score	-14	-12.65
	Single Child Median (n = 63)	Multi-Child Median (n = 67)
Gross Motor	-8.0	-8.0
Fine Motor	-3.0	-2.0
Cognitive	-3.0	-3.0
Developmental competence score	-14.0	-13.0

Table 9

Parental Beliefs about Development – Own Child

	Single Child (n=63)		Multi-Child (n = 67)	
Overestimation of Development (too young for task)	62	98.4%	62	92.5%
Developmentally appropriate age	0	-	0	-
Underestimation of development (too old for task)	1	1.6%	5	7.5%

To test the relationship between the variables of sibling presence and own child parental development beliefs, a Mann Whitney U analysis was performed grouped according to the variable of sibling presence. For parental beliefs regarding own child gross motor, fine motor, cognitive and overall development, no statistically significant relationship between the variables was found (*Table 10*).

Table 10

Parental Knowledge about Development Scores Analysis grouped according to Sibling Presence – Own Child

Development Task	Mann-Whitney U (n = 130)
Gross Motor	U = 1869.5 (Z = -1.313, p = .258)
Fine Motor	U = 1782.5 (Z = -1.543, p = .123)
Cognitive	U = 1764.0 (Z = -1.638, p = .101)
Developmental competence score	U = 1809.5 (Z = -1.405, p= .160)

Considering potential confounding demographic variables in the own child developmental competence results, the variables of child gender, child age, child race, parent education, and family income were analyzed for a statistical relationship to developmental competence. A statistically significant relationship was found between child race and own child parental developmental competence (χ^2 = 156.973, df = 108, p=

.001) and parent level of education and own child parental developmental competence (χ^2 = 214.069, df = 135, p = .000). Child gender (χ^2 = 27.627, df = 27, p = .430), child age (χ^2 = 813.221, df= 756, p = .073), and family income (χ^2 = 141.337, df = 125, p = .151) did not have a statistically significant relationship to parent's developmental competence for his/her own child.

Beliefs about supervision questionnaire

Parent's perspectives about appropriate ages for supervision were measured using the Beliefs about supervision questionnaire. Parents were asked to indicate the appropriate age for an activity to occur without constant supervision for ten minutes or longer. Age responses ranged between 1 year (12 months) and 6 ½ years (76 months) in six month increments. Each scenario was categorized according to the injury outcome associated with the scenario and paired according to perceived low or no injury risk and high injury risk situations. The mean age for each situation and risk category was calculated and used for comparison during the analysis.

A Mann Whitney U analysis revealed a statistically significant relationship between the variables of sibling presence and falls, no/low risk scenario indicating the presence of a sibling influence on parent supervision beliefs in low risk fall scenarios. No further statistically significant differences were found in the relationships between the parental beliefs about supervision scores and the variable of sibling presence. Detailed results from the results of the Beliefs about supervision questionnaire and analysis can be found in *Table 11 and Table 12*.

Table 11

Beliefs about Supervision Questionnaire Descriptive Statistics

	No/Low Risk Age (Years)		Risk Age (Years)	
Injury scenario – Single Child (n=63)	Mean Score	Median Score	Mean Score	Median Score
Falls	4.04	4.0	4.76	4.75
Burn	3.69	3.5	4.47	4.5
Poison	4.21	4.25	4.17	4.25
Suffocation/Choking	3.57	3.5	4.52	4.5
Cut	3.62	3.75	4.81	5.5
Drowning	4.13	4.25	4.59	5.0
Playing with friend	4.314	4.25	4.94	4.88
Playing away from home	6.22	6.5	6.08	6.5
Injury scenario – Multi-Child (n = 67)				
Falls	3.57	3.5	4.63	4.75
Burn	3.35	3.25	4.75	5.0
Poison	4.04	4.25	4.03	4.0
Suffocation/Choking	3.21	3.0	4.59	4.25
Cut	3.79	4.0	5.07	5.25
Drowning	4.18	4.5	4.82	5.0
Playing with friend	4.28	4.25	4.89	5.0
Playing away from home	6.25	6.5	6.22	6.5

Table 12

Beliefs about Supervision grouped according to Sibling Presence

Injury Scenario	Mann-Whitney U (n = 130) No/Low Risk	Mann-Whitney U (n = 130) Risk
Falls	**U = 1564.5 (Z = -2.554, pp = .011)**	U = 2024.0 (Z = -.404, p = .686)
Burn	U = 1762.5 (Z = -1.627, p = .104)	U = 1934.5 (Z = -.823, p = .411)
Poison	U = 1528.5 (Z = -1.139, p = .255)	U = 1808.0 (Z = -.826, p = .409)
Suffocation/Choking	U = 1701.5 (Z = -1.917, p = .055)	U = 2066.0 (Z = -.208, p = .835)
Cut	U = 2008.0 (Z = -.479, p = .632)	U = 2078.0 (Z = -.152, p = .879)

Drowning	U = 2079.0 (Z = -.147, p = .883)	U = 1860.0 (Z = -1.172, p = .241)
Playing with friend	U = 1652.5 (Z = -.628, p = .530)	U = 1814.5 (Z = -.234, p = .815)
Playing away from home	U = 1519.0 (Z = -.148, p = .882)	U = 1518.0 (Z = -1.204, p = .229)

The potential confounding variables of child gender, child age, child race, parent education, and family income were analyzed for a statistical relationship to parent beliefs about supervision. Based on chi-square analysis of the identified demographic variables and each sub-scale score on the BASQ, no statistically significant relationships were found between child gender (*Table 13*) and parent education level (*Table 14*) and the BASQ scores.

Table 13

Beliefs about Supervision grouped according to Child Gender

Injury Scenario	Chi-Square (n = 130), No/Low Risk	Chi-Square (n = 130), Risk
Falls	χ^2 = 12.543 (df = 15, p = .638)	χ^2 = 15.449 (df = 15, p = .420)
Burn	χ^2 = 20.424 (df = 22, p = .557)	χ^2 = 16.674 (df = 18, p = .546)
Poison	χ^2 = 7.290 (df = 13, p = .887)	χ^2 = 14.233 (df = 16, p = .581)
Suffocation/Choking	χ^2 = 19.360 (df = 18, p = .370)	χ^2 = 15.243 (df = 17, p = .578)
Cut	χ^2 = 10.471 (df = 16, p = .841)	χ^2 = 12.749 (df = 15, p = .622)
Drowning	χ^2 = 14.508 (df = 18, p = .695)	χ^2 = 20.360 (df = 17, p = .256)
Playing with friend	χ^2 = 14.293 (df = 16, p = .577)	χ^2 = 7.537 (df = 14, p = .912)
Playing away from home	χ^2 = 5.813 (df = 5, p = .325)	χ^2 = 1.712 (df = 5, p = .887)

Table 14

Beliefs about Supervision grouped according to Parent Education Level

Injury Scenario	Chi-Square (n = 130), No/Low Risk	Chi-Square (n = 130), Risk
Falls	χ^2 = 78.971 (df = 75, p = .355)	χ^2 = 58.426 (df = 75, p = .921)
Burn	χ^2 = 92.067 (df = 110, p = .892)	χ^2 = 86.168 (df = 90, p = .595)
Poison	χ^2 = 71.333 (df = 65, p = .275)	χ^2 = 79.998 (df = 80, p = .479)
Suffocation/Choking	χ^2 = 111.808 (df = 90, p = .060)	χ^2 = 93.824 (df = 85, p = .240)
Cut	χ^2 = 76.305 (df = 80, p = .596)	χ^2 = 50.859 (df = 75, p = .985)

Drowning	χ^2 = 98.191 (df = 90, p = .260)	χ^2 = 98.191 (df = 85, p = .342)
Playing with friend	χ^2 = 89.183 (df = 80, p = .226)	χ^2 = 69.733 (df = 70, p = .487)
Playing away from home	χ^2 = 33.371 (df = 25, p = .122)	χ^2 = 28.171 (df = 25, p = .300)

Child age was found to have a significant influence on the BASQ score of drowning, no/low risk (χ^2 = 528.139, df = 476, p = .049) indicating that the age of the child influenced the parent's beliefs about supervision in scenarios with drowning as an identifiable risk. Further details regarding the relationship between child age and the BASQ variables are in *Table 15*.

Table 15

Beliefs about Supervision grouped according to Child Age

Injury Scenario	Chi-Square (n = 130), No/Low Risk	Chi-Square (n = 130), Risk
Falls	χ^2 = 430.748 (df = 420, p = .348)	χ^2 = 390.910 (df = 420, p = .842)
Burn	χ^2 = 635.209 (df = 616, p = .288)	χ^2 = 485.144 (df = 504, p = .719)
Poison	χ^2 = 329.219 (df = 364, p = .905)	χ^2 = 432.497 (df = 448, p = .692)
Suffocation/Choking	χ^2 = 461.486 (df = 504, p = .913)	χ^2 = 468.608 (df = 476, p = .587)
Cut	χ^2 = 432.349 (df = 448, p = .694)	χ^2 = 385.788 (df = 420, p = .883)
Drowning	χ^2 = 526.042 (df = 504, p = .240)	**χ^2 = 528.139 (df = 476, p = .049)**
Playing with friend	χ^2 = 422.073 (df = 448, p = .805)	χ^2 = 372.688 (df = 392, p = .751)
Playing away from home	χ^2 = 154.101 (df = 135, p = .125)	χ^2 = 141.889 (df = 135, p = .325)

The demographic of child race was significantly related to fall, no/low risk (χ^2 = 87.723, df = 60, p = .011), burn, no/low risk (χ^2 = 131.357, df = 88, p = .002), suffocation/choking, no/low risk (χ^2 = 118.428, df = 72, p = .000), drowning, no/low risk (χ^2 = 92.973, df = 72, p = .049), and playing with friend, no/low risk (χ^2 = 123.733, df = 64, p = .000) indicating a child's race influenced parental beliefs about supervision in each of these injury risk scenarios. *Table 16* includes details about the analysis of the relationship of the BASQ variables and child race.

Table 16

Beliefs about Supervision grouped according to Child Race

Injury Scenario	Chi-Square (n = 130), No/Low Risk	Chi-Square (n = 130), Risk
Falls	**χ^2 = 87.723 (df = 60, p = .011)**	χ^2 = 56.947 (df = 60, p = .588)
Burn	**χ^2 = 131.357 (df = 88, p = .002)**	χ^2 = 54.087 (df = 725, p = .943)
Poison	χ^2 = 38.234 (df = 52, p = .923)	χ^2 = 82.817 (df = 64, p = .057)
Suffocation/Choking	**χ^2 = 118.428 (df = 72, p = .000)**	χ^2 = 86.641 (df = 68, p = .063)
Cut	χ^2 = 82.453 (df = 64, p = .060)	χ^2 = 39.725(df = 60, p = .980)
Drowning	**χ^2 = 92.973 (df = 72, p = .049)**	χ^2 = 71.291 (df = 68, p = .369)
Playing with friend	**χ^2 = 123.733 (df = 64, p = .000)**	χ^2 = 69.321 (df = 56, p = .109)
Playing away from home	χ^2 = 21.977 (df = 20, p = .342)	χ^2 = 14.260 (df = 20, p = .817)

Assessment of family income and BASQ scores yielded significant relationships with burn, no/low risk (χ^2 = 139.903, df = 105, p = .013), suffocation/choking, no/low risk (χ^2 = 115.247, df = 90, p = .038), suffocation/choking, risk (χ^2 = 126.763, df = 80, p = .001), and playing with friend, no/low risk (χ^2 = 118.339, df = 80, p = .003) indicating that families with different income levels had different beliefs about supervision in scenarios with potential injury from burns, suffocation/choking, and playing with friends. The results of the chi-square analysis of each of the BASQ variables and family income are included in *Table 17*.

Table 17

Beliefs about Supervision grouped according to Family Income

Injury Scenario	Chi-Square (n = 130), No/Low Risk	Chi-Square (n = 130), Risk
Falls	χ^2 = 84.256 (df = 75, p = .218)	χ^2 = 91.675 (df = 75, p = .093)
Burn	**χ^2 = 139.903 (df = 105, p = .013)**	χ^2 = 109.118 (df = 90, p = .083)
Poison	χ^2 = 74.284 (df = 65, p = .202)	χ^2 = 100.477 (df = 80, p = .061)
Suffocation/Choking	**χ^2 = 115.247 (df = 90, p = .038)**	**χ^2 = 126.763 (df = 80, p = .001)**
Cut	χ^2 = 91.519 (df = 80, p = .178)	χ^2 = 59.929 (df = 75, p = .898)
Drowning	χ^2 = 110.582 (df = 90, p = .070)	χ^2 = 82.737 (df = 85, p = .549)

Playing with friend	**χ^2 = 118.339 (df = 80, p = .003)**	χ^2 = 83.248 (df = 70, p = .133)
Playing away from home	χ^2 = 14.279 (df = 25, p = .957)	χ^2 = 25.625 (df = 25, p = .428)

Parent supervision attributes profile questionnaire

The Parent supervision attributes profile questionnaire (PSAPQ) was utilized to measure parent practices regarding supervision. The attributes of supervision, protectiveness, risk tolerance and fate were assessed according to a parent's indicated frequency of the associated supervisory thought or behavior. Each item was divided into the appropriate attribute category for scoring and a mean and median score was calculated for each. Details of the PSAPQ results can be found in *Table 18.*

Table 18

Parent Supervisor Attributes Profile Questionnaire Descriptive Statistics

Supervision Attributes	Single Child Mean Score (n = 63)	Multi-Child Mean Score (n = 67)
Protectiveness	3.65	3.56
Supervision	3.35	3.29
Risk Tolerance	3.20	3.23
Belief that Fate controls child health	1.85	1.90
	Single Child Median Score (n = 63)	Multi-Child Median Score (n = 67)
Protectiveness	3.67	3.67
Supervision	3.33	3.22
Risk Tolerance	3.13	3.25
Belief that Fate controls child health	1.67	2.00

Note: Score Legend, 1 = Never, 2 = Some of the Time, 3 = Half of the Time, 4 = Most of the Time, 5 = All of the Time

The mean scores for each of the supervision attributes was analyzed utilizing a Mann Whitney U test with the parent attributes grouped around the family dynamic of

singleton child or multiple child families. There were no significant differences between singleton child and multi-child families for any of the four attributes measured with a significance level p = .05. *Table 19* contains the detailed analysis of the PSAPQ results.

Table 19

Parent Supervisor Attributes Profile Questionnaire grouped according to Sibling Presence

Supervision Attributes	Mann-Whitney U (n = 130)
Protectiveness	U = 1621.0 (Z = -1.630, p = .103)
Supervision	U = 1698.0 (Z = -1.525, p = .127)
Risk Tolerance	U = 1892.0 (Z = -.725, p = .468)
Belief that Fate controls child health	U = 1836.0 (Z = -.877, p = .380)

Considering unintentional injury risk factors of demographics, the Parent Supervision Attributes Profile Questionnaire results were analyzed for a relationship with the variables child gender, child age, child race, parent education level, and family income. Utilizing a Mann Whitney U analysis, no statistically significant relationship was found between child gender and protectiveness, supervision, risk tolerance, and fate controlling child health (*Table 20*).

Table 20

Parent Supervisor Attributes Questionnaire grouped according to Child Gender

Supervision Attributes	Mann-Whitney U (n = 130)
Protectiveness	U = 1621.0 (Z = -1.630, p = .103)
Supervision	U = 1698.0 (Z = -1.525, p = .127)
Risk Tolerance	U = 1892.0 (Z = -.725, p = .468)
Belief that Fate controls child health	U = 1836.0 (Z = -.877, p = .380)

A chi-square analysis of the PSAPQ variables and child age resulted in a statistically significant relationship between child age and supervision ($\chi^2 = 667.279$, df = 504, p =

.000). No statistical significance was found between child age and protection, risk tolerance, and fate control of child health (*Table 21*).

Table 21

Parent Supervisor Attributes Questionnaire grouped according to Child Age

Supervision Attributes	Chi-Square (n = 130)
Protectiveness	χ^2 = 613.885 (df = 560, p = .057)
Supervision	**χ^2 = 667.279 (df = 504, p = .000)**
Risk Tolerance	χ^2 = 574.329 (df = 560, p = .328)
Belief that Fate controls child health	χ^2 = 254.058 (df = 280, p = .865)

Based on a chi-square analysis, child race was found to have a statistically significant relationship with supervision (χ^2 = 120.309, df = 72, p = .000) and fate controlling child health (χ^2 = 69.042, df = 40, p = .003) indicating a relationship between child race and parent supervisory attributes of supervision and belief in fate controlling child health. No statistical significance was found in the relationship between child race and protectiveness and risk tolerance (*Table 22*).

Table 22

Parent Supervisor Attributes Questionnaire grouped according to Child Race

Supervision Attributes	Chi-Square (n = 130)
Protectiveness	χ^2 = 91.603 (df = 80, p = .177)
Supervision	**χ^2 = 120.309 (df = 72, p = .000)**
Risk Tolerance	χ^2 = 99.292 (df = 80, p = .071)
Belief that Fate controls child health	**χ^2 = 69.042 (df = 40, p = .003)**

Parent education level and risk tolerance were found to have a statistically significant relationship with a chi-square = 159.306 (df = 100, p = .000). No statistically significant

relationship was found between level of parent education and protectiveness, supervision, and fate controlling child health (*Table 23*).

Table 23

Parent Supervisor Attributes Questionnaire grouped according to Parent Education Level

Supervision Attributes	Chi-Square (n = 130)
Protectiveness	$\chi^2 = 86.173$ (df = 100, p = .836)
Supervision	$\chi^2 = 67.044$ (df = 90, p = .967)
Risk Tolerance	**$\chi^2 = 159.306$ (df = 100, p = .000)**
Belief that Fate controls child health	$\chi^2 = 55.192$ (df = 50, p = .285)

A chi-square analysis of family income and PSAPQ attributes found no significant statistical relationships between protectiveness, supervision, risk tolerance, and fate controlling health (*Table 24*).

Table 24

Parent Supervisor Attributes Questionnaire grouped according to Family Income

Supervision Attributes	Chi-Square (n = 130)
Protectiveness	$\chi^2 = 101.146$ (df = 100, p = .449)
Supervision	$\chi^2 = 105.876$ (df = 90, p = .121)
Risk Tolerance	$\chi^2 = 100.287$ (df = 100, p = .473)
Belief that Fate controls child health	$\chi^2 = 47.992$ (df = 50, p = .554)

Home unintentional risk tool (HURT)

The Home unintentional risk tool (HURT) was used to measure parental home modification for injury prevention. Parents of singleton children and parents of multiple children were found to have similar rates of home modification behaviors. Parent scores were calculated based on the scoring system for the HURT. The parent HURT scores in the study ranged from 17 to 61. For the HURT, a score of 33.5 is considered to be the

mean with a standard deviation of five determining the categories of low HURT score range below 28.5, moderate HURT score range from 28.5 to 38.5, and high HURT score range above 38.5 (Garzon, et. al, 2007). Based on the HURT norm score ranges, the scores were divided into the categories of high protectiveness, moderate protectiveness and low protectiveness with low HURT scores correlated with high protectiveness behaviors and high HURT scores correlated with low protectiveness behaviors. Of the parent responses for singleton child families, 46% were high protectiveness, 33.3% were moderate protectiveness, and 20.7% were low protectiveness. Among the multiple child families, 41.8% of parents scored high protectiveness, 40.3% scored moderate protectiveness, and 17.9% scored low protectiveness. A chi-square of sibling presence and HURT protectiveness level yielded a chi-square = .685 (df = 2, p = .710) indicating no relationship between home modification behaviors and the independent variable of sibling presence. Further details regarding the HURT scores can be found in *Table 25*.

Table 25

Home Unintentional Risk Tool Descriptive Statistics

	Single Child (n=63)		Multi-Child (n=67)	
High Protectiveness	29	46%	28	41.8%
Moderate Protectiveness	21	33.3%	27	40.3%
Low Protectiveness	13	20.7%	12	17.9%

To investigate for confounding unintentional injury risk factors within the demographic variables, the HURT results were analyzed for a relationship with the variables child gender, child age, child race, parent education, and family income. A chi-square analysis revealed no statistically significant relationship between HURT

protectiveness rankings and child age, child gender, child race, parent education level, and family income. *Table 26* details the results of the analysis.

Table 26

Home Unintentional Risk Tool grouped according to Demographic Variables

Demographic Variable	Chi-Square (n=130)
Child Gender	$\chi^2 = .202$ (df = 2, p = .904)
Child Age	$\chi^2 = 65.080$ (df = 56, p = .190)
Child Race	$\chi^2 = 4.732$ (df = 8, p = .786)
Parent Education Level	$\chi^2 = 13.666$ (df = 10, p = .189)
Family Income	$\chi^2 = 10.786$ (df = 10, p = .374)

Injury event questionnaire

To measure injury rate among children in the study, parents were asked to complete an injury event questionnaire. The questionnaire included the frequency of medically attended injuries for the eligible preschool child, ages when the injuries occurred, and, if applicable, a description of the most recent medically attended injury event as well as the most recent hospitalization related to an injury event. Among the 130 child participants, parents/guardians indicated 61 (47%) of the children had no medically attended injuries. The remaining 69 (53%) children in the study had experienced at least one medically attended injury event. Of the 63 single children in the sample, 29 (46%) reported at least one medically attended injury event. Of the 67 children from multiple child families represented, 40 (59.7%) reported at least one medically attended injury events. Among children with no medically attended injuries, 34 (54%) were from singleton child families and 27 (40.3%) were from multiple child families. A chi-square analysis of injury occurrence and presence of siblings yielded a χ^2

= 2.436 (df = 1, p = .119) indicating no statistically significant relationship between these variables within the study population.

Of those children who experienced a medically attended injury, the majority of the children with injuries experienced only one injury event. Nineteen of the 29 (65.6%) injured singleton children experienced only one medically attended injury event. Twenty-five of the 40 (62.5%) injured children with siblings experienced only one medically attended injury event. Only two children were reported to have a hospitalization related to an injury event. Both injuries were related to falls and resulted in laceration injuries and both of those children were from singleton child families. Due to the low response rates of injury related hospitalizations, no further analysis was completed. The majority of injury events were reported to be caused by falling while walking, running or climbing with 13 of the 29 (44.8%) single child injury events and 20 of the 40 (50%) children with siblings injury events occurring related to this type of fall. The child's home was the most common location for injury events. Fourteen of the 29 (48.3%) singleton child injury events occurred at home and 21 of the 40 (52.5%) children with siblings injury events occurred at home. The most common injury types among the respondents were soft tissue injury, serious cut, and broken/dislocated bone. Further details regarding the reported injury events can be found in *Table 27.*

Table 27

Injury Event Variables Descriptive Statistics

Medically Attended Injuries	Number		Percent of sample	
Single Child with Injury Event	29		46%	
Multi-Child with Injury Event	40		59.7%	
	Single Child (n = 63)		Multi-Child (n = 67)	
No Injuries	34	54.0%	27	40.3%

One Injury	19	30.2%	25	37.3%
Two Injuries	6	9.5%	11	16.4%
Three + Injuries	4	6.4%	4	6.0%
Hospitalized for Injury				
Yes	2	3.2%	0	-
No	61	96.8%	67	100%
How injured	Single Child Injuries (n = 29)		Multiple Child Injuries (n = 40)	
Fall walk, run, climb	13	44.8%	20	50.0%
Fall from height	2	6.9%	4	10.0%
Hit by object	1	3.4%	1	2.5%
Burn	1	3.4%	2	5.0%
Ate something poisonous	1	3.4%	3	7.5%
Cut/pierce by object	2	6.9%	4	10.0%
MVC	2	6.9%	1	2.5%
No Response	7	24.1%	5	12.5%
Where injury occurred				
Home	14	48.3%	21	52.5%
Preschool/daycare	2	6.9%	4	10.0%
Other home (family, friend)	1	3.4%	2	5.0%
Public setting	0	-	3	7.5%
Car	1	3.4%	2	5.0%
Playground	2	6.9%	1	2.5%
Outside	1	3.4%	2	5.0%
No Response	7	24.1%	5	12.5%
What type of injury				
Burn	1	3.4%	4	10.0%
Soft tissue injury	6	20.7%	8	20.0%
Serious cut	8	27.6%	8	20.0%
Broken/dislocated bone	3	10.3%	8	20.0%
Sprain/strain	0	-	2	5.0%
Head injury/concussion	1	3.4%	2	5.0%
Tooth/mouth injury	2	6.9%	0	-
Swallow poisonous	1	3.4%	3	7.5%

No Response	7	24.1%	5	12.5%
Supervision During Injury Event				
Watched by parent/guardian	20	69.0%	27	67.5%
Watched by another adult	3	10.3%	8	20.0%
Watched by adolescent/child	0	-	3	7.5%
Supervisor within feet of child	17	58.6%	24	6.0%
Supervisor inattention	5	17.2%	11	27.5%
Supervisor able to see child	18	62.1%	26	65.0%
Supervisor able to hear child	21	72.4%	31	77.5%
No Response	7	24.1%	5	12.5%

Parents/guardians were reported as the child's supervisor during the majority of the injury events. Of the twenty-nine singleton child injury events, twenty (70%) of those occurred while parents/guardians were supervising. Among the forty children with siblings injury events, twenty-seven (67.5%) of the injuries occurred while the parent/guardian was supervising. Inattention of the child's supervisor was reported in only five of the twenty-nine (17.2%) singleton child injury events and eleven of the forty (27.5%) children with siblings' injury events. For the majority of the injury events, the child's reported supervisor was within feet of the child, able to see the child and able to hear the child. Further details regarding child supervision during the reported injury events can be found in *Table 27*.

To consider the impact of the variable of sibling presence on injury events, each of the injury event variables was grouped according to singleton child or multi-child family. No statistically significant differences were found in a chi-square analysis of the injury event variables of injury, injury frequency, injury cause, injury location, injury type, and supervision during the injury when grouped by sibling presence (*Table 28*).

Table 28

Injury Event Variables grouped according to Sibling Presence

Injury Variable	Chi-Square (n = 130)
Injury Occurrence (Injured or Not Injured)	$\chi^2 = 2.436$ (df = 1, p = .119)
How injured	$\chi^2 = 1.603$ (df = 6, p = .952)
Where injury occurred	$\chi^2 = 3.272$ (df = 6, p = .774)
What type of injury	$\chi^2 = 7.096$ (df = 7, p = .419)
Supervision During Injury Event	
Watched by parent/guardian	$\chi^2 = 1.770$ (df = 1, p = .183)
Watched by another adult	$\chi^2 = 2.312$ (df = 3, p = .510)
Supervisor within feet of child	$\chi^2 = 1.703$ (df = 3, p = .784)
Supervisor able to see child	$\chi^2 = .506$ (df = 2, p = .776)
Supervisor able to hear child	$\chi^2 = .718$ (df = 2, p = .698)

Research question 1:

Do parents of a single child household have different beliefs about supervision and supervisory practices than parents of a multiple child household?

One hundred thirty families were enrolled in the study with 63 families identified as singleton child families and 67 families identified as multiple child families. Parent responses to the Beliefs about supervision questionnaire and the Parent supervisor attributes profile questionnaire were used to measure parent beliefs about age appropriate supervision and supervisory practices. Mann Whitney U test for statistically significant relationships was utilized to investigate the relationship between the variables of sibling presence and parent beliefs and practices regarding supervision. The Beliefs about supervision questionnaire revealed only one statistically significant relationship for a no/low risk fall scenario between sibling presence and supervision beliefs (U = 1564.5, Z = -2.554, p = .011). No further statistically significant relationships were found between

the supervision scenarios and sibling presence in the family. The Parent supervisor attributes profile questionnaire yielded no statically significant relationship between sibling presence and the four supervisory attributes of protectiveness, supervision, risk tolerance, and fate controlling child health.

Research question 2:

Do parents of a single child household have different beliefs about development than parents of a multiple child household?

Parental beliefs about development were measured utilizing the developmental competence questionnaire. Parent beliefs about development scores compared between the 63 singleton child families and 67 multiple child families yielded no significant relationship between parental developmental beliefs and sibling presence. Parent knowledge about development was analyzed for typical child development and development specific to the parent's own child.

Parent beliefs about development scores for the typical child development responses ranged from -20.0 to 8.0 with a median score of -11.0, which reflected an overestimation of typical child development. Gross motor development score median (-7.0), fine motor development score median (-1.0), and cognitive development score median (-2.0) all reflected a parental overestimation of typical child development when compared to developmental norms. The Mann Whitney U analysis of the variables of sibling presence and typical child developmental competence scores and sub-scores yielded no statistically significant relationship between the variables. Typical child parental development beliefs and sibling presence yielded a Mann Whitney U = 2077.5 ($Z = -.154$, $p = .878$) with no statistically significant relationship.

Parental developmental beliefs for his/her own child followed a very similar pattern to the scores for typical child development. Parents overestimated the developmental abilities of their own children with developmental scores ranging from -26.0 to 7.0 with a median score of -14.0. Gross motor development score median (-8.0), fine motor development score median (-2.0) and cognitive development score median (-3.0) reflected an overestimation of the parents' beliefs about their own children's developmental ability in each of the sub-scale areas as well. Just as with typical child development scores, the Mann Whitney U = 1809.5 (Z = -1.405, p= .160) yielded no significant relationship between the variable of own child parent development knowledge and presence of siblings.

Research question 3:

Do parents of a singleton child household have different home modification practices intended to prevent child injuries than parents of a multiple child household?

Home modification and injury protective behaviors were measured utilizing the Home unintentional risk tool (HURT). HURT scores for the parent/guardian respondents ranged from a low score of 17, indicating high protective behaviors, to a high score of 61, indicating low protective behaviors. Parent's of singleton children scored 46% high protectiveness, 33.3% moderate protectiveness, and 20.7% low protectiveness. Parents of multiple children scored 41.8% high protectiveness, 40.3% moderate protectiveness, and 17.9% low protectiveness. HURT scores for parents of single children and HURT scores for parents of multiple children had no statistically significant differences in a chi-square = .685 (df = 2, p = .710).

Research question 4:

Are selected demographic characteristics a significant predictor of the sub-scale scores on parental supervision, supervisory practices, beliefs about development and home modification practices?

Demographic characteristics were analyzed for the singleton child and multiple child families to determine if any statistically significant difference existed between the two groups. No statistically significant differences were found for the child variables of gender, age and race between singleton children and multiple children. Among family variables, marital status ($\chi^2 = 13.741$, df = 4, p = .009) and family income ($\chi^2 = 15.847$, df = 5, p = .007) were found to have statistically significant differences between the families with singleton children and families with multiple children. The family demographic variables of parent/guardian age, parent/guardian race, and parent education level did not have any statistically significant differences between singleton child and multi-child families.

Considering unintentional injury risk factors, the demographic variables of child gender, child age, child race, parent education level, and family income were investigated for statistically significant influences on the data analysis. The PSAPQ attributes of protectiveness, supervision, risk tolerance, and fate controlling child health were analyzed for a relationship with the demographic variables. Statistically significant relationships were found between child age and supervision ($\chi^2 = 667.279$, df = 504, p = .000), child race and supervision ($\chi^2 = 120.309$, df = 72, p = .000), child race and fate controlling child health ($\chi^2 = 69.042$, df = 40, p = .003), and parent education and risk

tolerance (χ^2 = 159.306, df = 100, p = .000). Child gender and family income had no statistically significant relationship with any of the PSAPQ attributes.

Based on chi-square analysis of the Beliefs about supervision questionnaire and the identified demographic variables, child gender and parent education level had no statistically significant relationship to the BASQ scores. The demographic of child age was found to have a significant influence on the BASQ score of drowning, risk scenario (χ^2 = 528.139, df = 476, p = .049). Child race was statistically significantly related to fall, no/low risk (χ^2 = 87.723, df = 60, p = .011), burn, no/low risk (χ^2 = 131.357, df = 88, p = .002), suffocation/choking, no/low risk (χ^2 = 118.428, df = 72, p = .000), drowning, no/low risk (χ^2 = 92.973, df = 72, p = .049), and playing with friend, no/low risk (χ^2 = 123.733, df = 64, p = .000). Family income was statically significantly related to burn, no/low risk (χ^2 = 139.903, df = 105, p = .013), suffocation/choking, no/low risk (χ^2 = 115.247, df = 90, p = .038), suffocation/choking, risk (χ^2 = 126.763, df = 80, p = .001), and playing with friend, no/low risk (χ^2 = 118.339, df = 80, p = .003).

To evaluate demographic influences on parental beliefs about development, the developmental competence scores were analyzed grouped by the identified child injury risk demographics. Child race was found to have a statistically significant impact on typical child parental beliefs about development (χ^2 = 147.245, df = 96, p= .001) and on own child parental developmental beliefs (χ^2 = 156.973, df = 108, p= .001). Additionally, parent level of education was found to significantly impact the analysis of own child parental developmental beliefs (χ^2 = 214.069, df = 135, p = .000). Child gender, child age, and family income did not have a statistically significant relationship to parental developmental beliefs about development.

Home modification practices, measured by the HURT, were investigated for statistically significant relationships to the demographic variables of child gender, child age, child race, parent education, and family income. No statistically significant relationships were found for the HURT protectiveness rankings and the demographic variables.

CHAPTER V

Discussion

Unintentional injury is the leading cause of childhood morbidity and mortality in the United States (Borse et al., 2008). Preschool age children, one to four years of age, have the highest rates of unintentional injury events and are particularly vulnerable developmentally, cognitively and socially. Preschool age children are dependent on parents and guardians to provide injury prevention as the children are cognitively and developmentally unable to do so. This study focuses on investigating child injury from the perspective of parent and guardian beliefs and behaviors regarding development, supervision, and home safety modification.

As a descriptive study, this exploratory research is sought to identify the existence of relationships between the variables assumed to affect preschool injury risk. The particular focus of this research is to investigate the relationship between singleton children and children with siblings and parent/guardian beliefs regarding development, beliefs and behaviors regarding supervision, and home safety modification. The presence of siblings has been identified as a risk factor for preschool unintentional injury with higher injury rates for children in multiple child families (Scholer, et al., 1997; Nathens, et al., 2000; Morrongiello, et al., 2007). Unlike the results in the review of literature, for this study population, there was not a significant relationship between sibling presence and injury events. However, with a $\chi^2 = 2.436$ (df = 1, p = .119), the variables were close to significantly related and a significant relationship could be revealed in a larger study population. Children with injuries represented a relatively small part of the sample and

that could have influenced the non-significant relationship between siblings and injury events found in this study.

Within this review of literature, a variety of relationships have been suggested as to why the higher rate of injuries occurs in multi-child families, but studies have not investigated the relationships between sibling presence and parent beliefs and behaviors regarding development, supervision, and home safety modification. The results of this descriptive investigation will be applied to further inquiry into the relationship among the injury risk variables. The complex interaction of child, home environment, and family factors influencing preschool unintentional injury are illustrated in Figure 1. The conceptual framework for this research study focusing on child injury event risk factors was built on the Haddon Phase-Factor matrix of injury events as illustrated in Table 1 (Haddon, 1968, 1972; Barnett et al., 2005). The conceptual framework provided the study with a researchable injury model rather than a definition of injury as an accidental event. Child injury risk factors are the pre-event factors that influence a child's injury risk and establish a research framework for injury events. The Haddon Phase-Factor matrix provided the epidemiologic framework to explore the research questions posed in this study.

Child injury risk is based on exposure to the known risks for unintentional injury including age, gender, risk taking behaviors, and developmental abilities. However, preschool child injury risk is primarily influenced by parent and family factors as preschool children do not have the cognitive and developmental abilities to consistently comprehend and incorporate injury prevention strategies. Parent beliefs about supervision and behaviors regarding supervision influence parent's incorporation of

injury prevention strategies. This study proposes that parent beliefs about development also influence parent implementation of injury prevention strategies. Home environment is of particular focus as the majority of preschool injuries occur in the home (Baker, O'Neill, Ginsberg, & Li, 1992). Parent/guardian modifications of the home environment have been demonstrated to have a positive impact on preventing injuries. Child injury risk factors in the Haddon Phase-Factor matrix and the illustration of how each of the pre-event injury risks impact child injury risk provide the essential connections between the concepts of child developmental competence, parental supervision behaviors and attitudes, home injury risk, and unintentional injury. The review of literature and study results support the connection of these variables, but illustrates the need for further study to understand the complex relationships that exists among the variables and child injury risk.

In the discussion of the results of this descriptive research study, it is important to consider the limitations of the study. The primary limitation of the study is a non-representative sample based on population demographics. The majority of parents responding to the research questionnaires were white, college educated, and married with an income well above the median family income for the St. Louis metropolitan area. Significant statistical difference was found between singleton child families and multiple child families and marital status. The remaining demographic variables did not demonstrate statistically significant differences between singleton and multiple child families but do not represent population demographics. Parents were recruited across a diverse geographic and socio-economic population, but parent self-selection was the ultimate determining factor in study participation. The study could be strengthened by

targeting early childhood care centers that would draw a more diverse study population to be more representative of the population of the region.

Snowball sampling was utilized for data collection through referrals from study participants. Snowball sampling accounted for 30 of the 130 included responses, which represents 23% of the study population. Recruitment of study participants by other study participants could have contributed to the demographic homogeneity of the study sample as participants may have not had a diverse social network and those social networks were the likely participants referred to the study. Future studies would build mechanisms to increase demographic diversity in the study population which would likely result in a more diverse snowball population as well.

Family questionnaire responses were voluntary which allowed parents/guardians to self select to participate. This could have influenced the data collection process as parents with more diverse beliefs and behaviors regarding development, supervision, and home modification may have self-selected not to participate. The length of the questionnaire could also have affected responses. The questionnaire was timed by the researchers to require 20 to 30 minutes to complete, which is a large amount of time for busy parents of preschool age children. Single parents and parents from lower socioeconomic groups, which are underrepresented in the study population, may have not had the time available to complete such a lengthy questionnaire. Additionally, parents were assumed to have responded truthfully and accurately, which is an inherent limitation of self-report questionnaire.

The majority of the findings of the study yielded non-significant relationships between the study variables. The variables were categorical and ordinal in nature, which

only allowed for a non-parametric analysis of relationships. Non-parametric statistics have lower levels of sensitivity, which could have limited the significant findings revealed. The developmental competence instrument is a new instrument developed and implemented for this study. The instrument could lack precision and needs further validation. Lack of instrument precision could have contributed to the non-significant results. Analysis of mean, median and frequency identified results that were different between the singleton child and multiple child groups but did not attain statistically significant levels of difference. Significant relationships could be found with larger numbers of study participants. The power analysis conducted prior to the data collection process was powered at a moderate effect size. A smaller effect size with a larger number of participants may have increased the significance found in the relationships among the variables.

Discussion of Results

Parental Developmental Beliefs. Parents were consistently unable to identify ages appropriate for gross motor, fine motor and cognitive developmental tasks. The majority of parents overestimated child developmental levels thus predisposing their child to injury risk. Overall parental developmental competence scores had a median of (-11.0) indicating that parents overestimated child developmental abilities in at least 11 of the 26 developmental tasks indicating a profound mismatch between normal child developmental abilities and parent beliefs about abilities. An assumption of this research is that developmental mismatch causes an increased injury risk among preschool age children. Allowing children to engage in situations that are beyond their motor or

cognitive developmental abilities place children at greater risk for injury because these children may be allowed in developmentally inappropriate situations.

Analysis of the relationship between parental understanding of gross motor development, fine motor development, cognitive development, and overall parental development and sibling presence found no statistically significant differences between parents of singleton children and parents of multiple children. This was true for parental developmental beliefs regarding typical children and their own child, indicating no significant relationship between parental beliefs about development and sibling presence. It was hypothesized that parents with multiple children would have beliefs about development that were more closely aligned with developmental norms. To that end, study data were collected on the youngest eligible child in the family to capture this phenomenon. The study results indicated no relationship between parent developmental beliefs and presence of siblings indicating that parents who have older children have no difference in their understanding of development than parents who have no other children despite the additional parenting experience.

To control for the confounding bias of parental expectations, the parental developmental competence instrument was purposely given to parents twice. Porter et al. (2007) identified that parents had a broad range of developmental beliefs regarding appropriate ages for developmental milestones. It was hypothesized that parents would have an inaccurate perception of his/her own child's development but a more realistic view of child development in general. In the design, the questions regarding typical child development were intended to identify parent overestimation of child developmental abilities and compare those to the own child developmental beliefs to assess for

significant differences between responses. Parents were expected to overestimate the developmental abilities of their own children. Developmental estimations of typical child development and own child development were fairly equivalent and may have not impacted parent estimations of child developmental abilities.

Child race and level of parent education were found to be significant confounding variables for parental beliefs about development. The connection between child race and parent beliefs about development needs further investigation especially considering the low level of diversity in the study population. Parent level of education could influence knowledge base of child development. A more demographically diverse study population may yield results that would more clearly identify relationships between the demographic variables.

Beliefs about supervision. Parent beliefs about supervision were found to have limited significant relationships to sibling presence. The only supervisory scenario found to be significantly related to singleton child families versus multiple child families was falls in the no/low risk scenario. The remaining no/low risk and risk scenarios were not significantly related to sibling presence. These results indicate that parent beliefs about supervision are not related to the presence of a sibling and are consistent among parents with singleton children and parents with multiple children. Multiple studies discussing increased injury risk among children with siblings have proposed parental supervision differences as a possible explanation. No relationship appears to exist between parental supervisory beliefs and sibling presence in families.

Demographic injury risk variables did influence the results with statistically significant differences found between the BASQ variables and child age, child race, and

family income. Child age was significantly related to the variable of drowning, which could be explained by a higher level of protective behaviors for younger children. In the review of literature, Borse et al. (2008) and Goodman, Glik, and Jackson (2004) identified age as an injury risk factor for preschool age children. Child age is a marker for the cognitive and motor development of preschool age children. Child race was significantly related to multiple supervisory belief variables. Race was not specifically identified as an injury risk factor in the review of literature and further analysis and investigation is needed to determine the extent and nature of the relationship. Family income was found to be significantly related to multiple supervisory belief variables. Within the review of literature, lower socioeconomic status was identified as a risk factor for preschool injury (Peden et al., 2008; Scholer et al., 1997; Hong et al., 2010). The relationship between supervision and injury risk demonstrates a mediating variable between family income and injury risk which would explain the supervision differences found in the study results and demonstrate consistency with the injury literature.

Parent supervision attributes profile. Parent supervisory attributes of supervision, protectiveness, risk tolerance and fate controlling child health were analyzed for a relationship to sibling presence. None of the parent supervisory attributes was found to have a significant relationship with sibling presence. These results suggest there is no significant difference in supervision between parents with singleton children and parents with multiple children. The significance scores for protectiveness and supervision were close to the statistical significance level necessary to demonstrate a relationship between the variables during the Mann Whitney U analysis. With an increase in effect size and power and a more diverse study sample, a relationship may

exist between sibling presence and protectiveness and supervision attributes. Studies indentifying increased injury risk among children in multiple child families hypothesized parent supervision attribute differences were a possible explanation. In this study, supervision attributes were hypothesized to be different among singleton child families and multiple child families. The study results identified no significant relationship indicating that parent supervisory behaviors are not a significant influence on the increased injury risk among children in multiple child families.

With the recognized connection between demographic variables and child injury risk, parent supervision attributes were analyzed for confounding demographic relationships. Significant relationships to parent supervision attributes were not found with the variables of child gender and family income. A statistically significant relationship was found between child age and supervisory practices. Murray, Zentner, and Yakimo (2009) identified a broad range of fine motor, gross motor and cognitive developmental milestones throughout the preschool years. The significant relationship between age and supervisory practices reflects those developmental changes that occur between the ages of 2 ½ years and 5 years This finding is consistent with the results of Morrongiello, et al. (2006) who identified significant differences in parent supervision practices for children two to three years of age compared to children four to five years of age. Child race was statistically significantly related to supervision and fate controlling health. Further investigation is needed to understand the influence of child race on supervision attributes, such as fate. Risk tolerance was discovered to have statistically significant differences based on parent level of education. Consistent with the study results, Scholer et al. (1997) found lower levels of parent education to be a factor in

increased preschool injury risk. Parents with a higher education level could be more astute at identifying potentially injurious situations and practice more risk adverse supervision. However, further investigation is needed to understand the relationship between parent supervisory behaviors and parent education level.

Home unintentional risk tool (HURT). Comparisons of parent HURT scores between singleton child families and multiple child families yielded no significant differences in home modification behaviors. The demographic variables of child age, child gender, child race, parent level of education, and family income were also not significantly related to HURT scores. The results suggest there is no significant difference in home modification and injury protective behaviors between singleton families and multiple child families which indicates this is not a factor in the differences in injury rates between the two groups. Home modification differences were expected, with parents of multiple children hypothesized to have lower protectiveness scores to coincide with the increased injury risk of children with siblings. However, no differences were found between singleton child families and multiple child families indicating that home modification differences do not significantly impact the higher injury risk among children with siblings. Considering the sample demographics, these results may be reflective of the homogeneity of the study sample and should be investigated with a more diverse study population.

Injury event questionnaire. The focus of the study was to investigate the influences of multiple factors on child injury risk. The injury event questionnaire was specific to medically attended injuries. Fifty-three percent of the children in the study experienced a medically attended injury. Of those, 46% of the injuries were to singleton

children and 59.7% were to children with siblings. The injury rate was different between singleton and multiple child families, but was not statistically significant. Based on the injury literature, children with siblings have significantly higher rates of injury. This was not found in this study. While there is a large difference between the two groups, the relatively low number of injuries and low power inherent to non-parametric statistical analysis may account for the non-significant findings. This study's results replicate and reinforce other preschool injury phenomena. In the literature review, Borse et al. (2008) discussed falls as being a leading mechanism of injury for preschool age children. Within the sample population, injuries related to falls accounted for 51% of the injury events. As found by Baker et al. (1992), the home is the location for a majority of preschool age injury. Despite the children in the study population predominately enrolled in childcare centers outside the home, the child's home (48%) was the primary location for the injury events described in the data.

Specific details regarding supervision during the injury event were also collected as part of the injury event questionnaire. Parents supervised the majority of the injury events (68%) and the supervisor was identified as being within feet of the child (59%), able to see the child (64%), and able to hear the child (75%). The variables of supervisor inattention and having another child or sibling as supervisor were not designated frequently. Supervision by a sibling and supervisor inattention, especially caused by other children, have been posited as contributors to higher rates of injury for children of multiple child families. Because there was not enough designation of these two items, analysis of the significance of these factors is not possible. Further study is needed to investigate these supervisory variables.

Implications for Nursing Practice

The history of professional nursing is grounded in care of the community as a health care provider and educator. Nurses have a professional responsibility to promote health through education. For the patient population of preschool age children, unintentional injury is a key health concern and leading contributor to morbidity and mortality. Nurses, as community care providers and health care advocates, should be at the forefront of investigating the risk factors for child unintentional injury and incorporating that knowledge into health education.

Injury research demonstrates that children in multiple child families have significantly higher injury risk and rates of injury than singleton children. Various ideas have been proposed to account for the disparity in injury rates, but few have been investigated for legitimacy. There is an intuitive connection between the number of children in a family and parent supervisory practices. However, this descriptive study found no relationship between the presence of siblings and parent supervisory beliefs, parent supervisory practices, home modification behaviors and parent beliefs about development. These results suggest that none of these are significant explanation for the injury disparity between singleton children and children in multiple child families in this sample.

Despite the lack of significant relationships found among the research questions, the most important finding of this research study is the misperceptions among parent beliefs about child development. The overwhelming majority of parents in the sample overestimated typical child development and their own child's development when compared to standardized norms. Even among a well educated parental sample, parents

had an overwhelming lack of developmental competence. Further research with a more diverse sample could reveal even larger gaps in parental developmental competence. It is an assumption that parents who do not understand appropriate developmental tasks place their children in danger by placing the child in injury risk situations that the child is not developmentally able to negotiate. The analysis and significance of this lack of parental understanding of child development and the association with injury risk is being undertaken as part of the larger study of which this investigation is a component. Those results will be utilized to further inform nursing practice and parent education to improve parental developmental understanding, especially among parents of preschool age children. The improvement in parental developmental competence through nursing practice and parent education could have a profound influence on reducing childhood unintentional injury rates.

As health care advocates and educators, nurses must base professional practice on nursing science and research based evidence. Parent education involving preschool injury prevention should not include assumptions regarding sibling presence and parent supervision, home modification, and parental developmental beliefs. Nurses as scientists should continue to investigate the concepts of parent developmental beliefs, supervision, home modification and sibling presence to develop a more clear understanding of how these are connected to injury risk. Nurses as health care professionals should focus parent education on injury prevention based on research and an evolved understanding of child and family risk factors to improve the effectiveness of the prevention education and ultimately reduce injury rates.

Implications for Nursing Research

The presence of siblings has been demonstrated to significantly increase injury risk among preschool age children. As discussed earlier in this discussion section, the design of this research study was descriptive in nature with ordinal and nominal level data. Nonparametric statistics have a lower power and lower sensitivity which could obscure significant findings that may be evident in a larger sample with increased power and effect size. The relationship of sibling presence and parent supervisory attributes of supervision and protectiveness were close to significant and a more significant relationship could be revealed in a higher powered study. Additionally, the homogeneity of the study sample also could have contributed to the non-significant results. A larger, more diverse study would support that parent supervision, home modification and parental developmental beliefs do not significantly impact the increased injury risk of children in multiple child families. Each of these has been proposed as an influence on the injury risk disparity but a relationship is not revealed in the study data. With no significant relationships identified, further research is needed to investigate other influences on the increased injury risk among children with siblings.

Conclusion

This descriptive research study did not find any significant relationship to sibling presence amongst parent supervision, home modification behaviors, and parent beliefs about development. Preschool children in multiple child families are at increased risk for injury. With no apparent connection to parent supervision, home modification, and parental developmental beliefs, injury researchers must study further the child, family,

and environmental variables that influence preschool injury to elucidate the influence of sibling presence on injury risk.

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Appendix A: ***Family Questionnaire***

FAMILY QUESTIONNAIRE

Please fill in today's date: ___ / ___ / _____

This form filled out by: (Please circle one) *Mother Father Grandparent Other* _____

Questionnaire Instructions –

We are asking families to complete only one questionnaire. If you or your child's other parent or guardian have already completed this survey, please return the blank questionnaire in the envelope. Due to the anonymous nature of the survey collection, we do not know who has and has not completed the questionnaire, but wanted to give those not completing the questionnaire another opportunity to participate. Completing a second questionnaire will not increase your chances of winning one of the $50 gift cards.

This questionnaire is intended for families with children 2 ½ to 5 years old (30 to 59 months). Parents are asked to complete the following questionnaire based on that child and his/her development and supervision. If you have two children in the eligible age range, please complete the questionnaire on the youngest child. Families are asked to complete only one questionnaire for this study so do not complete a questionnaire for the second child. If you have children who are twins, please complete the instrument on the first-born twin. For the purposes of this research study, twins are not considered older siblings of each other.

There are seven sections to the questionnaire. Follow the instructions for each section as you complete that section. Please complete all sections of the questionnaire. The researchers estimate it will take 20 – 30 minutes to complete the entire questionnaire. You time, responses and opinions are truly appreciated.

Complete the following information on the children who reside in the family home a majority (at least 50%) of the time.

Child # 1 (2 ½ to 5 years)

What is your child's birthday? ___ / ___/ _____

Your child is (please circle) Boy Girl

Child # 2

What is your child's birthday? ___ / ___/ _____

Your child is (please circle) Boy Girl

Child # 3

What is your child's birthday? ___ / ___/ _____

Your child is (please circle) Boy Girl

Child # 4

What is your child's birthday? ___ / ___/ _____

Your child is (please circle) Boy Girl

Section 1 – Instructions

Please answer each of the following questions by placing an "X" in the appropriate column. There are no right or wrong answers. We simply want to know what you think. We understand that it may be difficult for you to think of a child doing some of these activities because of your child's current age, however please do your best to guess an approximate age for each of the following situations (do not leave any questions blank). We simply want to know at what age you believe a ***typical child*** and then ***your child*** can do the following activities without assistance.

	At what age do you consider a <u>typical child</u> to be able to….	**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
a)	go down stairs by sitting on his/her bottom and "bumping" down stairs?												
b)	climb the stairs placing both feet on each step before going to next step?												
c)	climb the stairs *while alternating feet* (step left foot onto one step, right foot onto the next step, etc)?												
d)	safely climb the stairs without supervision?												
e)	stand on one foot for 2 - 3 seconds?												
f)	stand on one foot for 7 - 8 seconds?												
g)	hop on one foot?												
h)	run without falling, most of the time?												
i)	take a bath and be left alone for more than 5 minutes?												
j)	use a crayon to draw, color or scribble?												
k)	attempt to seek or inspect/explore electrical outlets?												
l)	has good balance (example - able to prevent self from falling when he/she losses balance)?												
m)	know what to do if smoke alarm goes off?												

At what age do you consider a <u>typical child</u> to be able to….		**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
n)	walk a straight line with balance?												
o)	button and unbutton clothes while getting dressed and undressed?												
p)	open door by him/herself by turning handle?												
q)	turn faucet on and off?												
r)	run smoothly, turn sharp corner and able to stop quickly without losing balance?												
s)	pedal tricycle?												
t)	brush teeth well with supervision?												
u)	ride a bike with training wheels?												
v)	know and be able to follow safety rules?												
w)	follow simple one step command (example – pick up your jacket)?												
x)	follow two step command (example – pick up your jacket and take it to your room)?												
y)	walk without falling, most of the time?												
z)	cross the street safely while not holding adult's hand?												

At what age was <u>your child</u> able to or do you think <u>your child</u> will be able to…..		**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
a)	go down stairs by sitting on his/her bottom and "bumping" down stairs?												
b)	climb the stairs placing both feet on each step before going to next step?												
c)	climb the stairs *while alternating feet* (step left foot onto one step, right foot onto the next step, etc)?												
d)	safely climb the stairs without supervision?												
e)	stand on one foot for 2 - 3 seconds?												
f)	stand on one foot for 7 - 8 seconds?												
g)	hop on one foot?												
h)	run without falling, most of the time?												
i)	take a bath and be left alone for more than 5 minutes?												
j)	use a crayon to draw, color or scribble?												
k)	attempt to seek or inspect/explore electrical outlets?												
l)	has good balance (example - able to prevent self from falling when he/she losses balance)?												
m)	know what to do if smoke alarm goes off?												
n)	walk a straight line with balance?												
o)	button and unbutton clothes while getting dressed and undressed?												

At what age was <u>your child</u> able to or do you think <u>your child</u> will be able to…..		**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
p)	open door by him/herself by turning handle?												
q)	turn faucet on and off?												
r)	run smoothly, turn sharp corner and able to stop quickly without losing balance?												
s)	pedal tricycle?												
t)	brush teeth well with supervision?												
u)	ride a bike with training wheels?												
v)	know and be able to follow safety rules?												
w)	follow simple one step command (example – pick up your jacket)?												
x)	follow two step command (example – pick up your jacket and take it to your room)?												
y)	walk without falling, most of the time?												
z)	cross the street safely while not holding adult's hand?												

Section 2 Instructions

Please answer each of the following questions by placing an "X" in the appropriate column. Read the statements below and select the answer that best describes your child in the last six months. There are no right or wrong answers. We simply want to know what is true for you.

	During the last six months, has your child…	Never	Almost Never (once or twice)	Sometimes (once a month)	A lot of the time (once every other week)	Very often (More than once a week)	Does Not Apply
a)	Run out into the street (or parking lot)						
b)	Jumped off furniture (like beds, sofas), or playground equipment						
c)	Jumped down the stairs						
d)	Ridden a toy (such as big wheel, kiddie car, skateboard) in unsafe areas (street, hill, down stairs)						
e)	Run into or bumped into things (such as furniture, walls, poles, etc.)						
f)	Fallen down						
g)	Played with fire (such as matches, candles, lighters, etc.)						
h)	Put objects into electrical wall sockets or appliances (for example, toaster, VCR)						
i)	Left the house without permission						
j)	Refused to use the seat belt or car seat or stay seated in the car						
k)	Played with sharp objects (such as tools, knives)						
l)	Pushed or pulled furniture or heavy objects over						

	During the last six months, has your child…	Never	Almost Never (once or twice)	Sometimes (once a month)	A lot of the time (once every other week)	Very often (More than once a week)	Does Not Apply
m)	Fell out of windows or down stairways						
n)	Put objects or non-food items in mouth						
o)	Got scratches, scrapes or bruises during outdoor play						
p)	Taken chances on playground equipment (done risky things)						
q)	Run out into the street (or parking lot)						
r)	Tried to climb on top of furniture, cabinets.						
s)	Stood on chairs						
t)	Explored places that are “off limits” or against the rules (such as medicine cabinets, storage shed)						
u)	Gotten into dangerous substances (medication, gasoline, cleaning supplies)						
v)	Played carelessly or recklessly (done risky things)						
w)	Gotten burned with hot objects (such as stove, iron)						
x)	Behaved carelessly around water (pools, bathtubs)						
y)	Teased animals (like a dog she/he doesn’t know)						

Section 3 – Instructions

Please answer each of the following questions by placing an "X" in the appropriate column. There are no right or wrong answers. We simply want to know what you think. We understand that it may be difficult for you to think of a child doing some of these activities because of your child's current age, however please do your best to guess an approximate age for each of the following situations (**do not leave any questions blank**). Also, you CANNOT respond never for any questions because, at some time, you (like every other parent) will allow your child to do these activities without constant supervision. We simply want to know at what age you believe a typical child and then your child can do the following activities without constant supervision.

	At what age do you believe a child can be allowed to do the following without constant supervision for more than 10 minutes?	**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
a)	Playing with toys in a fenced yard, and you can monitor the child occasionally from your location inside the house?												
b)	Playing with toys on the floor of his/her bedroom, and you can monitor the child occasionally from your location in another room of the house?												
c)	Playing with toys in the bathtub, and you can monitor the child occasionally from your location outside the bathroom?												
d)	Playing on playground equipment (swings, slide) in a fenced yard, and you can monitor the child occasionally from your location inside the house?												
e)	Playing with toys in the kitchen, and you can monitor the child occasionally from your location in another room of the house?												
f)	Playing with toys in the dining room, and you can monitor the child occasionally from your location in another room in the house?												
g)	Playing with toys in the living room, and you can monitor the child occasionally from your location in another room of the house?												

	At what age do you believe a child can be allowed to do the following without constant supervision for more than 10 minutes?	**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
h)	Going to the neighborhood playground with some friends in the park behind your house, and you can monitor the child occasionally from your location at your house?												
i)	Watching TV or videos, and you can monitor the child occasionally from your location in another room in the house?												
j)	Playing with toys in a playroom, and you can monitor the child occasionally from your location in another room in the house?												
k)	Playing with toys in the garage, and you can monitor the child occasionally from your location in the house?												
l)	Playing with toys on the bathroom floor, and you can monitor the child occasionally from your location in the house?												
m)	Playing with toys in the den with the fireplace on low in a distant corner, and you can monitor the child occasionally from your location in another room in the house?												
n)	Playing with marbles in a playroom , and you can monitor the child occasionally from your location in another room in the house?												
o)	Removing puzzles and games they want to play with from a closet, and you can monitor the child occasionally from your location in another room of the house?												

	At what age do you believe a child can be allowed to do the following without constant supervision for more than 10 minutes?	**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
p)	Playing with toys in a kiddie pool that has been made into a sandbox, and you can monitor the child occasionally from your location inside the house?												
q)	Playing with toys on the top bunk bed, and you can monitor the child occasionally from your location in another room of the house?												
r)	Playing with toys on the floor of his/her bedroom where a container of pills have been left on the dresser, and you can monitor the child occasionally from your location in another room of the house?												
s)	Playing with toys in the kitchen where a cup of hot chocolate has been left on the table, and you can monitor the child occasionally from your location in another room of the house?												
t)	Playing with toys in the dining room where furniture polish and glass cleaner have been left on the table, and you can monitor the child occasionally from your location in another room of the house?												
u)	Playing with toys in the living room where regular scissors have been left on the table and you can monitor the child occasionally from your location in another room of the house?												
v)	Watching TV or videos with friends at your home, and you can monitor the children occasionally from your location in another room of the house?												

	At what age do you believe a child can be allowed to do the following without constant supervision for more than 10 minutes?	**1 year**	**1 ½ years**	**2 years**	**2 ½ years**	**3 years**	**3 ½ years**	**4 years**	**4 ½ years**	**5 years**	**5 ½ years**	**6 years**	**6 ½ years**
w)	Playing with toys in the garage where an open toolbox has been left out, and you can monitor the child occasionally from your location inside the house?												
x)	Playing with toys in the den, and you can monitor the child from your location outside the bathroom?												
y)	Playing with toys on their bed, and you can monitor the child from your location in another room of the house?												
z)	Playing with toys in a kiddie pool containing 8 inches of water, and you can monitor the child occasionally from your location inside the house?												
aa)	Removing puzzles and games they want to play with from plastic storage bags in the closet, and you can monitor the child from your location in another room of the house?												
bb)	Playing outside a friend's house who lives 6 houses further up the street, and you can monitor the child occasionally from your house?												
cc)	Playing just outside your house, for example, in the driveway area or on the front lawn and you can monitor the child occasionally from your location in the house?												
dd)	Playing just outside your house with friends, for example, in the driveway area or on the front lawn, and you can monitor the child occasionally from your location in the house?												

Section 4 Instructions

Please answer each of the following questions by placing an "X" in the appropriate column. Parents need to balance supervision, to assure their child's safety, with the child's need for growth and independence. We are trying to learn more about parents' attitudes about the protection and supervision needs of their young children, particularly ***when at the playground***. Please read each statement below and select a response to indicate how often you think each is true while at the playground. There are no right or wrong answers. We simply want to know what is true for you.

	When you answer these questions, the child we are referring to is the child you are completing the questionnaire about.	**Never**	**Some of the time**	**½ of the time**	**Most of the time**	**All of the time**
z)	I make him/her keep away from anything that could be dangerous.					
aa)	I let him/her learn from his/her own mishaps.					
bb)	Whether or not my child gets injured is largely a matter of fate.					
cc)	I keep an eye on my child's face to see how he/she is doing.					
dd)	I stay close enough to my child that I can get to him/her quickly.					
ee)	I let my child experience minor mishaps if what he is doing is lots of fun.					
ff)	I feel very protective of my child.					
gg)	I keep a close watch on my child.					
hh)	I wait to see if he/she can do things on his/her own before I get involved.					
ii)	I warn him/her about things that could be dangerous.					
jj)	When my child gets injured it is due to bad luck.					
kk)	I make sure I know where my child is and what he/she is doing.					
ll)	I can trust my child to play by himself/herself without constant supervision.					

	When you answer these questions, the child we are referring to is the child you are completing the questionnaire about.	**Never**	**Some of the time**	**½ of the time**	**Most of the time**	**All of the time**
mm)	I let my child take some chances in what he/she does.					
nn)	I have my child within arm's reach at all times.					
oo)	I try things with my child before leaving him/her to do them on his/her own.					
pp)	I say to myself that I can trust him/her to play safely.					
qq)	I hover next to my child.					
rr)	I feel fearful that something might happen to my child.					
ss)	I stay within reach of my child when he/she is playing on the playground equipment.					
tt)	I let my child make decisions for himself/herself.					
uu)	I feel a strong sense of responsibility.					
vv)	I encourage my child to take risks if it means having fun during play.					
ww)	I think of all the dangerous things that could happen.					
xx)	I let my child do things for him/herself.					
yy)	I know exactly what my child is doing.					
zz)	I encourage my child to try new things.					
aaa)	Good fortune plays a big part in determining whether or not my child gets injured.					
bbb)	I keep my child from playing rough games or doing things where he/she might get hurt.					

Section 5 – Instructions

Please answer each of the following questions by circling your best response to each of the questions below. Read the questions below and answer for the place where your child lives.

a)	Do you think the place where your child lives is safe for children?	Yes (skip to b)			No		
	If No, which of the following rooms/areas do you think are <u>most dangerous</u> for your child? Check all that apply.	Kitchen	Bathroom	Living room	Family room/ Play room	Child's bedroom	Your bedroom
		Other (specify)_____					
b)	Do you have a smoke alarm in your home?	Yes		No		I don't know	
	If Yes, when was the last time someone changed the battery in your smoke alarm?	_____ months ago		No batteries/ electric		I don't know	
c)	Do you have a fire extinguisher in your home?	Yes		No		I don't know	
d)	At what temperature/setting is your hot water heater set?	_____ degrees				I don't know	
e)	Do you have a carbon monoxide detector in your home?	Yes		No		I don't know	
f)	Where do you keep your cleaning supplies? Mark all that apply.	On a high shelf above child's reach		On a counter	Under the sink		I don't know
		Other (specify)_____					
g)	Are your cleaning supplies kept locked up?	All are locked	Some are locked		None are locked		I don't know

h)	Do you have stairs in your home?	Yes			No (skip to i)	
	If Yes, do you use any of the following equipment on or near your stairs? Mark all that apply.	A gate at the top	A gate at the bottom	A door	Nothing	I don't know
		Other (specify) _____				
i)	Where do you keep your medicines? Mark all that apply.	In a locked cabinet/ pantry	In an unlocked cabinet/ pantry	On a counter	I don't know	
		Other (specify) _____				
j)	Do you have plants in your home?	Yes		No (skip to k)	I don't know (skip to k)	
	If Yes, are any of your plants poisonous?	Yes		No	I don't know	
k)	Do you have the poison control number in your home?	Yes		No	I don't know	
n)	Do you have loose rugs in your home (it tends to slip when you step on it)?	Yes		No	I don't know	
o)	Are any of the floors in your home slippery when they are dry?	Yes		No	I don't know	
p)	Are any of your floors uneven?	Yes		No	I don't know	

q)	Do you have a gun in your home?	Yes	No	I don't know		
	If yes, what types of guns do you have? Mark all that apply	Rifles	Shotguns	Handguns	Other What kind? _____	
	How do you store your guns? Mark all that apply.	Unlocked/ loaded	Unlocked/ unloaded	Locked/ loaded	Locked/ unloaded	I don't know
		Other (specify)_____				
	Where do you store your guns? Mark all that apply.	In a closet	In a gun case	In the basement	In the attic	Under the bed	I don't know
		Other (specify)_____				
	Where do you keep your ammunition/bullets? Mark all that apply.	With the gun	Locked container separate from gun	Unlocked container separate from gun	I don't know	
		Other (specify)_____				
r)	Do you use electrical outlet/ socket protectors in your home?	Yes	No	I don't know		
	If Yes, what rooms do you use the outlet/ socket protectors in? Mark all that apply.	Child's bedroom	Family room/ play room	Living room	Bathroom	Kitchen
		All the rooms in the house	I don't know	Other (specify) _____		

Section 6 – Instructions

Please answer each of the following question by circling the most appropriate choice and filling in the corresponding blank regarding age at the time of the injuries. Answer the following questions about the child for whom you are completing the questionnaire.

Thinking about your child's past, has there ever been a time when your child had a medically attended injury. A medically attended injury is an injury that results in you calling medical personnel (nurse, doctor, etc.) for advice, or taking your child to a doctor's office, emergency room, urgent care or hospital. Please answer the following questions about your child.

1)	How many times has your child been injured when it resulted in you calling medical personnel (nurse, doctor, etc.) for advice, or taking your child to a doctor's office, emergency room, urgent care or hospital?	No medically attended injuries	1 medically attended injury	2 medically attended injuries	3 medically attended injuries	4 medically attended injuries	5+ medically attended injuries				
2)	For each of the medically attended injuries, please mark the age(s) of your child at the time of the injury.	Birth - 6 months	6 – 12 months	13 – 18 months (1 – 1 ½)	19 – 24 months (1 ½ - 2)	25 – 30 months (2 – 2 ½)	31 – 36 Months (2 ½ - 3)	37 – 42 months (3 – 3 ½)	43 – 48 months (3 ½ - 4)	49 – 54 months (4 – 4 ½)	55 – 60 months (4 ½ - 5)
	For each age indicated, please note how many medically attended injuries occurred at that age.	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
3)	Has your child ever been hospitalized for an injury?	Yes						No			

If your child has had more than one injury requiring medical attention, please fill out questions 4 – 8 about the <u>most recent injury</u>.
If your child has ever been hospitalized for an injury, please fill out questions 9 – 13 about the <u>injury that resulted in the child being hospitalized</u>.

4)	How old was your child at the time of the most recent injury?	Birth - 6 months	6 – 12 months	13 – 18 months (1 – 1 ½)	19 – 24 months (1 ½ - 2)	25 – 30 months (2 – 2 ½)	31 – 36 Months (2 ½ - 3)	37 – 42 months((3 – 3 ½)	43 – 48 months (3 ½ - 4)	49 – 54 months (4 – 4 ½)	55 – 60 months (4 ½ - 5)
5)	How was your child injured?	Fall while walking, running, or climbing		Fall from a high object like a slide or on stairs		Hit by an object like a toy, ball or rock		Burn from a flame, liquids, foods, or other hot object		He/she ate something you thought was poisonous	
		Cut or pierced by an object		Motor Vehicle Accident		Bicycle accident		Other (Specify) _____			
6)	Where did the injury occur?	Home		Preschool or daycare		Other home like a friend or family		Public setting like a restaurant, mall, store		Car	
		Playground		Outside		Other location (Specify) _____					
7)	What type of injury did your child have?	Burn		Soft tissue injury, swelling or bruise		Serious cut that needed glue or stitches		Broken bone		Sprained or strained muscle	
		Head injury or concussion		Tooth/mouth injury		Swallowed something poisonous		Choked on food or other object		Internal bleeding	
		Other (Specify) _____									

8)	**For the following questions, please mark the appropriate response with an "X".** **At the time your child was injured, was he/she:**			**Yes**	**No**	**I Don't Know**
	Being watched by a parent or guardian					
	Being watched by another adult					
	Being watched by an older child or adolescent					
	Was the person watching your child within 5 feet of your child at the time of the injury?					
	Was the person watching your child doing something other than watching your child like reading, watching TV, using the computer or talking on the phone?					
	Was the person watching your child able to see your child at the time of injury?					
	Was the person watching your child able to hear your child at the time of injury?					
	If yes, how many children was this person watching?	1 child		2 children	3 - 4 children	5+ children
	If applicable, what were the other children's ages?	_____	_____	_____	_____	_____	_____

If your child has ever been hospitalized for an injury, please fill out questions 9 – 13 about the injury that resulted in the child being hospitalized.

9)	How old was your child at the time of the most recent injury?	Birth - 6 months	6 – 12 months	13 – 18 months (1 – 1 ½)	19 – 24 months (1 ½ - 2)	25 – 30 months (2 – 2 ½)	31 – 36 Months (2 ½ - 3)	37 – 42 months((3 – 3 ½)	43 – 48 months (3 ½ - 4)	49 – 54 months (4 – 4 ½)	55 – 60 months (4 ½ - 5)
10)	How was your child injured?	Fall while walking, running, or climbing		Fall from a high object like a slide or on stairs		Hit by an object like a toy, ball or rock		Burn from a flame, liquids, foods, or other hot object		He/she ate something you thought was poisonous	
		Cut or pierced by an object		Motor Vehicle Accident		Bicycle accident		Other (Specify) _____			
11)	Where did the injury occur?	Home		Preschool or daycare		Other home like a friend or family		Public setting like a restaurant, mall, store		Car	
		Playground		Outside		Other location (Specify) _____					
12)	What type of injury did your child have?	Burn		Soft tissue injury, swelling or bruise		Serious cut that needed glue or stitches		Broken bone		Sprained or strained muscle	
		Head injury or concussion		Tooth/mouth injury		Swallowed something poisonous		Choked on food or other object		Internal bleeding	
		Other (Specify) _____									

13)	**For the following questions, please mark the appropriate response with an "X".** **At the time your child was injured, was he/she:**			**Yes**	**No**	**I Don't Know**
	Being watched by a parent or guardian					
	Being watched by another adult					
	Being watched by an older child or adolescent					
	Was the person watching your child within 5 feet of your child at the time of the injury?					
	Was the person watching your child doing something other than watching your child like reading, watching TV, using the computer or talking on the phone?					
	Was the person watching your child able to see your child at the time of injury?					
	Was the person watching your child able to hear your child at the time of injury?					
	If yes, how many children was this person watching?	1 child		2 children	3 - 4 children	5+ children
	If applicable, what were the other children's ages?	_____	_____	_____	_____	_____ _____

Section 7 – Instructions

Please answer each of the following questions by placing an "X" to indicate the most appropriate choice. Answer the following questions about yourself and the child for whom you are completing the questionnaire.

How old are you?	_____ Years					
What is your marital status?	Single (never been married)	Married	Divorced	Separated	Widowed	
What level of education have you completed?	Grade school or middle school	High school diploma	GED (high school equivalency)	Some college	College degree	Graduate degree
What is the zip code where you live?	__ __ __ __ __					
Are you currently employed outside of the home?	Yes, Full time		Yes, Part time		No	
Which of these categories do you use to describe your race?	African American	Hispanic	Asian	Pacific Islander	Caucasian (white)	Bi-Racial (specify below)
	Other (specify) _____					
Which of these categories do you use to describe your child's race?	African American	Hispanic	Asian	Pacific Islander	Caucasian (white)	Bi-Racial (specify below)
	Other (specify) _____					
What is your household's annual income? (optional)	Under $20,000	$20,000-39,999	$40,000-59,999	$60,000-79,999	$80,000-99,999	Over $100,000
How many people live in your household?	**_____ (number)**					

Is there anything you would like to add?

Comments:

Did you find this questionnaire (circle all that apply)	Hard	Easy	Fun	Boring	Made me anxious	Interesting
How enjoyable was completing this questionnaire? (mark the BEST answer)	Not at all		A little		A lot	

If you have questions or comments about this survey, please call Dawn Garzon (314-368-4577) or Jennifer Taylor (314-753-3229).

Appendix B: ***Parent Informed Consent***

College of Nursing

Jennifer L. Taylor, MSN, RN
Dawn L. Garzon, PhD, PNP-BC, CPNP-PC, FAANP
8001 Natural Bridge Road
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Parent Informed Consent for Participation in Research Activities

Relationships between parental developmental competence, parental supervision, and preschool unintentional injury

Participant Anonymous – Don't Write Name HSC Approval Number 101116G

Principal Investigator &Phone Number Dawn Garzon (314-368-4577) / Jennifer Taylor (314-753-3229)

You are invited to participate in a study about parents' understanding about child development and parental supervision conducted by Dawn Garzon, an assistant professor, and Jenifer Taylor, a doctoral student in the College of Nursing at the University of Missouri-St. Louis. Your child care provider agreed to distribute this packet to their families. If you wish to participate all that we ask you to do is complete the attached Family Questionnaire. The questionnaire asks you questions about your child's development, how you supervise your child's activities, child safety practices in your home, and information about any injuries in your child's history. It takes about 20 to 30 minutes to complete the questionnaire. By completing and returning this questionnaire, you are consenting to participate in this study.

Your participation in this study is completely voluntary. Your participation will not affect your child care provider services. We will collect some information about you but this information is anonymous and will not identify you or your child. When completing the questionnaire you may feel distress reporting an injury that your child has had. You may choose not to answer any question. Your participation will help us to better understand the choices parents make and may help develop interventions to help parents and young children use child safety practices and prevent injuries. We thank you for your help! If you complete the questionnaire, you are eligible to compete in a raffle for one of three $50 Visa gift cards.

Remember, your participation is voluntary. If you complete the questionnaire, please return it in the enclosed envelope. If you do not want to participate, please return the empty questionnaire in the enclosed envelope. By returning the envelope, your child care provider will not know who does or does not to participate in this study.

If you have questions about this research, you can contact the study investigators, Dawn Garzon (314-368-4577) or Jennifer Taylor (314-753-3229). If you have questions about your rights as a research participant, you may call the Chairperson of the Institutional Review Board at 314-516-5897

College of Nursing

Jennifer L. Taylor, MSN, RN
Dawn L. Garzon, PhD, PNP-BC, CPNP-PC, FAANP
8001 Natural Bridge Road
St. Louis, Missouri 63121-4499
Telephone: 314-516-xxxx
Fax: 314-516-xxxx
E-mail: taylorjenn@umsl.edu
E-mail: d_garzon@umsl.edu

If you want to be considered for a raffle drawing for one of three $50 Visa gift cards, please complete the section below. This sheet will be separated from the questionnaires as they are collected by the study investigators so your information will not be associated with your questionnaire.

_____

Name

Phone number(s)

E-mail

Appendix C: ***Classroom Teacher Information Letter***

College of Nursing

Jennifer L. Taylor, MSN, RN
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Dear Classroom Teacher,

Thank you for assisting us in conducting this research study. We appreciate the time and attention you are giving us during your busy days. Our research would not be possible without your willingness to interact with families to distribute and collect the research materials. We hope the following information will help you better understand our research purpose and help you answer any parent questions that come up as the packets are distributed and returned. In the packets is an informed consent document that contains much of the same information that we are providing you in this letter. Families will have that information to consider as they decide whether they wish to participate and complete the questionnaire. Any questions you or your families have can always be directed to us.

Data Collection Process

1. Packets are distributed to the director of the participating early childhood care center y the investigators.
2. Classroom teachers are given appropriate number of packets for families with children between the ages of 2 ½ to 5 years of age (30 – 59 months).
3. Classroom teacher then distributes packets to families during the normal child pick-up process with any other materials sent home regarding the child's daily activities.
4. Families are instructed to return packets to the classroom teacher who will then give the packets to the care center director. Returned packets are gathered in the clear plastic container provided by the investigators.
5. The investigators will return to the center to gather the packets from the container.
6. A second distribution following the same process will occur two to three weeks after the initial packet distribution.
7. Families will be offered a second packet to provide those who did not initially participate a second opportunity to participate.
8. Those packets will be returned to teachers, gathered by the director and retrieved by the investigators in the same manner as the first distribution.

Dawn Garzon, PhD, PNP-BC, CPNP-PC, FAANP
314-368-4577

Jennifer Taylor, MSN, RN
314-753-3229

Frequently Asked Questions

What is the title of the research project?
Relationships between parental developmental competence, parental supervision, and preschool unintentional injury

What is the purpose of the research?
The purpose of this study is to investigate the relationships between parental supervisory beliefs and practices, parental developmental competence, implementation of home safety modifications, preschool child injury, and sibling presence in the home.

What child age range is the research focusing on?
2 ½ to 5 years of age (30 – 59 months).

Is participation required?
Participation is strictly voluntary.

Will I know if families are participating?
Participation in the study is anonymous and no identifying information is collected from families. To maintain anonymity regarding participation, families are instructed to return packets whether they are complete or incomplete. You will not know if the packets you are receiving back from families are completed therefore you will not know who is and is not participating.

Will participation in the research study affect family's relationship with the childcare center?
Care center directors and classroom teachers are not aware of who has and has not participated in the research study. Packets are to be returned complete or incomplete and have no identifying information, so there will be no way to track who has and has not participated.

What types of questions are asked of families?
The questionnaire asks questions about the child's development, how the child's activities are supervised, child safety practices in the home, and information about any injuries in the child's history.

How long does it take to complete?
It takes about 20 to 30 minutes to complete the questionnaire.

What incentive exists to participate?
Families who complete and return the questionnaire are eligible to compete in a raffle for one of three $50 Visa gift cards.

What if families have additional questions?
If you have questions about this research, you can contact the study investigators, Dawn Garzon (314-368-4577) or Jennifer Taylor (314-753-3229). If you have questions about your rights as a research participant, you may call the Chairperson of the Institutional Review Board at 314-516-5897.