1998

Parental Factors Affecting Child Restraint Device Use in Children Ages 3-5 Years

Peggy Sue Meulenberg
Grand Valley State University

PARENTAL FACTORS AFFECTING CHILD RESTRAINT DEVICE USE IN CHILDREN AGES 3-5 YEARS

By

Peggy Sue Meulenberg

A THESIS

Submitted to
Grand Valley State University
in partial fulfillment of the requirements for the
degree of

MASTER OF SCIENCE IN NURSING

Kirkhof School of Nursing

1998

Thesis Committee Members:

Jean Martin, DNSc, RN-C, PNP

Linda Nicholson Grinstead, Ph.D., RN, CPN

Paul Stephenson, Ph.D.

ABSTRACT

PARENTAL FACTORS AFFECTING CHILD RESTRAINT DEVICE USE IN CHILDREN AGES 3-5 YEARS

By

Peggy Sue Meulenberg

Motor vehicle accidents are a leading cause of morbidity and mortality in children. Although Michigan law requires all children to be restrained, many children remain unrestrained or improperly restrained. The purpose of this study was to determine how preschool children are restrained and to examine where parents obtain information on restraining techniques. A descriptive study utilizing a newly developed questionnaire was performed. The Health Belief Model served as the conceptual framework. A significant relationship was found between parents who wore their seat belts all the time and the child being restrained. Most parents restrained their child by a lap and shoulder belt rather than a CRD. The barriers to CRD use included affordability, difficulty in use, CRD too small, and child's objection to CRD. Sources of information most frequently identified by parents were family and friends, magazines, newspapers, TV, and radio. The study was limited by the small sample.

Acknowledgments

I would like to thank everyone who supported and encouraged me during the writing of this thesis. Your steadfast hope and kindness was very appreciated, especially during the rough times.

I would like to sincerely thank my committee chairperson, Jean Martin. Without her guidance and knowledge, I would never had stayed on track and completed this thesis. A warm-hearted thank you is also extended to my committee members, Nicki Grinstead and Paul Stephenson, for their time and effort. I would like to give my gratitude to Linda Scott for all her help with the data analysis. Without it, I would have been lost.

A special acknowledgment goes to Dr. Don Bouchard, for his sincere efforts at helping me attain my goal and for allowing me to invite his patients to participate in this study. Another warm-hearted thank you is extended to Dr. Susan Woolford and Maggie Sowers, PA-C for being there to provide encouragement and perspective when I needed it most. A special thank you to the MetroHealth Pediatrics staff for all your help!

Most of all, I need to thank a very special person in my life for all his encouragement, love, patience and understanding. My husband, Mike, allowed me to obtain my dream of being a pediatric nurse practitioner. He kept me going even when I was ready to quit. Thanks also, to my daughter, Nicole, who inspired this study by not sitting still in the seat belts at age three and requiring a booster seat, and to my daughter, Courtney, who along with her sister has so much spunk, she will achieve the world in her own time.

Table of Contents

List of Tables

TABLE

List of Figures

FIGURE

List of Appendices

APPENDIX

CHAPTER 1

INTRODUCTION

Motor vehicle accidents continue to be a leading cause of injuries and death in children in the United States even though all 50 states have child restraint laws (Committee on Injury and Poison Prevention, 1996). Motor vehicle occupant injury is a problem and car seats are the prevention strategy (Cohen, Runyan, Downs, & Bowling, 1997). The prevention strategy is not being utilized to protect children and as many as 30% continue to ride unrestrained (Johnston, Rivara, & Soderberg, 1994). Furthermore, improper use of child restraint devices (CRDs) is as high as 70%, contributing to the morbidity and mortality (Margolis, Wagenaar, & Molnar, 1992). With proper use, injuries could potentially be reduced by 67% and deaths by 70% (Osberg & DiScala, 1992). Toddlers and preschool children are at risk for being improperly restrained because they are not large enough to be placed in adult seat belts (Agran, Winn, & Anderson, 1997). Decina and Knoebel (1996) found only 6% of children weighing 40-60 pounds were restrained in a booster seat, which would be the proper restraint choice for this child.

The focus of this current study is 3-to 5-year-old children because other studies found this age group to be a forgotten entity with poor statistics regarding CRD use (Osberg & DiScala, 1992; Stylianos & Harris, 1990; Margolis et al., 1992; Johnston et al., 1994).

Safety promotion and injury prevention should be included in all well child visits. "The nurse practitioner is in an excellent position to influence the health care outcomes of the nation through work in the health promotion arena" (Burns, 1996, p.159). Pediatric nurse practitioners (PNPs) who work in primary care settings should have several opportunities to assess for parental CRD knowledge. The PNP's responsibility is to advise parents on proper CRD (car seat or booster seat) and seat belt use for their children. This can occur in a variety of settings, including day care centers, schools and health care facilities (Murphy, 1998).

In 1996, the American Academy of Pediatrics (AAP) updated their guidelines on CRD use (Appendix A). Proper restraint use is based mainly on the child's weight. Car seats facing forward in the vehicle are appropriate for children weighing 20-40 pounds and booster seats for children weighing 40-60 pounds. Ideally, the 40-60 pound child should be placed in a booster seat that requires the use of the vehicle's lap and shoulder belt. This positions the child high enough so the lap belt fits across the hips

and the shoulder belt fits across the chest and not across the face or in front of the neck (Halpern, 1990). Another accepted alternative is a booster seat with a shield or harness system. However, if the only available protection is the vehicle's restraint system, it is better than allowing the child to ride unrestrained (Stylianos & Harris, 1990).

If children weighing less than 60 pounds are placed in the vehicle's restraint system, they could potentially be at risk for injury. This restraint system was not designed to protect such small occupants (Agran, Winn, & Anderson, 1997). Young children have constantly growing bodies and their body proportions change frequently, allowing them to wiggle out of adult seat belts or to change the location of the belt from the hip to the abdomen (Agran, Winn, & Anderson, 1997). Children also have a natural curiosity and are in constant motion, thus increasing their injury potential. Placing a child in a lap belt could potentially increase the chance of 'seat belt syndrome'. According to Stylianos and Harris (1990), this syndrome occurs when the child's abdomen is compressed by the lap belt during a motor vehicle accident (MVA). The lap belt acts as a fulcrum exerting tremendous pressure on the abdomen and spine often causing severe injuries in this region. The lap belt does not offer the full protection of a booster seat (Agran, Winn, & Anderson, 1997). Parents need to be

informed of the best protection for their child. PNPs have the knowledge and opportunity to provide this information.

Injury prevention counseling is beneficial according to several studies (Cohen et al., 1997; Bass et al., 1993; Miller & Galbraith, 1995; Macknin, Gustafson, Gassman, & Barich, 1987; Miller & Pless, 1977). Consistent anticipatory guidance and frequent reminders at subsequent visits helped patients to conform to the behavior (Macknin et al., 1987). Greater emphasis on safety issues by PNPs could reduce the number of accidental injuries and deaths among children.

The Car Child-Occupant Safety Project was one program designed to encourage parents and others to correctly restrain their children (Gaines, Layne, & DeForest, 1996). Specially trained personnel conducted visual inspections after parents readied their child for a ride. Feedback was given and mistakes could be corrected by the parents immediately. Safety errors included no locking clip to stabilize the car seat in the vehicle, placement of the vehicle's shoulder belt across the child's neck or under the child's arm, placement of the child in the least protective area of the vehicle, and not restraining the child at all.

Other information sources are the Office of Highway Safety Planning in Michigan, the Children's Miracle Network, and Grand Valley Safe Kids Coalition, and the

yearly "Buckle Up America" campaign. Printed flyers in various languages have been used. Vehicle owners manuals describe how to attach car seats to that particular vehicle and each new restraint device comes with a manual explaining correct use. Although many resources on CRD information are available, not many studies have been done to identify where parents are obtaining their information.

Bradbard and Lisboa-Farrow (1995) studied program strategies aimed at increasing CRD use in rural Southern areas. The study explored information sources of low-income white and black young mothers in two rural counties. These young mothers identified health departments, clinics, law enforcement officials, home health agencies, physicians, nurses, and hospitals as the places they obtained information on CRD use.

Since many PNPs have roles in primary health care, knowledge of current restraining practices for children would be beneficial to guide the PNP in anticipatory guidance for this age group. Parents need to know that the PNP can be a potential resource available to them for health promotion and injury prevention strategies.

Purpose

The purpose of this study is two-fold: 1) to determine how children ages 3-5 are being restrained by their parents, and 2) to inquire about the places parents obtain information about restraining techniques. The

Michigan law (P.A. 90 of 1991) states that a child must be restrained in the vehicle but does not mention proper technique to provide maximum protection of the child. Other resources need to be available to parents.

Problem Statement

Nationally, 59% of toddlers were not in a car seat at the time of a crash (Johnston et al., 1994). "Unrestrained children are at increased risk for all injuries, greater numbers of injuries, more serious injuries, and more fatalities" (Agran, Winn, & Anderson, 1997, p. 2). This population continues to be at risk for injuries sustained from MVAs so a renewed effort by PNPs and others health care providers to provide anticipatory guidance on injury prevention to families must be a priority.

CHAPTER 2

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Pediatric nurse practitioners (PNPs) promote health behaviors and injury prevention strategies, key parts of pediatric health care. Influencing parents to provide injury protection such as CRD use to their children can sometimes be difficult. Understanding ways to positively teach and reinforce preventive behaviors should be a priority for PNPs. The Health Belief Model (HBM) is one model PNPs can use to guide them in teaching preventive behaviors.

In the 1950s, a group of Public Health Service representatives developed the HBM in an attempt to explain why people did not utilize prevention or screening tests offered to them (Rosenstock, 1974). According to Davidhizar (1983), nurses are in the prime arena to conduct research using the HBM. By utilizing the model for preventive behavior studies, PNPs can incorporate the HBM into nursing research as a reliable tool to assist in future studies.

Conceptual Framework

The HBM was one of the first models designed to study preventive health behavior. The model's variables are

taken from Kurt Lewin's social psychological theory, looking at positively and negatively valued regions. These regions either reduced or increased tension for the individual (Mikhail, 1981). Rosenstock (1990) adds that the model's beginnings came from the Stimulus Response Theory and the Cognitive Theory in which Lewin was involved. "For more than three decades, the model has been one of the most influential and widely used psychosocial approaches to explaining health related behavior"(Rosenstock, 1990, p. 39). In 1981, Mikhail authored an overview of selected studies of HBM use. These included many health related behaviors such as: TB x-ray screening, influenza vaccination, dental visits, Pap tests for cancer screening, penicillin prophylaxis, Tay-Sachs screening, utilization of pediatric clinic services, and following diet regimens.

The HBM is based on the patient's subjective feelings about health related behaviors. People place value on different areas of health and how it relates to them personally. The model can be individualized for each patient, making this model ideal for nursing. The components of the model are: perceived susceptibility, perceived seriousness, benefits of a certain action, and the barriers of the action. According to Rosenstock (1974), these perceptions determine whether the individual will perform a recommended health action.

Rosenstock (1990) described the perceived

susceptibility as the individual's subjective perception of the possibility of contracting a health condition. This perception "has been found to be positively related to the taking of a wide variety of preventive health actions (Mikhail, 1981, p.69). The parent's perception of a motor vehicle accident (MVA) occurring while the child was riding in a vehicle would increase the chance that the child would be properly restrained.

Perceived seriousness was defined as "feelings concerning the seriousness of contracting an illness or of leaving it untreated (and) included evaluations of both medical and clinical consequences and possible social consequences" (Rosenstock, 1990, p.43). The parent's perception of the child sustaining more serious injuries from a MVA if riding unrestrained might influence the parent to restrain the child. Having social consequences like child neglect charges or fines for an unrestrained child might influence the parent's perception of the seriousness of leaving a child unrestrained.

If the parent perceives the susceptibility of a MVA and the seriousness of injuries to the child, the benefit would be to protect the child from injury. This benefit is best achieved by proper restraint use for the child. PNPs play a key role in teaching parents the proper restraining techniques including CRD use for their children. Many studies have demonstrated that CRDs do indeed prevent childhood MVA injuries and save lives (Osberg & DiScala,

1992; Margolis et al., 1992; Stylianos & Harris, 1990).

The perceived barriers could influence the individual's health related behaviors negatively. Mikhail (1981) stated that monetary cost was one of the largest factors negatively affecting behavior. In a previous study the barriers to using CRDs included the cost of the seat, the difficulty of use, the child's objection to the CRD, having to use one car seat for two vehicles, and the extra time involved in securing the child in the CRD (Bradbard & Lisboa-Farrow, 1995).

The application of the HBM to parental use of child restraint devices is explained in Figure 1. The parental perceived susceptibility and perceived seriousness together are the parental perceived threat. The modifying factors are the variables and the cues to action, which both influence the parental perceived threat. The parental perceived threat along with the benefits of restraining the child minus the barriers of restraining the child lead to the likelihood of action. In the best scenario, the action would be that the child is properly restrained at all times.

The variables include demographic, sociopsychologic, and structural data. The demographic variables are the parent's age, gender, marital status, race, and income; and the child's age and weight. Margolis et al. (1992) stated that the child's age directly influenced whether the child was restrained, with infants being restrained more than

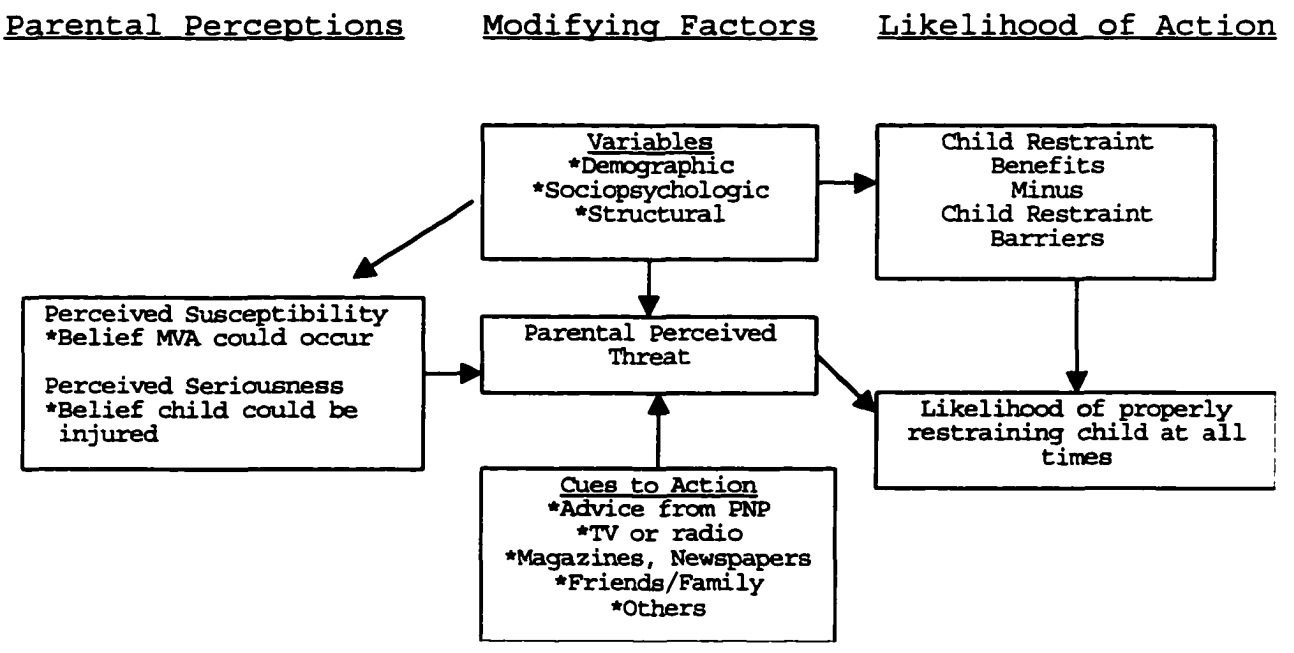


Figure 1: Health Belief Model-Parental Use of Child Restraints

older children. The young mothers of Bradbard and Lisboa-Farrow's (1995) study explained that infants needed ore protection than toddlers. The mothers also indicated infants were restrained more often because they did not complain about being in a car seat. Sociopsychologic factors include the parent's personality, the child's temperament, the laws, and societal norms. The perceived comfort of the car seat, the belief that societal norms supported CRD use, and the fact that the parent was the driver of the vehicle in which child was riding increased the chance that the child was secured properly in a CRD (Margolis et al.). The structural variables are the parent's CRD knowledge and prior experience with CRDs. Many of the rural young mothers studied stated they did not realize that CRD misuse was as high as 70-90% and this information would encourage them to double check their restraint techniques (Bradbard & Lisboa-Farrow, 1995).

The modifying factors also include cues to action which could be advice from health care providers, television talk shows, recent news events, magazines, pamphlets, newspaper articles and mass media campaigns. Many studies indicated that the pediatrician's office was a good place for parents to learn about injury prevention methods (Macknin et al., 1987; Bass et al., 1993; Cohen et al., 1997). The mothers in Bradbard and Lisboa-Farrow's (1995) study stated that they received information on CRD use from the health department, clinics, law enforcement

officials, home health agencies, physicians, nurses, and hospitals. These same mothers stated they would like to receive CRD information from physicians, the health department, the Women, Infants, and Children (WIC) office, and from brochures, pamphlets and posters placed in frequently visited sites.

The PNP fits into the Health Belief Model under the cues to action category. As a source of information, the PNP influences the parental perceived threat leading to the likelihood of action. If the parent perceives a threat of adverse effects to the unrestrained child, the likelihood of action would be the parent would properly restrain the child at all times. The PNP needs to be a reliable source of CRD information so that the parent realizes the harm of not restraining the child.

Literature Review on Child Restraint Devices

The past studies on CRD use were mostly descriptive and retrospective. The research articles studied children age 0 to 15 years. There were inconsistencies among the measurement techniques. Some of the studies only listed the child as restrained or unrestrained (Osberg & DiScala, 1992; Margolis et al., 1992; Stylianos & Harris, 1990) while Johnston et al. (1994) and Decina and Knoebel (1996) defined optimal restraining techniques.

Some studies examined the effectiveness of CRDs and seat belts for children. Osberg and DiScala (1992) used the Abbreviated Injury Scale, the Injury Severity Score and

the Glasgow Coma Scale (GCS) to study 413 hospitalized children aged 4 to 14 years. Two hundred and ninety children were unrestrained while 123 children were restrained. In comparison tables, seat belts were found to reduce mortality, the severity and proportion of injuries, and the number of children leaving the hospital with impairments. There was also a reduction in the length of intensive care unit days ($p<.05$) and overall hospital stay. An increase in abdominal injuries was seen secondary to seat belt use but the unrestrained children had more injuries in more regions of the body ($p<.05$).

This phenomenon was also found in the nine children Stylianos and Harris (1990) studied. The children had a mean age of 8 years and ranged from 1-14 years. The four restrained children ages 7-9 years had lap belt injuries involving the intestinal, vertebral and spinal cord regions but no head injuries. These children were restrained by a lap belt and none used a car or booster seat. Four unrestrained children ages 1-14 years had severe closed head injuries leading to significantly longer intensive care stays and longer hospital stays. The fifth unrestrained child was dead on arrival at the hospital. Stylianos and Harris used the Pediatric Trauma Score, the Injury Severity Score, and GCS to rate the severity of injuries and compare the two groups.

Agran, Dunkle, and Winn (1985) studied children less than four years of age who were treated in an emergency

room after being involved in a MVA. The authors reported that the children who were restrained properly in a CRD received unavoidable minor injuries if injured at all. Improperly restrained children and children in adult seat belts received more substantial injuries because they hit interior walls of the vehicle. The restrained children (34%) fared better than the unrestrained children (70%) by having fewer and less serious injuries over all.

In another study by Agran, Dunkle, and Winn (1987), seat belted children, ages 0-14 years, were studied to describe patterns of injuries sustained when a MVA occurred. They discussed cases where injury was unavoidable secondary to the mechanism of action. Certain injuries were avoidable in children younger than 10 years whose anatomy made it possible for the injuries to occur while being restrained by seat belts. The authors called for better designed restraint systems for children ages 10 years and younger. Agran, Winn, and Dunkle echoed this theme again in a study in 1989 using 4-9 year olds. They argued that current adult seat belts did not sufficiently protect children.

In a case study by Agran, Winn, and Anderson (1997), a 44-pound, 5-year-old male was riding in the front seat without an air bag, restrained by the vehicle's lap and shoulder belt. While traveling at 35 miles per hour, the car was hit on the driver's side front end. The child sustained a bowel perforation, traumatic pancreatitis, and

a mild closed head injury. His 2-year-old sister who was properly restrained in a CRD in the middle of the back seat, only received a minor lip laceration. Agran, Winn, and Anderson stated that young children are "less than optimally protected in adults belts. The seat belt syndrome, spinal and intra-abdominal injuries, and possibly thoracic injuries, although uncommon, have been incurred by children in belts configured for adults" (p. 7).

In 1994, a secondary analysis of data received from the National Highway Traffic Safety Administration was performed by Johnston et al. They analyzed 16,685 child passengers in vehicles involved in MVAs for injury pattern and use of restraints. The restraint use was known for 61% of the sample and of these, 40% were optimally restrained, 29% suboptimally and 31% were unrestrained at the time of the MVA. Comparison of the known restraint use group with the unknown group indicated the two groups were similar. The population was divided into three groups: children less than 5 years of age (38%), 5-9 year olds (30%), and 10-14 year olds (32%). Thirty-one percent reported some sort of injury, ranging from minor to fatal. The infants showed the highest percentage of optimal restraint use (76%) but this declined dramatically for toddlers with only 41% being optimally restrained. Sixty- eight percent of the 5-9 year olds were restrained in some manner but only 35% were optimally restrained by the lap and shoulder belt. Less than 0.5% of the 5-14 year olds reported using a restraint

other than the lap belt or lap and shoulder harness. The lowest percentage of injury was found among the infants and toddlers who were optimally restrained. For the 0-4 year olds, car seat usage reduced injuries by 60%, but the lap and shoulder belts were only 38% effective for 5-14 year olds ($p < .001$). The authors stated that toddlers have a higher risk of injury because they have a decreased use of car seats compared to infants. If the toddlers were optimally restrained the injury rate would be the same.

The use and misuse of car seats was explored by Margolis et al. (1992) in children younger than age 4 years. A cross-sectional design was used. They observed 717 child passengers and 661 drivers that entered parking lots of fast food restaurants in southeast Michigan and recorded how the children were restrained. Fifty-five percent of the children were restrained in a car seat, but of that, only 37% were correctly restrained. Twenty-five percent were not restrained at all. The investigators found that the best indicator that a child would be placed in a CRD was that the adult was wearing a seat belt. Eighty-six percent of the children riding with seat belted adults were in CRDs in contrast to 44.3% of the children riding with unrestrained adults ($p<.0001$). By performing logistic regressions and odds ratios, the authors found seven other variables leading to CRD use. The strongest one was age of the child with the younger child being restrained more often ($p<.001$). The others factors leading

to increased CRD use were parent's race, with white drivers more likely to use CRDs ($p<.016$), the parent was the driver ($p=.003$), driving more than one day per week ($p=.006$), three or less occupants in the vehicle ($p=.005$), the perceived comfort of the car seat ($p=.002$), and the belief that the social norm supported car seat use ($p=.023$).

Decina and Knoebel (1996) studied misuse patterns of car seats in 5,900 children under 60 pounds in four states. The states were Mississippi, Missouri, Pennsylvania, and Washington. They observed vehicles entering parking lots of local stores, fast food restaurants, parks, playgrounds, zoos, and a pediatrician's office, and recorded restraint use of parents and children. For the toddlers, 67.5% were in a car seat and 18.9% of the car seats were correctly used. Six percent of preschoolers weighing between 40 and 60 pounds were riding in a booster seat and of that 50% were correctly used. Decina and Knoebel found that if the adult driver was wearing a seat belt then there was an increased likelihood that the child was properly restrained in a CRD. More children were also placed in a CRD if air bags were present in the vehicle, the driver was a family member, the child was placed in the middle of the back seat, and the car seat was not frequently removed. The authors did not state their statistical methods.

Two studies used direct observation and interviews with the participants (Margolis et al., 1992; Decina & Knoebel, 1996). These authors stated direct observation

was a more accurate measure of child restraint use compared with self-reports. Limited samples and an inability to generalize to the whole population were limitations. Margolis et al.'s homogenous sample was 91% Caucasian and 95% were high school graduates or greater. The authors commented that they thought their sample was fairly representative of Michigan, but the results could not be generalized to other areas. All the participants ate at fast food restaurants in southeast Michigan. Decina and Knoebel limited their sample to four states. They stopped collecting data during inclement weather, and it is unknown whether people restrain their children differently depending in poor weather. The drivers were mostly female (77%), the parent of the child (87%), with most being the mother (68%) and 82% were under age 40 years. Another limitation was that a few cars may have been missed entering the parking lots while the researchers were attending another vehicle. Families who do not frequent the study sites were not represented in either study.

In the retrospective studies the data source may have been incomplete (Osberg & DiScala, 1992; Johnston et al., 1994; Stylianos & Harris, 1990). An under-reporting of crash events and injuries and an over-reporting of restraint utilization in the police reports Johnston et al. examined could have limited the use of the data. Proper restraint techniques and misuse of restraints were not studied, so misrepresentation of injuries sustained to

restrained children could have occurred (Johnston et al., 1994; Osberg & DiScala (1992).

An extremely small sample (n=9) was studied by Stylianos and Harris (1990). The authors limited their study to children restrained by a lap belt or ones who were unrestrained. They did not study the effectiveness of CRDs or the lap and shoulder belt.

Literature Review on Parental Information Sources

Limited studies were found describing parental information sources on proper child restraint techniques. None were found relating directly to information sources for CRD knowledge. One study related to developing program strategies to increase CRD use in rural areas identified information on where young low income rural mothers received information (Bradbard & Lisboa-Farrow, 1995). Several studies explored the value of anticipatory guidance on prevention strategies for children (Cohen et al., 1997; Bass et al., 1993; Miller & Galbraith, 1995; Miller & Pless, 1977; Macknin et al., 1987).

The young rural mothers in Bradbard & Lisboa-Farrow's (1995) study were teens or in their 20s and had children under age four. The annual household income was less than $15,000. The mothers came from two counties, one in Tennessee and one in Georgia. The Tennessee participants were all white, while the Georgia participants were all black. The mothers indicated they obtained car seat information from health departments, clinics, law

enforcement officials, home health agencies, physicians, nurses, and hospitals. The sites at which the mothers would like to receive information included physician offices, health departments, and the WIC office. Other sources included brochures, pamphlets, and posters placed in frequently visited places such as fast-food restaurants, supermarkets, post office, and drug stores. The mothers did not rank their responses and a statistical analysis was not performed. Inconsistency among the participants was found for radio messages or television announcements with many stating they would change the radio station if someone was talking or leave the room during commercial breaks on television.

Other studies focused on childhood injury prevention. Cohen et al. (1997) explored prevention strategies inclusion into anticipatory guidance using a Modified Delphi technique. Of the 26 experts in childhood injury prevention who were asked to participate 23 agreed. The experts remained anonymous during the study and each was required to fill out a questionnaire on injury problems and prevention strategies they thought were significant. The researchers tallied the answers into a second questionnaire that was sent again to the experts. A consensus was reached on which prevention strategies should be included in anticipatory guidance sessions. All the participants agreed that motor vehicle occupant injuries and car seat use was the highest priority guidance needed in the 2 years

and under age group. The study was not repeated for older children.

Bass et al. (1993) performed a critical review of the literature from 1964 to 1991 on prevention counseling in the primary care office setting. Twenty original articles fit the inclusion criteria with 18 articles stating injury prevention counseling had a positive effect on families. CRD use increased when a two-fold effort consisting of physician performed counseling and community efforts worked together. The researchers concluded that primary care based counseling along with community efforts needed to continue to promote a decline in childhood injuries.

A study by Miller and Galbraith (1995) developed well-figured estimates to put a dollar value on counseling effectiveness. They concluded that if all children ages 0-4 years completed the AAP's The Injury Protection Program (TIPP), an estimated 230 million dollars would be saved in medical spending annually and injury costs would decline by 3.4 billion dollars. These numbers appear inflated secondary to the impossibility of all 19.2 million children ages 4 years and under being able to receive the same anticipatory guidance. The dollar figures are based on estimates but office-based counseling appears to be cost-effective.

Macknin et al. (1987) studied the effect of seat belt counseling intervention on 385 healthy children ages 5-19 years in Ohio when seat belt laws did not exist. The

hypothesis stated that "a single intervention by a pediatrician might have an immediate, positive short-term impact on seat belt use" (Macknin, 1987, p. 1305). Adults and children were observed for seat belt use when they enter and left the pediatrician's office. The children were seen for well child visits. Restraint counseling was provided by the pediatrician on weeks one, three and five. No mention of vehicle restraints was made during weeks two and four. A 38% increase in child seat belt use was demonstrated (McNemar test, $p<.001$) in children who received the intervention. The control group increased by 5% and was not significant. The intervention benefited younger siblings (46% increase, $p=.03$) and older siblings (42% increase, $p<.001$), as well. A significant increase in sibling seat belt use was not demonstrated during the control weeks. A significant relationship was that all the children were wearing their seat belts if the adult was wearing one, but only 34% of the children were restrained if the adult did not wear seat belts ($p<.001$). One year later, a follow-up questionnaire was sent out. Little difference in restraint was found between the intervention group and control group except that the control group's seat belt use increased. One pediatrician in the study consistently provided anticipatory guidance on restraint use and was noted to have a higher rate of compliance among his patients in regards to seat belt use (Spearman correlation, $r=.97$, $p=.001$).

A study using an experimental design was conducted by Miller and Pless in 1977. They hypothesized that the type of seat belt instruction would be related to the actual use of seat belts and those participants receiving three methods of instruction would have a higher rate of seat belt compliance. The control group received no interventions. Each of the three experimental groups received a different method of intervention. The intervention was either a pamphlet on restraint use; a pamphlet and verbal instruction; or a pamphlet, verbal instruction and a slide-tape show. The study site consisted of two pediatric group practices. The sample was 654 parents who brought their child in for a well child visit. The children were between 0-17 years of age with a mean age of 4 years. Frequency of reported use did increase after the intervention was given (69% restraint use increased to 76% use) but the results were not significant. The only significant relationship using the Pearson correlational coefficient was between age and use of restraints ($r=-21$, $p<.05$) with younger children being restrained more than older children. The authors concluded that there was insufficient evidence to state that the type of instructional method, or any of the methods made a difference in child restraint use. Some problems with the study were an overrepresentation of the upper and middle socioeconomic classes and an unequal distribution of parents in the intervention groups compared with the

control group. The intervention groups also were in a higher socioeconomic class than the control group. The days the participants were given either an intervention or no intervention were randomized, but no randomization occurred with selection of the participants.

Bradbard and Lisboa-Farrow's (1995) study was limited by the population. The researchers stated that the program strategies were specific to young rural mothers and would not be applicable to the population at large. The low-income rural southern young mothers were not representative of the national population. The study did not formally list how many participants were involved, or their demographics. The basis of the study was the thoughts of these young mothers, which are subject to change.

The limitations in the injury prevention guidance included non-randomization (Cohen et al., 1997; Macknin et al., 1987; Miller & Pless, 1977), use of estimates (Miller & Galbraith, 1995) and populations that were mostly middle and upper class (Miller & Pless, 1977; Macknin et al., 1987; Miller & Galbraith, 1995). The experts in Cohen et al. were chosen by the researchers and the building of the consensus led to socially desired responses, a problem using the Delphi technique.

Implications for Study

The properly restrained child has a better chance for a successful outcome should a MVA occur. Less complicated CRDs would increase the protection of the child and

decrease the chance for misuse (Margolis et al., 1992; Decina & Knoebel, 1996; Johnston et al., 1994; Osberg & DiScala, 1992). Stylianos and Harris (1990) added that any restraint is better than none, however a shoulder and lap belt offer better protection than a lap belt alone.

Anticipatory guidance related to CRD use should continue to be provided by health care providers, namely pediatric nurse practitioners (Bass et al., 1993; Cohen et al., 1997; Miller & Galbraith, 1995, Grey, 1998). Frequently provided information could lead to a reduction in motor vehicle occupant injuries and a cost savings in medical spending (Bass et al.; Miller & Galbraith). Some families do not see a health care provider regularly, so restraint use information should be available at health departments, WIC offices, supermarkets, and other places frequented by parents (Bradbard & Lisboa-Farrow, 1995). Increasing the number of places the information is available might increase the number of CRDs used and decrease the number of injuries related to nonuse and misuse of CRDs.

Research Questions

This study focused on two questions.

1.) How do parents restrain their children ages 3-5 years?

2.) Where do parents obtain their information on restraining techniques?

Hypotheses

Three hypotheses were tested in this study.

1.) Parents who wear their seat belts 100% of the time will be more likely to restrain their child.

2.) There is a relationship between parents' education level and whether their child is restrained in the back seat of the vehicle.

3.) There is a relationship between parents' perception of susceptibility to being involved in an accident *every* time they transport their child and the frequency of restraining their child.

Definition of Terms

Child restraint device (CRD) was defined as a car seat for children weighing between 20-40 pounds, and a booster seat for children weighing between 40-60 pounds.

Parent was defined as the primary caretaker and guardian of the child. In this study, it was also limited to caretakers of children in the age range of 3-5 years.

Source of information included any source the parents might refer to as an information resource for restraining their child. This could include, but was not limited to, the PNP or other primary health care provider, the health department, the media, or family and friends.

CHAPTER 3

METHODS

Design

The study was a descriptive design utilizing a questionnaire distributed to parents of children aged 3-5 years. The descriptive design was chosen because it allowed the researcher to describe and document aspects of how parents were restraining their children and where parents were getting information. The design was flexible, cost-efficient, and able to be completed in a timely manner. More potential participants could be reached by mailing a questionnaire. Participants could remain anonymous and answer the questions on the instrument without the threat of adverse reactions. The questionnaire was voluntary and the data collection was non-invasive.

Disadvantages of the design included a low response rate, high return rate of undeliverable questionnaires, and the inability to determine whether the participants answered truthfully. The estimated response rate of questionnaires is usually less than 60%, possibly leading to results that do not represent the whole group (Polit & Hungler, 1995). A reminder card could potentially lead to

a higher response rate but also incurs more expense (Polit & Hungler, 1995). Missing data on the questionnaire poses a problem. A weakness of the descriptive design is that no intervention is performed and no causal relationships are determined (Polit & Hungler, 1995).

Prior to the study, a pilot study for the newly designed instrument was performed. Parents of children who attended a local parochial preschool were used as the sample. The questionnaire was distributed via the children's mailboxes at the school. A large envelope was placed in the same area for their return. Forty-four percent of the questionnaires were returned with seven of them being incomplete. The incomplete data included five missing the parent's age; one also was missing the primary source of information and the belief of whether the parent thought CRDs were safer than seat belts; and two participants marked both true and false to questions in the belief section. One parent marked it intentionally and commented on why, the other made no comments and it remains unknown whether it was intentional. Subsequent clarification of the parent's age question and rewording of two belief questions occurred prior to the study. The pilot study helped increase the internal reliability of the questionnaire.

For the study, 200 questionnaires were mailed to parents of children aged 3-5 years from a pediatrician's office along with a consent letter describing the study,

its intent, and asking for participation. A self-addressed stamped envelope was included to encourage the return of the questionnaire. Five of the returned questionnaires had missing data but three included comments as to why they left the data blank. One of the missing data questionnaires indicated the child's age where the parent's age was requested. Fourteen of the participants made comments about restraining their child on the questionnaire.

Population and Sample

The target population included all parents of children aged 3-5 years who transport their children in a motor vehicle. The pilot study sample included 45 parents of children who attended a parochial preschool in western Michigan. The preschool director granted permission to use the children's mailboxes for distribution of the questionnaires (Appendix B). The researcher's daughter attended the preschool at the time of the study and potentially could have biased the results. Twenty of the parents returned the questionnaire (44%). All respondents were Caucasian, female, married, had at least some college, and had private insurance. The mothers' mean age was 34.66 years (SD=4.4) and ranged from 29 to 42 years. Five of the mothers' ages were unknown secondary to them placing their child's age in the area asking the age of the parent. Twenty-five percent of the parents had children weighing 20-40 pounds and 75% had children weighing 40-60 pounds.

The study's sample consisted of 200 parents whose children aged 3-5 years were patients at a western Michigan pediatrician's office. Permission was granted from the pediatrician to invite his patients to participate in the study (Appendix C). A computer generated list of families with children in the desired age range provided address labels to allow for home mailings.

Of the 200 questionnaires mailed out, 44 were used in the study (22%). Thirty-four were undeliverable. The sample was predominantly female, Caucasian, and married. Most participants had some college or greater level of education.

Instrument

The 23-question Child Car Restraint questionnaire was developed by the researcher (Appendix D). The questions were specific to parents of 3-5 year old children. Eight questions addressed parental demographic information. Six questions inquired about parental seat belt use, child seat belt use and type of restraint, percentage of time the child was restrained in the back seat, and sources of information the parent used. The basis for optimal restraint techniques was taken from the AAP's guidelines (1996). The parents were asked what their health care provider recommended in regards to restraining their child, and to state their primary resources for learning how to restrain their child. The parents were not asked to rank the sources of information.

The remaining nine questions were focused on the parental beliefs of child restraint use. These questions tied the study to the Health Belief Model using the concepts of perceived susceptibility, perceived seriousness, benefits, and barriers.

An expert panel consisting of doctors and nurses was sought to establish validity. This panel included a pediatrician specializing in pediatric intensive care medicine and five registered nurses in a pediatric intensive care unit who see the most devastating consequences of unrestrained children. A primary care pediatrician also reviewed the questionnaire. Proper restraining techniques were taken from the AAP guidelines (1996).

As a result of the pilot study, a few minor changes were made to clarify questions on the questionnaire. The pilot study was performed to increase the reliability and internal validity of the questionnaire prior to the study.

Procedures

The subjects of the study were the parents of children aged 3-5 years. Parents were recruited from a pediatrician's office to participate in the study. The questionnaire was distributed via the mail to the parent's home and returned using the self-addressed stamped envelope provided.

Approval from the Human Research Review Committee at Grand Valley State University was obtained prior to the

questionnaire distribution (Appendix E). The pilot study was performed in May, 1998 to test for reliability and internal validity of the questionnaire. The revised questionnaires were then mailed to the parents' homes in July of 1998. The researcher and the Human Research Review Acting Chair were available by telephone to answer any questions. One mother called after completing the questionnaire to discuss CRD use and the laws in Michigan. She also requested the researcher to lecture on CRD use at her local mothers' club.

The questionnaire was voluntary. The pediatrician's office did not know which individuals returned the questionnaire. The questionnaire was anonymous and the researcher was not able to identify any individual parent. Copies of the consent form for both the pilot study and the full study are in the appendix (Appendices F and G, respectively).

CHAPTER 4

RESULTS/DATA ANALYSIS

Techniques

Descriptive statistics were used to analyze the data. The questions on the instrument were demographics, multiple choice with the parent being able to choose as many as applied, and true and false for the CRD belief area. The two research questions were answered and the three hypotheses were tested using Fisher's exact test due to the small sample size (n=44). A p-value less than .05 was considered significant. The analysis was performed using the Statistical Package for the Social Studies (SPSS). The questionnaires were mailed out to the homes and the participants were asked to return them in one and a half weeks. Six questionnaires had missing data but were used in the study. The missing data included one questionnaire missing the parent's age, two participants did not use a CRD so they were unable to state if too difficult to use, one participant stated it was unknown if the parent was considered at fault for unrestrained child's injuries, and three missed a question and did not comment about it. Fourteen participants wrote comments about car seats on the

questionnaire. These will be discussed in chapter 5.

Characteristics of subjects

The sample was predominantly female (93%). Participants were 73% Caucasian, 13.6% Black and 13.7% had other ethnic backgrounds including American Indian, Asian, and Hispanic. The majority of the participants (77%) were married. Twenty percent were single and 2.3% were separated. The mean age was 30.97 years (SD=5.39) and ranged from age 20 to 44 years. One person listed the child's age instead of her own. The educational level of the sample revealed 34% were high school graduates or less and 66% had at least some college. Seventy-five percent had private insurance, while 21% were on Medicaid and 2% had no insurance coverage. Of the children, 66% were 20-40 pounds and 32% were 40-60 pounds while one child (2%) was over 60 pounds.

Research questions

The multiple choice section was used to answer the research questions. The parents were asked to quantify their own seat belt use. The results were that 72.7% of the parents stated they used seat belts 100% of the time, 15.9% stated they used seat belts 75-99% of the time, and 11.3% used restraints less than 74% of the time.

The first research question was "How do parents restrain their children ages 3-5 years?" Of the parents that responded, 88.6% of the children were restrained 100% of the time; 6.8% were restrained 75-99% of the time; and 4.6% were restrained less than 74% of the time. In regards

to back seat use, 63.6% of the children were restrained 100% of the time in the back seat; 29.5% were restrained 75-99% of the time in the back seat and 4.5% were restrained 50-74% of the time in the back seat. One parent commented that she owned a vehicle without air bags and therefore, the child could ride in the front seat. The types of restraining methods used are listed in Table 1. More than one option could be selected to allow for differences in restraining techniques depending on the vehicle in which the child was riding. Of the 44 returned questionnaires, 26 of the parents used only one method to restrain their child, 16 parents used two methods and two parents used three to four methods to restrain their child. The parents were not asked to quantify the amount of time the child spent in each restraint method.

The second research question was "Where do parents obtain their information on restraining techniques?" The information is presented in Table 2. Again, more than one option could be chosen and parents were allowed to list others that applied. The parents were not asked to rank their responses. Twenty-seven of the parents chose more than one source and eleven parents listed additional sources. These were included under the 'other' category in Table 2. Family and friends was chosen by 56.8% of the parents. The health care provider was chosen by only 18.2% of the parents as being a source of information. As a response to the health care provider's recommendations on

Table 1

Child Restraint Device Utilization by Type

Category	n	%
Car Seat	8	18.2
Booster Seat	15	34.1
Lap & Shoulder Belt	28	63.6
Lap Belt only	14	31.8
No Restraints	0	0

restraining children, 36.4% perceived no information being given. Thirty-four percent stated the health care provider recommended a car or booster seat, while 13.6% stated the recommendation was to use the lap and should belts. Just to make sure the child was restrained was chosen by 6.8% of the parents.

Results of the questions related to child restraint beliefs indicated that 100% of the parents believed that an accident could occur every time they were driving, while 95.5% believed that if an accident did occur their child could be seriously injured. When asked if a car seat or booster seat could protect their child from injury, 90.9% believed it could, and 88.6% agreed that a car seat or booster seat properly attached to the vehicle would be safer than the vehicle's seat belts. Responses to

Table 2

CRD Information Sources Utilized by Parents

Category	n	%
Magazine or Newspaper	22	50
TV or Radio	20	45.5
Health Care Provider	8	18.2
Health Dept or WIC Office	4	9.1
Family or Friends	25	56.8
Other: local hospital employed in auto insurance common sense myself manufacturer motor vehicle laws store	12	27.3

questions about the barriers to car and booster seats indicated 9.1% of the parents believed they could not afford a CRD, 9.1% stated the CRD was too difficult to use, and 6.8% stated they would not force their child to be restrained. Two parents commented they did not own car or booster seats so therefore, they could not respond to the difficulty of use question. Ninety-three percent agreed that they would be at fault if their child was injured while riding unrestrained. The middle of the back seat was

considered the safest position to restrain the child by 88.6% of the participants.

Hypotheses

Three hypotheses were tested in the study. The first one stated that parents who wear their seat belts 100% of the time will be more likely to restrain their children. For the 72.7% of parents who wore their seat belts 100% of the time, 96.9% of them also restrained their child 100% of the time. Using the Fisher's one-tailed test, the relationship was found to be significant($p=.01$).

The second hypothesis stated that there would be a relationship between parents' educational level and whether their child was restrained in the back seat of the vehicle. Of the 44 parents who responded, 29 (67.4%) had some college or higher level of education and 62.1% of those parents restrained their child in the back seat. The remaining parents (32.6%) had a high school degree or less education, and 71.4% of those parents restrained their child in the back seat. This hypothesis was not supported using Fisher's Exact Test ($p>.05$).

The third hypothesis stated that a relationship existed between parents' perception of susceptibility to an accident every time they transported their child and the frequency of restraining their child. All participants (100%) stated they believed they were susceptible to an accident every time they transported their child so this hypothesis could not be examined statistically. Clinically

though, only 88.6% of the children were restrained 100% of the time so the parental perceived susceptibility was not enough to ensure that 100% of the children were restrained 100% of the time. Only the relationship between the parent's 100% seat belt use and the frequency of the parent restraining their child was found to be significant.

Other findings of interest

Frequencies were performed to determine how many of the 20-40 pound children were restrained in a car seat and how many of the 40-60 pound children were restrained in a booster seat. The results appear in Table 3.

Table 3

Restraint Type Compared to Weight of Child

	Weight of Child(n=44)	
Restraint Type	20-40# (n=29) n(%)	40-60# (n=14) n(%)
Car Seat	7(24.1)	1(7.1)
Booster Seat	12(41.4)	3(21.4)
Lap Belt only	12(41.4)	1(7.1)
Lap & Shoulder Belt	15(51.7)	12(85.7)

The results indicated some other potentially interesting relationships might exist. One such

relationship was to see if the parent's age was related to the parent's seat belt use. The parents were divided into two groups. The mean age (30.9 years) was the dividing point. In the younger group (30 years or less), 63.6% used their seat belts 100% of the time. In the older group (31 years or older), 81.8% used their seat belts 100% of the time. For the 44 respondents, parental age was not related to the parental seat belt use (X^2=1.83, df=1, p>.05).

When the age of the parent was compared with the parent restraining the child 100% of the time, the younger and older age groups were comparable. Results indicated 86.4% of the younger parents and 90.9% of the older parents restrain their child 100% of the time. No significance was found between the age of the parent and the parent restraining the child 100% of the time (X^2=.225, df=1, p>.05).

The age of the parent was also compared to the frequency of the child being restrained in the back seat of the vehicle. Eighty-one percent of the younger parents restrained their child 100% percent of the time in the back seat while only 50% of the older parents did so. The X^2 was significant at 4.53 and p<.05 but the X^2 with Yates continuity correction was 3.27 and the p>.05. The sample was not large enough to say this relationship was significant.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Discussion of findings and conclusions

Forty-four of the 200 questionnaires were returned. Thirty-four questionnaires were unable to be delivered and sent back. It is unknown if the group of parents who did not return the questionnaire would have answered the same as the group that did return it. The pediatrician's office used for the study had a high rate of families who moved frequently. It remains unknown if these parents would have answered the questions differently or if frequent moving affects restraint status.

This study had a high percentage of children reported to be restrained 100% of the time (88.6%) and none of the parents admitted to complete nonuse of restraints for their children. Of the parents, 72.7% reported wearing their own seat belts 100% of the time. Margolis, et al. (1992) observed restraint use in 75% of the children (n=717) and 59.7% of the parents they studied. Johnston et al. (1994) reported 69% of children were restrained (n=16,685). These children were all injured in a MVA, which might make the reported restraint use lower since the uninjured children involved in a MVA were not included (Johnston et al.). The

observation study by Decina and Knoebel (1996) had an overall restraint use of 87.2% (n=5,865 children). The current study had a higher use of restraints in both children and parents. People are more aware of restraint laws now and that could reflect the higher usage described here. The sample for this study was fairly homogenous and could utilize restraints more that the general population. The parents who did not return the questionnaire might have influenced the results if they would have responded. In the current study, one of the mothers wrote on the questionnaire that she knew her children should be restrained but that it was easier to leave one of them unrestrained instead of listening to their fighting with each other, which interrupted her concentration on driving.

A finding of interest was that only 7 of the 29 children weighing 20-40 pounds were placed in a car seat. The car seat has been shown to be the restraint system of choice for this weight, but only 24.1% of the children were placed in one (AAP, 1996). Some of the comments related to this included that the child outgrew the car seat, the child can undo the restraint system and climb out, affordability, the child refused to sit in the seat, the car seat was a hassle, and there was not enough room in the vehicle in which to place three car seats. In Decina and Knoebel's 1996 study, the toddlers (20-40 pounds) were restrained in a car seat 67.5% of the time. One difference between the studies was age, Decina and Knoebel used weight

as the basis and many 1-2 year olds fall into this category. In this study, the children were 3-5 year olds. Some parents seemed to be basing the change from car seat to regular seat belt on the age of the child and not the weight. In this study, the other choices for the 20-40 pound child included the booster seat (41.4%), the lap belt (41.4%), and the lap and shoulder belt combination (51.7%). Each of these options was used more than the preferred method for this weight range, possibly leading to an increase risk of potential injuries for this group. The totals did not add up to 100% because the parents were asked to choose all the methods they used for their child and 18 parents used more than one method. The use of car seat might potentially be less than stated because a parent could list both a CRD and vehicle restraint system. The parent might be using the seat belts the majority of the time and only occasionally be using the CRD, leading to a misrepresentation of CRD use.

For the 40-60 pound preschool child, the lap and shoulder belt combination was cited most often (85.7%) followed by the booster seat (21.4%). Many studies stated that the vehicle's seat belts do not offer adequate protection for this age group (Agran, Winn, & Anderson, 1997; Johnston et al., 1994; Margolis et al., 1992). Decina and Knoebel (1996) reported similar findings with 6.1% of the 40-60 pound children in a booster seat, 75.3% in safety belts, and 18.6% unrestrained. "Lap/shoulder

belt systems are estimated by the National Highway Transportation and Safety Administration (NHTSA) to reduce fatal injury by 45% and moderate-to-critical injury by 50% among children older than 5 years" (Agran, Winn, & Anderson, 1997, p. 7). They do not offer adequate protection to children younger than age 5 years. The children in the current study are at increased risk for injury if they spend the majority of the time in the adult seat belts.

Almost 64% of the children in this study were placed in the vehicle's lap and shoulder belt. This leaves these children at risk for the seat belt syndrome. One parent did comment that they used the 'safefit' system that properly positioned the shoulder and lap belt for their 5-year-old. Other vehicles have a clip to lower the shoulder strap so it does not cover the child's neck. Another parent commented that her 5 and 3-year-old use the lap and shoulder belts, but place the shoulder strap behind them. This again leaves the children at risk for injury should a crash occur. Booster seats do not appear to be used by many children in either this study or Decina and Knoebel's although they have been shown to provide better protection. Agran, Winn and Anderson (1997) stated that the best method to restrain children less than 60 pounds is a booster seat that requires the lap and shoulder belt and to have them sit in the back seat so it remains unclear as to why these parents do not use this method.

Parents may not be receiving the information they need to continue to place their child in a CRD until they reach 60 pounds. The Michigan law only requires the use of the vehicle's restraints for children older than 1 year of age. The law also only allows for secondary enforcement of restraints. The parents may not be stopped just because the child is unrestrained, some other infraction must occur. The fine is a mere $25 for allowing a child to ride unrestrained (Agran, Winn, & Anderson, 1997). Is this all Michigan thinks of it's young passengers? Many parents need a wake-up call to provide the best protection they can to their children. One mother in the current study stated she uses a car seat and booster seat for her two children whether they are traveling for one minute or one hour. She stated law enforcement officials need to be harder on parents who let their children ride unrestrained. Other participants stated they knew a CRD would protect their child but it was a hassle to use. It is hard to believe children are not worth the hassle.

Another interesting finding was the relationship between the parent's 100% seat belt use and the child being restrained. Decina and Knoebel (1996), Margolis et al. (1992), and Macknin et al. (1987) also stated that the parent wearing a seat belt was a predictor of the child being restrained. Margolis et al. included the parental restraint use as a predictor that the child would be restrained properly. More programs aimed at the parents

making safer choices for themselves might increase the CRD use in children. Parents need to realize they are in danger of being injured or killed in a MVA also. The child relies on the parent to make safety choices for them and the parent's job is to protect the child, so programs designed to educate both the parent and the child might prove beneficial.

The Health Belief Model (HBM) fit nicely with this study. The model's concepts were related to questions in the instrument. Since all the parents perceived they were susceptible to an accident, the third hypothesis could not be analyzed statistically. However, not all children were restrained 100% of the time. The perception of a MVA occurring must not be enough to ensure the child will be restrained. Only 4.5% of the parents believed their child might not be seriously injured if a MVA occurred, so why did almost 12% of the parents not restrain their child 100% of the time. Perceived seriousness alone was not strong enough to guarantee 100% restraint use of children. One 21-year-old single mother commented "I know that there is a *possibility* that I may be in an accident while driving, but it wouldn't be my fault. I am not a reckless driver. I also 'drive for other people'. There are some people out there driving that *don't care*!" This mother recorded her own seat belt use at 50-74% of the time. She restrained her 20-40 pound child 75-99% of the time in the vehicle's lap belt. While defensive driving is a good idea, one

would think this mother contradicts herself by not wearing her own seat belt or restraining her child 100% of the time. While she perceived susceptibility to a MVA occurring, she still did not value the use of restraints in protecting herself or her child. If the child dies from being unrestrained or improperly restrained, would it matter who caused the accident? The mother would still be negligent in not restraining her child.

When asked if the parent could be considered at fault if their child was injured while riding unrestrained, 93.2% stated true. This may become more relevant as legislation is being passed that allows for prosecution of parents if their child is injured while riding unrestrained.

While parents appear to find CRDs beneficial with 90.9% agreeing that CRDs could protect their child from injury and 88.6% believe that CRDs are safer than the vehicle's seat belt for their child, most of the children (63.6%) were restrained in the vehicle's seat belts. Barriers to CRD use identified by parents were affordability (9.1%), difficult to use (9.1%), car seat was a hassle (one parent commented), child objected (6.8%), seat not big enough (four parents commented), and the vehicle not being able to hold three car seats (one parent commented). Most parents (88.6%) agree that the middle of the back seat is the safest place to restrain their child but only 63.6% of the children were restrained in the back seat 100% of the time. Two parents commented on not being

able to watch the child closely so they placed the child in the front seat. One of the parents stated she did not have air bags so it was okay for the child to ride in the front seat. Another parent stated that the booster seat with the shield was not a safe alternative because the child could slide out. Another wrote that they had "tried several booster seats for this age, none were *secure* enough for our satisfaction".

The sample in this study was too small to state whether a relationship existed between the parent's demographics and proper restraining of the child. The hypothesis which examined the parent's education level and the frequency of back seat restraining for the child was not supported. Other studies by the National Center for Injury Prevention and Control found that more highly educated parents restrained their child more often, but no studies were found related to the education level and back seat restraint use. Chi square tests were also performed looking for a relationship between the parent's age and frequency of using their seat belts, and the frequency of restraining the child. No significant relationships were found.

The HBM's cues to action were the parental information sources. Many past studies indicated that the pediatrician or PNP's office was a good place for parents to get injury prevention education for their children (Macknin et al., 1987; Bass et al., 1993; Cohen et al., 1997; Grey, 1998).

Eighteen percent of the parents in this study listed the health care provider as a source of information. Over 55% stated family and friends were their information source. This would be fine if the family or friends were well educated in restraint use. Low income rural young mothers found the health department and WIC office were good resources, only 9.1% of the current sample used these places as a resource (Bradbard & Lisboa-Farrow, 1995). The samples were very different, though possibly explaining the difference. Just over 35% of parents stated that they received no information on CRDs from their health care provider. Thirty-four percent stated their health care provider recommended a car or booster seat. There are several possibilities for this response. Either the information given on injury prevention did not occur at some well-child visits, or some families came in for well-child visits and others did not, or some parents retained information given to them while others did not. Since the health care provider was not considered to be a primary source of information by many parents, other ways to target parents need to be developed. One example found in a local newspaper was an advertisement from a car dealership offering free child restraint inspections to ensure children were restrained properly. This is similar to the Car Child-Occupant Safety Project (Gaines, et al., 1996). More of these programs might increase the proper restraint use of children.

In summary, many parents in this study valued CRDs and found them beneficial in protecting children but most of the children were restrained by the vehicle's lap and shoulder belt. All the parents felt they were susceptible to becoming involved in a MVA and most felt that their child could be seriously injured if a crash occurred, but again most of the children were not optimally restrained for their weight according to the AAP's guidelines. Car and booster seats were not adequately utilized in this study. A few parents listed barriers to CRDs use but this should not replace the protection they offer. Is the child's protection not worth the money or energy? Children are not miniature adults. They need adequate protection. A renewed effort at well-child visits to educate parents needs to take place. Every child deserves a chance to survive a crash with the least amount of injuries and impairments.

Application to Practice

PNPs and all others working with children need to make every effort to educate parents on CRD use. MVAs should be given primary concern because they continue to be a leading cause of injuries and death in children. This should be a preventable injury for most children. A child who is properly restrained has an 83% chance of not being injured. This drops to 57% if the child is unrestrained (Johnston et al., 1994).

Programs exist to guide providers in giving the age

appropriate injury prevention information. CRD use and proper restraining techniques should be included at every visit because all children, regardless of age, need to be protected. Grey's study (1998) on the "Put Prevention Into Practice" guidelines increased car seat documentation on well child charts by PNPs in pediatric primary care. No results were given to state the frequency of CRD information provided increased. The AAP recommends The Injury Prevention Program (TIPP) for pediatricians to give age appropriate counseling to parents of children 0-4 years of age. Miller and Galbraith (1995) estimated that $230 million dollars would be saved in medical spending costs and that injury costs would decline by $3.4 billion if every child aged 0-4 years completed TIPP. Primary care providers and others can influence parents to provide injury prevention strategies to their children.

Another area PNPs can become involved in is at the legislative level. The Michigan law requires children aged 1-4 years to be restrained but does not specify how they should be restrained. Having the law state that a CRD needs to be used for these children might potentially increase the use and decrease the injury rate.

Limitations

This study's limitations were related to the design, sample and instrument. The design was descriptive and no manipulation of the study subjects was performed. The use of self-reported questionnaires is considered a weaker

design by Polit and Hungler (1995). Many of the questionnaires were not returned, a problem with this type of study. Some of the participants never received the questionnaire due to an invalid address. It was unknown whether the participants who did not return the questionnaire would have answered the same as the respondents who did return the questionnaire. Sample size and homogeneity were limitations. The small sample size limited the statistical analysis that could be performed. Only the first hypothesis was significant, the others could not be supported. With a larger more diverse sample, more relationships between the parents' demographics and child restraint use might become apparent.

Most participants were white and almost all were female. Education level varied but most had private insurance. Results cannot be generalized because of the small sample size. A response bias may have occurred with the participants responding to what they know is proper restraining techniques but is not actually how the child is restrained. Also, the questionnaires that were not returned may have provided different information than the returned ones. The sample criteria were controlled by requiring the participant to be a parent of a child aged 3-5 years and also a client of one local pediatrician.

This was the first time the study's instrument was used. A pilot study was performed prior to the study but even so this is a threat to the internal validity of the

study. The instrument would become more valuable if the results could be replicated with a different sample. If samples from other health care provider's offices yielded the same results the reliability of the instrument would be increased.

In regards to external validity, seat belt use for children has become a hot topic for childhood injury prevention over the last 10 years. During the pilot study and the actual study, radio broadcasts encouraging buckling of children aired on the local radio stations and also, a local car dealership performed a CRD check point for parents to stop on one Saturday and make sure they were properly restraining their child. Information shows on television have also shown crash dummies and the effects of being unrestrained in the last few months. All of these could have influenced the study's results.

Suggestions for further research

Although many studies on parental use of child restraint devices have been conducted, few studies are limited to 3-5 year olds. This study provides a basis for further study of this age group. Recommendations for future research include duplication of the study using a larger and more diverse sample to further establish reliability of the questionnaire and using more primary care offices that provide services to children. This could potentially unmask injury prevention education problems and offer an incentive for better communication of prevention

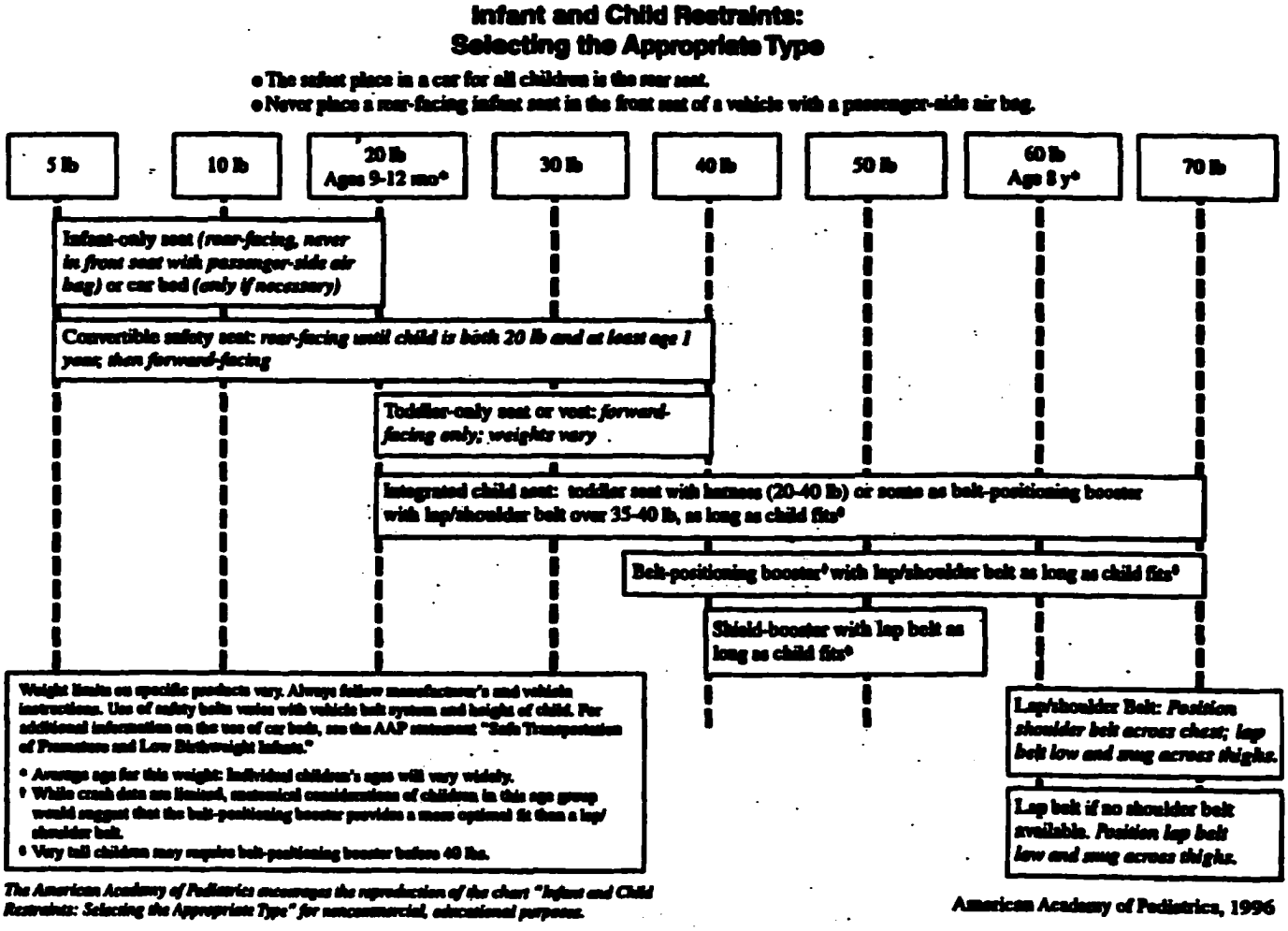
strategies to parents. Further exploration of the application of the Health Belief Model to CRD use could provide useful data in developing successful prevention strategies.

APPENDIX A

AMERICAN ACADEMY OF PEDIATRICS: 1996 GUIDELINES

APPENDIX A

American Academy of Pediatrics



APPENDIX B

PRESCHOOL PERMISSION LETTER

APPENDIX B

Preschool Permission Letter

St. Peter's Lutheran Preschool and Kindergarten
310 East Division Street
Rockford, Michigan 49341-1306
(616) 866-3700 866-1818

Dianne Hill, Director ***Rev. Thomas Brazinsky, Pastor***

"Jesus said, 'Let the little children come to me, and do not hinder them, for the kingdom of heaven belongs to such as these.'"
Matthew 19:14 (NIV)

April 13, 1998

Human Research Review Committee
Grand Valley State University
Allendale, Michigan 49401

Re: Pilot Study for Master's Degree
by Peggy S. Meulenberg, BSN, RN

Dear Committee Chair:

Peggy S. Meulenberg has my permission to insert a questionnaire in the mailboxes of the students enrolled in St. Peter's Lutheran Preschool. Peggy has assured me that participation in the study on child car restraints is strictly voluntary by the parents of children aged three to five years.

Since we have a ready source of people in the range needed for her sample, we are happy to be a part of her pilot study.

Sincerely,

[redacted]

Dianne Hill
Director

APPENDIX C

STUDY PERMISSION LETTER

APPENDIX C

Study Permission Letter

April 23, 1998

Metro Health Pediatrics
1801 Breton Road, SE
Grand Rapids, MI 49506

Human Research Review Committee
Grand Valley State University
Allendale, MI 49401

Dear Committee Chair:

Peggy S. Moulenberg has my permission to mail questionnaires to the parents of patients in the Metro Health Pediatric Practice. Peggy has assured me that participation in the study on child car restraint device use is strictly voluntary by the parents of children ages 3-5 years.

I am aware that this is a study to fulfil Peggy's requirements for her Master's degree in Nursing.

Sincerely,

[redacted]

Chris Lawrence
Metro Health

APPENDIX D

CHILD CAR RESTRAINT QUESTIONNAIRE

APPENDIX D

Child Car Restraint Questionnaire

1. Do you have a child age 3-5? (1)_____Yes (2)_____No

If yes, please continue, if no please stop here and mail the questionnaire back in the envelope provided.

Demographics

2. What is your age?_____(parent's age in years)

3. Are you(1)_____Female (2)_____Male?

4. What is your marital status?

____(1)Married
____(2)Single
____(3)Separated
____(4)Divorced

5. What is the highest educational level you have completed?

____(1)Some high school
____(2)High school graduate
____(3)Some college
____(4)College graduate
____(5)Other_____

6. What is your ethnic background?

____(1)American Indian
____(2)Asian
____(3)Black
____(4)Hispanic
____(5)White
____(6)Other_____

7. What type of insurance do you have?

____(1)HMO/PPO/Private insurance
____(2)Medicaid
____(3)No Insurance
____(4)Other_____

8. What is your child's weight?

____(1)20-40 pounds
____(2)40-60 pounds
____(3)over 60 pounds

Car Restraint Use

9. I wear my seat belt _____ percent of the time.

____(1)100%
____(2)75-99%
____(3)50-74%
____(4)25-49%
____(5)I do not wear a seat belt.

10. I restrain my child in the car _____percent of the time.

_____(1)100%
_____(2)75-99%
_____(3)50-74%
_____(4)25-49%
_____(5)I do not restrain my child.

11. I restrain my child in the back seat of the car ____percent of the time

_____(1)100%
_____(2)75-99%
_____(3)50-74%
_____(4)25-49%
_____(5)I do not restrain my child.

12. I use the following car restraint device(s) for my child ... (Check all that apply)

_____(1)car seat.
_____(2)booster seat.
_____(3)vehicle's lap and shoulder belts.
_____(4)vehicle's lap belt.
_____(5)I do not restrain my child.
_____(6)Other _____

13. My child's health care provider recommends...

_____(1)a car seat or booster seat.
_____(2)the vehicle's lap and shoulder belts.
_____(3)just to restrain my child.
_____(4)No information given.
_____(5)Other _____

14. My primary source of information on car seat/seat belt use for my child came from...(Check all that apply)

_____(1)magazines and/or newspapers.
_____(2)TV and/or radio.
_____(3)my child's health care provider.
_____(4)the health department or WIC office.
_____(5)my family or friends.
_____(6)Other _____

Beliefs on Child Restraint Use

15. Every time I drive my vehicle, there is a chance I will be involved in an accident.

_____(1)True
_____(2)False

16. If an accident occurred, my child could be seriously injured.

_____(1)True
_____(2)False

17. Car seats and booster seats could protect my child age 3-5 from injury.

_____(1)True
_____(2)False

18. Car seats and booster seats properly attached in a car are safer than the vehicle's seat belts for my child age 3-5.

_____(1)True
_____(2)False

19. I cannot afford a car seat or booster seat.

_____(1)True
_____(2)False

20. Car seats and booster seats are too difficult to use, so I do not use them.

_____(1)True
_____(2)False

21. I could be considered at fault for any injuries my child sustained if he/she was riding unrestrained.

_____(1)True
_____(2)False

22. I will not force my child to stay in a car seat or booster seat if he/she does not want to.

_____(1)True
_____(2)False

23. The middle back seat of the vehicle is considered the safest place for my child age 3-5 to be restrained.

_____(1)True
_____(2)False

Please feel free to write any comments on the back of this page.

Please return the questionnaire in the enclosed envelope.

Thank you again for your participation!

APPENDIX E

HUMAN RESEARCH REVIEW COMMITTEE APPROVAL

APPENDIX E

Human Research Review Committee Approval

GRAND VALLEY
STATE UNIVERSITY

1 CAMPUS DRIVE • ALLENDALE, MICHIGAN 49401-9403 • 616/895-6611

May 14, 1998

Peggy Meulenberg
10301 Shanner NE
Rockford, MI 49341

Dear Peggy:

Your proposed project entitled "***Parental Factors Affecting Child Restraint Device Use in Children Age 3-5***" has been reviewed. It has been approved as a study which is exempt from the regulations by section 46.101 of the Federal Register 46(16):8336, January 26, 1981.

Sincerely,

[redacted]

Robert Hendersen, Acting Chair
Human Research Review Committee

APPENDIX F

PRESCHOOL CONSENT LETTER

APPENDIX F

Preschool Consent Letter

Dear St Peter's Lutheran Preschool Parent:

You are being asked to participate in a pilot study regarding child car restraint devices for children ages 3-5. This study involves parents of 45 students from St. Peter's Lutheran School.

Motor vehicle accidents are still a leading cause of injury and death in children and of the children restrained, as many as 70% are incorrectly restrained. Your input will be helpful in assessing child car restraint knowledge and in determining where parents get information on restraining techniques.

This study has been approved by the Human Research Review Committee at Grand Valley State University. Mrs. Dianne Hill, the preschool director, has granted permission to use the children's mailboxes at St. Peter's Lutheran Preschool to deliver the questionnaires.

The questionnaire is voluntary and should take about 15 minutes to complete. Your anonymity is guaranteed and returning the questionnaire implies your consent to participate. The questions relate to you or your child, so please refer to only one child age 3-5 to answer the questions. If you have more than one child in this age range and two questionnaires are sent, please fill out one for each child.

Upon completion of the questionnaire, please put it in the large envelope marked "Child Car Restraint Questionnaires" located next to the children's mailboxes by Friday, May 22, 1998.

This child car restraint study partially fulfils the requirements for my Masters degree. The results will be posted at the preschool at the completion of the pilot study.

Any questions can be directed to Peggy S. Meulenberg at (616)866-8041 or Robert Hendersen, Acting Chair of the Human Research Review Committee, at (616)895-2195.

Thank you for your participation,

Peggy S. Meulenberg, BSN, RN

APPENDIX G

STUDY CONSENT LETTER

APPENDIX G

Study Consent Letter

Dear Parent:

As the parent of a child age 3-5, you are being asked to participate in a study of child car restraint devices. This study consists of parents of 200 children in the age range of 3 to 5 years.

Motor vehicle accidents are still a leading cause of injury and death in children. Children are either unrestrained or as many as 70% are incorrectly restrained. Your input will be helpful in assessing child car restraint knowledge and in determining where parents get information on restraining techniques.

This study has been approved by the Human Research Review Committee at Grand Valley State University. Dr. Don Bouchard at MetroHealth Pediatrics provided your name as someone who might be willing to participate.

This questionnaire is voluntary and should take about 10 minutes to complete. Your anonymity is guaranteed and returning the questionnaire implies your consent to participate. The questions relate to you or your child age 3-5, so please refer to only one child in this age group to answer the questions. If you have more than one child in this age range and two questionnaires are sent, please fill out one for each child.

Upon completion of the questionnaire, please return it in the provided envelope by July 17, 1998. Thank you for your participation. The results will be posted in the waiting room of Dr. Bouchard's office at the completion of the study.

This child car restraint study partially fulfils the requirements for my Masters degree. Please direct any questions to Peggy S. Meulenberg at (616)831-4717 or Robert Hendersen, Acting Chair of the Human Research Review Committee at (616)895-2195.

Thank you for your assistance,

Peggy S. Meulenberg, BSN, RN

LIST OF REFERENCES

LIST OF REFERENCES

Agran, P., Dunkle, D., & Winn, D. (1985). Motor vehicle accident trauma and restraint usage patterns in children less than 4 years of age. Pediatric, 76(3), 382-386.

Agran, P., Dunkle, D., & Winn, D. (1987). Injuries to a sample of seatbelted children evaluated and treated in a hospital emergency room. Journal of Trauma: Injury, Infection, and Critical Care, 27(1), 58-64.

Agran, P., Winn, D., & Anderson, C.(1997). Child occupant protection in motor vehicles. Pediatrics in Review, 18(12), 413-423.

Agran, P., Winn, D., & Dunkle, D. (1989). Injuries among 4-to9-year-old restrained motor vehicle occupants by seat location and crash impact site. American Journal of Diseases of Children, 143(11), 1317-1321.

Bradbard, S. L. & Lisboa-Farrow, E. (1995). Program strategies for increasing car seat usage in rural areas (DOT HS 808 274). Washington, DC: National Highway Traffic Safety Administration.

Bass, J. L., Christoffel, K. K., Widome, M., Boyle, W., Scheidt, P., Stanwick, R., & Roberts, K. (1993). Childhood injury prevention counseling in primary care setting: A critical review of the literature. Pediatrics, 92(4), 544-550.

Burns, C. E. (1996). Introduction to health promotion. In C. E. Burns, Barber, N., Brady M., Dunn, A., Pediatric primary care: A handbook for nurse practitioners (pp.159-172). Philadelphia, PA: W.B. Saunders.

Center for Disease Control and Prevention. (Oct. 9, 1991). Child passenger restraint use and motor vehicle-related fatalities among children-United States, 1982-1990. JAMA 266:1913.

Cohen, L. R., Runyan, C. W., Downs, S. M., & Bowling, J. M. (1997). Pediatric injury prevention counseling priorities. Pediatrics, 99(5), 704-710.

Committee of Injury and Poison Prevention(1996). Selecting and using the most appropriate car safety seats for growing children: Guidelines for counseling parents. Pediatrics, 97, 761-763.

Davidhizer, R. (1983). Critique of the health-belief model. Journal of Advanced Nursing, 8, 467-472.

Decina, L. E. & Knoebel, K. Y. (1996). Patterns of misuse of child safety seats (DOT HS 808 440). Washington, DC: National Highway Traffic Safety Administration.

Gaines, S. K., Layne, B. H., & DeForest, M. (1996). Promoting automobile safety for young children. The American Journal of Maternal/Child Nursing, 21, 148-151.

Grey, M. (1998). The impact of the 'Put Prevention Into Practice' initiative on pediatric nurse practitioner practices. Journal of Pediatric Health Care, 12(4), 171-175.

Halpern, J. S. (1990). Clinical notebook: How safe are child safety seats? Journal of Emergency Nursing,16, 151-155.

Johnston, C., Rivara, F., & Soderberg, R.(1994). Children in car crashes: Analysis of data for injury and use of restraints. Pediatrics, 93(6), 960-965.

Macknin, M. L., Gustafson, C., Gassman, J., & Barich, D. (1987). Office education by pediatricians to increase seat belt use. American Journal of Diseases of Children, 141, 1305-1307.

Margolis, L. H. Wagenaar, A. C., & Molnar, L. J.(1992). Use and misuse of automobile child restraint devices. American Journal of Diseases in Children, 146, 361-366.

Michigan Office of Highway Safety Planning and United States Department of Transportation. (1991). Michigan's safety belt law. [Brochure].

Mikhail, B. (1981). The health belief model: A review and critical evaluation of the model, research, and practice. Advances in Nursing Science, 65-82.

Miller, J. & Pless, J. B. (1977). Child automobile restraints: Evaluation of health education. Pediatrics, 59(6), 907-911.

Miller, T. R. & Galbraith, M. (1995). Injury prevention counseling by pediatricians: A benefit-cost comparison. Pediatrics, 96(1), 1-4.

Murphy, J. M. (1998). Child passenger safety. Journal of Pediatric Health Care, 12(3), 130-138.

National Center for Injury Prevention and Control. (1997). Prevention of motor vehicle-related injuries: A compendium of articles from the Morbidity and Mortality Weekly Report, 1985-1996. Atlanta, GA: Centers for Disease Control and Prevention.

Osberg, J. S., & DiScala, C.(1992). Morbidity among pediatric motor vehicle crash victims: The effectiveness of seat belts. American Journal of Public Health, 82(3), 422-425.

Polit, D. & Hungler, B. (1995). Nursing research: Principles and methods (5th ed.). Philadelphia, PA: J. B. Lippincott.

Rosenstock, I. (1974). Historical origins of the health belief model. Health Education Monographs, 2(4), 328-334.

Rosenstock, I. (1974). The health belief model and preventive health behavior. Health Education Monographs, 2(4), 354-386.

Rosenstock, I. (1990). The health belief model: Explaining health behavior through expectancies. In Health behavior and health education (pp. 39-55). San Francisco: Jossey-Bass Publishers.

Stylianos, S. & Harris, B. H.(1990). Seatbelt use and patterns of central nervous system injury in children. Pediatric Emergency Care, 6(1), 4-5.