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Webster Krause, Lisa Ruth, <u>Maternal Depression as Predictor of Repeat Child Unintentional Injury.</u> Master of Public Health (Community Health), December 2004, 39 pp., 4 tables, references 28 titles.

Current literature supports maternal depression as a predictor of child unintentional injury. There have been conflicting results concerning mediating and other risk factors. This study aims to reexamine the link between maternal depression and the occurrence of repeat child unintentional injury in the home. Using the NHIS 2002 data maternal depression was found to predict child repeat unintentional injury in this national sample. It was found that the most predictive model of repeat child unintentional injury consisted of maternal depression and low-income. Since maternal depression and low-income have been identified as underlying determinants of child unintentional injury, they should be a priority in prevention efforts so as to more effectively reduce the occurrence of repeat unintentional injury among children in the home.
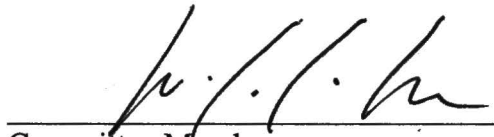
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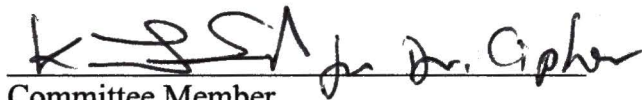
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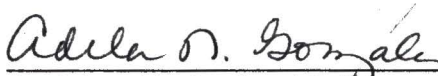
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MATERNAL DEPRESSION AS PREDICTOR OF REPEAT CHILD

UNINTENTIONAL INJURY

THESIS

Presented to the University of North Texas

Health Science Center at Fort Worth

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By

Lisa Ruth Webster Krause, M.P.H.(c)

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First and foremost I want to acknowledge God, through my Lord and Savior Jesus Christ, without whom this accomplishment would not have happened. Without the memory of my dad's confidence and conviction in my abilities, my academic accomplishments would have been less ambitious. I want to thank my mother for her undying support, and for somehow always conveying to me her conviction that there wasn't anything that I couldn't do. Lastly, I want to acknowledge my family and friends and all the people who contributed to my academic success along the way. Thank you.

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CHAPTER I

INTRODUCTION/ BACKGROUND

Injury is a serious problem in America, particularly unintentional injury, as it is

the leading killer and a leading cause of disability among all Americans ages 1-34

(Centers for Disease Control and Prevention [CDC] Web-based Injury Statistics Query

and Reporting System, [WISQARS], 2004). According to the National Safety Council

(2000), intentional and unintentional injuries account for $469 billion in medical care and

associated costs (as cited in McKenzie, Pinger, and Kotechi, 2002). Injury takes its toll

in terms of 11,479,838 years of potential life lost (YPLL) (CDC WISQARS), and untold

personal costs. Despite these statistics, injury prevention researchers and practitioners

claim that injuries are virtually 100% preventable (American Academy of Pediatrics,

2004; Christoffel and Gallagher, 1999; Feury, 2003; Home Safety Council, 2004;

McKenzie et al.; SafeKids Campaign, 2004; Spady, et al., 2004).

Injuries consist of two groups: intentional and unintentional. Intentional injuries

are those that have been judged to have been inflicted with intent, or on purpose

(McKenzie, et al., 2002). Unintentional injuries, or "accidents", account for the majority

(65% of all fatal injuries and over 93% of all non-fatal injuries) of all injury that occurs in

this country (CDC WISQARS, 2004). According to the National Safety Council (2000)

(as cited in McKenzie et al.) and the Home Safety Council (2004), unintentional injuries

result in economic costs of approximately $400 billion in medical care and associated

costs. Unintentional injuries result in 2,058,978 YPLL, or 17.9% of all causes of YPLL (CDC WISQARS). The most common location of non-vehicular unintentional injuries is in the home (Carter and Jones, 1993; Home Safety Council, 2004; Schiller and Bernadel, 2002). Sixty to 79% of all unintentional injuries to children occur in or around the home (Carter and Jones, 1993; Hambidge, Davidson, Gonzales, and Steiner, 2002; Home Safety Council, 2004).

The purpose of this thesis is to investigate maternal depression and other established risk factors for child unintentional injury as underlying social and behavioral determinants of child unintentional injury in the home. The importance of this project lies in the identification of these determinants and the subsequent potential reduction of unintentional injury of children in the home.

The impact of injury on America is severe. Injury is the 5th leading cause of death and a leading cause of disability. As indicated, according to the National Safety Council in 2000, it accounts for $469 billion in medical care and associated costs (as cited in McKenzie et al., 2002), 11,479,838 YPLL (CDC WISQARS, 2004), and enormous costs in personal suffering. Gordon (1949) defines injury as an overexposure to mechanical, thermal, electrical, chemical or radiation energy, or lack, thereof (e.g. hypothermia is lack of thermal energy) to which the body has no protective resistance (as cited in Christoffel and Gallagher, 1999). There are two broad categories of injuries with subcategories. Injuries are either, 1) fatal or non-fatal, and 2) intentional or unintentional. Fatal injuries are injuries which ultimately result in death and non-fatal injuries (defined for the purposes of this paper) are those that result in a medical visit to or medical advise from

an emergency room, a doctor's office or clinic, hospital admission, and often result in temporary or permanent disability. Intentional injuries are defined as having been "judged to have been purposely inflicted, either by another or oneself" (McKenzie et al., p. 517). Examples of intentional injuries are assaults; intentional shootings and stabbings; and suicides, homicide and child abuse. Otherwise known as "accidents" unintentional injuries are those injuries for which there was no intention of harm (McKenzie et al., p. 517).

The NHIS injury data, and therefore the results of this study, include both intentional (excluding self-harm) and unintentional injuries. Since the focus of this study is unintentional injuries of children in the home, intentional injuries were not considered; however, it is important to note that there was no differentiation between intentional and unintentional injuries in the NHIS survey questionnaires. Therefore, the NHIS data and the results of these data do involve intentional injuries. According to CDC WISQARS Injury Database, the percentage of intentional injuries of children ages 1-17 nationwide is 5.60%. Therefore, it can be assumed that approximately 5.60% of the results of these data refer to intentional injuries. Only data on medically advised (telephone call) or treated (doctor's visit) child unintentional injuries that occurred in or around the home were collected by NHIS interviewers, and therefore, assessed in this current study. Despite these numbers, experts claim that injuries are virtually 100% preventable. Whether caused by violence due to alcohol or drug abuse or caused by maternal depression, injury prevention specialists and researchers tell us that injuries are virtually all preventable (American Academy of Pediatrics, 2004; Christoffel and Gallagher, 1999;

Feury, 2003; Home Safety Council, 2004; McKenzie, et al., 2002; SafeKids Campaign, 2004; Spady, et al., 2004). According to Haddon Jr. (1970 and 1980) and other researches, injuries are prevented through modifications in the environment and through behavior change (Christoffel and Gallagher, 1999; as cited in Runyan, 1998). There is some action that we can take, as public health professionals to increase the safety of Americans in regard to injuries.

According to Haddon, Jr. (1981) and Rivara (1982), "accidents" or unintentional injuries occur as a result of one's physical "built" environment, social environment or the inability to function within one's environment without incurring injury due to a lack of individual physical or cognitive abilities (As cited in Christoffel and Gallagher, 1999; as cited in Glik et al., 1993). In many cases injuries occur as a result of some combination of factors. Yet, injuries are preventable on several different levels. Injury prevention experts have found that changing others' behavior is the most difficult, least effective means by which to prevent injuries. When behavior changes, injuries are prevented, yet it is the task of effecting a change in behavior that has proven difficult. Henceforth, in efforts to prevent injuries, levels of intervention have been defined. These levels are defined by the degree to which individual behavior change is required (Christoffel and Gallagher, 1999).

The first, and by far, most effective level of intervention, defined as requiring no behavior change on the part of the individual, is the automatic intervention. Automatic intervention is accomplished, for example, through the design of consumer products so that usage is completely safe; the prevention of potential injury is inherent in the product

design, and thus requires no substantial change in behavior on the part of the individual in order to be effective. The second example of the different levels of injury prevention "forces" a behavior change through the enforcement of laws. The law against buying alcohol for minors is an example of a law that helps to prevent injuries. The third level of injury prevention and that which has the least degree of effectiveness requires active participation in behavior change on the part of the individual. Typically, injury prevention on this level is accomplished through a behavior change as a result of the efforts of public health professionals educating the public on injury prevention methods and techniques. However, we know that antecedents to behavior are stable and lie deep within a person's psyche in the form of attitudes, beliefs, and values which cannot be readily changed. Automatic intervention is the most effective means by which to reduce the impact of unintentional injury.

Unintentional injuries account for the majority of all injuries and as such are the leading killer overall for Americans ages 1-34. Approximately 64% of all fatal injuries, and over 93% of all non-fatal injuries that occur in the United States are unintentional (CDC WISQARS, 2004; McKinney et al., 1999). Just slightly over 100,000 fatal unintentional injuries occur at a rate of 35.53 per 100,000 persons per year. The incidence rate for the general population is 35.55 and the most common type is motor-vehicle crashes (MVC) (25 per 100,000), followed by falls (5.28 per 100,000), and poisoning (5.17 per 100,000). The race with the highest unintentional injury incidence rate is Native Americans. The African-American population is a distant second at a fatal unintentional injury rate of 37.61 per 100,000 persons per year. The most common cause

of injuries among both of these populations is MVCs and the age group most frequently injured is 15-21 years. Caucasians and Asian Americans have the lowest overall incidence and prevalence of unintentional injury (CDC WISQARS).

Unintentional injury accounts for the greatest proportion of injury in America. The greatest proportion of unintentional injuries is non-fatal. The rate of non-fatal injuries is a staggering 9,767.41 injuries per 100,000 persons per year. The most common non-fatal unintentional injuries are typically injuries which occur in and around the home (CDC WISQARS; Home Safety Council, 2004; Schiller and Bernadel, 2002).

In 2002, 9.9 million medically attended injury episodes occurred inside (5.7 million) and outside (4.2 million) of the home (Schiller and Bernadel, 2002). The elderly and the very young suffer the greatest burden of unintentional home injuries (Carter and Jones, 1993; CDC WISQARS, 2004; Home Safety Council, 2004). Injuries to children and youth ages 1-21 account for $347 billion in medical costs, future work lost and quality of life (Danseco, Miller, and Spicer, 2000). The majority of these unintentional injuries occur in and around the home (Home Safety Council, 2004; McKenzie et al., 2002). The most common types of fatal and non-fatal unintentional injuries for children that occur in and around the home are (12.6%), drownings, fire/ burns (6.80%), suffocations (3.80%), poisonings (2.90%); and falls, being struck by or against an object, being cut or pierced, poisonings, and miscellaneous, respectively (CDC WISQARS, 2004; Home Safety Council, 2004). Society pays the greatest medical and associated economic costs for non-fatal unintentional injuries that result in medical visits, hospital admission, or disability (CDC WISQARS).

It has been well established that the environment plays the most important role in the determination of an injury event. Rivara et al., (1982) and other injury researchers and injury prevention practitioners have identified three factors that influence the likelihood of an injury occurrence in a given environment, and hence the degree to which an injury event is preventable: the "built" physical environment, the social or behavioral environment including supervision, and physical or mental limitations (Christoffel and Gallagher, 1999; as cited in Glik, et al., 1993). The "built" environment, as it affects children suffering injuries in the home, is determined by the degree of safety having to do with the actual home structure and interior furnishings. The social or supervisory environment includes supervision that prevents injuries: maintaining vigil, verbal direction, physical intervention, and "supervision" in terms of protectiveness in creating a safe environment, that is, an environment free of hazards, for children in the home (Christoffel and Gallagher, 1999; Glik et al.; Santer and Stocking, 1991). In addition, the social environment encompasses an emotional environment determined by family relationships, including the mother's affect toward her child(ren). These aspects of the child's home environment are typically affected by the mother as primary caregiver.

Negative maternal affect has been found to result in adverse consequences for the child. Researchers have found that mothers who exhibit less responsiveness to the child, helplessness, self-preoccupation, or decreased memory, and fewer reciprocal interactions, for example have children who suffer mental and physical complications, including "accidents" (Zuckerman and Beardslee, 1987).

In this current study, maternal depression as predictor of repeat non-fatal child unintentional injury in the home will be investigated. Also, other known risk factors for child unintentional injury will be examined and ranked in order of importance as predictors of repeat child unintentional injury in the home.

CHAPTER II

LITERATURE REVIEW

The purpose of this thesis is to investigate maternal depression and other risk

factors as underlying social and behavioral determinants of child unintentional injury.

The importance of this project lies in the identification of these determinants and

ultimately the reduction of the burden and overall impact of unintentional injury of

children in the home.

Maternal Depression and Child Unintentional Injury in the Home

Research by Brown and Davidson, 1978 and Beautrais, Ferguson, and Shannon,

1982 and others has revealed maternal depression as a risk factor for child unintentional

injury in the home (As cited in Bijur, Golding, and Haslum, 1988; McLennan and

Kotelchuck, 2000; Santer and Stocking, 1991; Zuckerman and Beardslee, 1987).

Although there have been some discrepancies (Carter and Jones, 1993; Horwitz,

Morgenstern, DiPietro, and Morrison, 1988), it has been found that maternal depression

increases child unintentional injury directly and indirectly. Maternal depression directly

impacts child unintentional injury through parental affect and "inappropriate" parenting

(Zuckerman and Beardslee, 1987). According to Mills, Puckering, and Pound (1985),

parenting behaviors of a depressed parent may include low-levels of

responsiveness to the child, helplessness, self-preoccupation, or decreased memory, and fewer reciprocal interactions (as cited in Zuckerman and Beardslee, 1987). In addition, Susman, Trickett, Iannotti, et al., (1985) have identified among depressed parents the experience of having difficulty with emotional regulation, separation, and individuation, and a lower likelihood of encouraging accomplishment and using inconsistent discipline that evokes feelings of guilt in the child (as cited in Zuckerman and Beardslee, 1987). According to Sameroff, Siefer, and Zax (1982), depressed parents have been found to be less spontaneous, less happy, less vocal, and depressed parents have been found to spend less time in close physical proximity to their child (As cited in Zuckerman and Beardslee, 1987). Maternal depression directly affects children directly in terms of maternal affect.

Maternal depression influences child injury indirectly in terms of physical hazards (Chung, McCollum, Elo, Lee, and Culhane, 2004; Glik et al., 1993; McLennan and Kotelchuck, 2000; Santer and Stocking, 1991), such as non-working smoke alarms, un-gated, unguarded windows, and dangling drapery cords; safety practices including the use of protective devices, such as car seats and electrical outlet covers (McLennan and Kotelchuck, 2000), behaviors, and level of protectiveness in supervision (Glik et al.).

Studies have shown that thwarted and negative maternal affect and decreased maternal supervision including limited use of environmental safety measures have been associated with unintentional injury among children in the home. It has been found that a mother may directly and indirectly create a home environment that is conducive to injury (McLennan and Kotelchuck, 2000; Russell, 1998; Santer and Stocking, 1991; Zuckerman

and Beardslee, 1987). It seems intuitive that an environment conducive to injury would be an environment conducive to repeat injuries.

Defining Repeat Injuries

There is a methodological consideration when reviewing the literature on repeat injuries; specifically, in terms of how the term, "repeat" injury is defined. Researchers define repeat injuries as more than one injury having occurred with a specified amount of time. The differing time frames yield different measures of repeat, or previous injuries. Most common is an injury history of one calendar year, yet unfortunately for the sake of comparison, not all studies report a one year time frame (Horwitz et al., 1988; MMWR, 1990; Russell, 1998). A Canadian study looked at an injury history of nine years, and was able to report over 75% of their sample as having suffered repeat injuries (Spady, Saunders, Schopflocher, and Svenson, 2004). A British study used a five year injury history (Bijur et al., 1988). The data for this current thesis project yields an injury history of only three months. Therefore, "repeat" injuries in this current study are extremely narrowly defined.

Maternal Depression and Repeat Child Unintentional Injury

The relationship of maternal depression to childhood injury has been minimally examined. Russell (1998) found that maternal depression was associated with child repeat injury only for Caucasians. Russell found depression in White mothers with children with repeat injuries higher than in with mothers of other racial backgrounds. African-American women, while not showing any associations between maternal depression and repeat injury, did have the usual risk factors for maternal depression according to

Hopkins, Marcus, and Campbell (1984), Hall, Williams, and Greenberg (1985);

Heneghan, Johnson, Bauman, Westbrook, and Stein (1998), Kemper and Babonis (1992)

and Orr, Burns and Thompson (1989) and other researchers: non-white race, low

education, and low income (As cited in Chung et al, 2004; Zuckerman and Beardslee.,

1987).

Child Unintentional Injury and Other Mediating Factors

Child unintentional injury has been found to be associated with other mediating

factors, specifically socioeconomic (SES) factors (Home Safety Council, 2004; MMWR,

1990; Pomerantz, Dowd, and Buncher, 2001; Russell, 1998; Santer and Stocking, 1991),

maternal non-white race (MMWR 1990; Pomerantz, et al.; Russell, 1998), and maternal

alcohol consumption [(Bijur, Kurzon, Overpeck, and Scheidt, 1992; Burt, 1995 (As cited

in Russell, 1998); Russell, 1998)].

Socioeconomic Status (SES)

Low socioeconomic status (SES) has been consistently found to be a predictor of

child unintentional injury (Home Safety Council, 2004; MMWR, 1990; Pomerantz, et al.;

Russell, 1998; Santer and Stocking, 1991). It has also been found that low SES is related

to physical hazards in the home (Glik et al, 1993). Santer and Stocking found that poor

children were exposed to both material physical hazards such as un-gated flights of stairs,

unguarded above floor ground windows, and unlocked poisons and other hazardous

chemicals, and lack of proper supervision. Some young children in Santer and

Stocking's study had been supervised by children only a few years older than themselves,

sometimes bathed alone, and sometimes swam without supervision. In addition, it was

found that knowledge of safety practices was low with this sample. Getting to the hospital emergency room could have been difficult or impossible due to lack of sufficient safety knowledge. In their Hamilton County, Ohio study of all injury to children ages 0-14 years, Pomerantz, et al. found injury rates to be higher among areas with families living below the poverty line, with less than a high school education. These differences were found to be statistically significant risk factors. These factors in turn have an influence on child unintentional injury, both directly and indirectly through maternal depression. Therefore, it was deemed necessary to explore socioeconomic influences on both maternal depression and repeat child unintentional injury in this current study.

Maternal Non-white Race

Pomerantz, et al. (2001), Russell (1998), and MMWR (1990) found injury rates to be higher among areas with families living below the poverty line, with less than a high school education and of non-Caucasian racial background. Since socioeconomic factors, such as low income and low education levels are so closely related to non-Caucasian race, they play a significant role in non-Caucasian racial status being shown to statistically predict injury outcome. However, these differences are not due to race, alone, but to the associative SES factors (Pomerantz et al.).

Maternal Alcohol Use

Russell (1998) found that maternal alcohol use was associated with child repeat injuries in the home among African-Americans. Mothers with children who had repeat injuries were found to be more likely to have consumed alcohol within the past three months. In addition, Bijur, Kurzon, Overpeck, and Scheidt (1992) and Burt (1995) found

a similar association between alcohol and child repeat unintentional injuries (As cited in Russell, 1998).

Previous Injury as Predictor of Future Injury

It has been consistently found that previous injuries predict future injuries (Bijur, et al., 1988; Carter and Jones, 1993; Dowd, Langley, Koepsell, Soderberg, and Rivara, 1996; Glik et al., 1993; Horwitz, et al., 1988; Russell, 1998; MMWR, 1990). Bijur et al., 1988 and Horowitz et al., 1988 both found that previous injuries predicted future injuries in young children. In Bijur et al's study, injuries of children between the ages of 0-5 years were a significant predictor of future injuries between 5-10 years. The children that incurred one to two injuries between 0-5 years were twice as likely to incur three or more injuries between ages 5-10 years when compared to children with no injuries between the ages of 0-5 years. The same was found for hospitalization injuries, except that the likelihood for children with previous injuries was 2 ½ times greater to incur a hospitalization in the future than for the children who had experienced no injury resulting in hospitalization.

Risk factors, such as low SES, maternal alcohol use, and child previous injuries have been found to contribute directly to the likelihood of child unintentional injury occurrence and as such warrant investigation as contributors to child unintentional injury in the home.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

This study used secondary data. The original source of data for this retrospective, cross-sectional study was from the National Health Interview Survey (NHIS) 2002 of the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). These secondary public use data files are currently available online and directly through the CDC. The NHIS was designed to collect data for an assessment of the health status of the nation using indicators such as limitations in activities, special education or early intervention services, injuries, health care utilization and access, and health insurance coverage (Schiller and Bernadel, 2002). Annual in-person interviews of non-institutionalized, civilian members of the general public were conducted using a multi-cluster sampling design for the selection of subjects.

CDC used a multi-cluster sampling design for the purposes of stratification, clustering and over-sampling of particular subgroups of the population. Three basic questionnaires are the source of ultimately ten different datasets. The Basic Core Questionnaires include the Family Core, the Sample Adult Core, and the Sample Child Core. The ten resultant datasets are: Alternative Health, Alternative Verbatim, Household, Family, Sample Adult, Person Record, Sample Child, Immunization, the Injury/ Poison Episode and the Injury Verbatim Datafiles. This present study made use

of only four of the ten datasets, namely the Sample Adult, the Family Record, the Person Record, and the Injury/ Poison Episode datafiles. The research objectives of this study are, 1) to investigate the associations between maternal depression and repeat child unintentional injury, and 2) to determine the most predictive model of currently known risk factors of repeat child unintentional injury.

Summary of the Methods and Sampling of the Data Source

The NHIS 2002 is a multipurpose health survey used by the CDC's National Health Statistics Center (NCHS). The NHIS includes only the general, non-institutionalized, U.S. population and is designed to provide national estimates for a wide range of health indicators in assessing the health of the nation. The annual in-person interview consists of three different surveys that collect a variety of information on every person in the household. These three surveys yield ten different datasets ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2002). The Basic Core consists of the Family Core Questionnaire, the Sample Adult Core Questionnaire, and the Sample Child Core Questionnaire. The Family Core measures characteristics of the family such as the number of parents in the family, number of children in the family, and number of family members with physical, emotional or mental limitations. The Sample Adult Core Questionnaire measures personal characteristics of one adult in each family sampled, such as depression and alcohol consumption, and the Child Core Questionnaire ascertains such information as child immunizations, special education needs, and behavioral problems of one sample child from each family. The data from these questionnaires result in ten different datasets, including two for injuries

and poisonings. The response rate for NHIS 2002 was 89.6% (Schiller and Bernadel, 2002).

Variables

Depression was defined according to M. Hamilton (See Zuckerman and Beardslee, 1987, p. 110): "The term depression has been used to refer either to a depressive mood or a diagnosis of depression." According to Hamilton, using depressive symptomology catches more cases of depression than actual diagnosed cases because of the many undiagnosed cases that exist. Bromet, Solomon, Dunn, et al. (1982) and Moss and Lewis (1977) found 12% of actual diagnosed cases versus 52% of self-reported depressive symptomology present, respectively (As cited in Zuckerman and Beardslee). "A depressive mood consists of feelings of sadness, helplessness, and gloom" (See Zuckerman and Beardslee, 1987, p. 110). A self-reported composite of variables of depressive symptoms were used to measure depression in this study.

Recoding of variables from their original NHIS categories was necessary for analyzing data for this current study. Socioeconomic variables of income and education levels were broken down according to what was found to be usual in the current body of literature (Glik, et al., 1993; Pomerantz et al., 2001; Russell, 1998). Income was originally broken down and categorized in increments of $5000, a category indicating below $20,000 and a category for above $20,000. These variables were recoded to indicate whether or not the subject family was low-income (=< $25,000) or not low-income (> $25,000). In addition, an indicator variable was created to indicate whether or not the family lived below the poverty threshold of less than $20,000 per year (Glik, et

al., 1993; Russell, 1998). Education was similarly recoded to indicate low education level, defined as the equivalent of high school or lower (Chung, et al., 2004; Russell, 1998). The original categories included no education, high school, high school graduate/ GED recipient and levels of college from some college to doctoral degree. The original coding scheme was used for both the race and ethnicity variables. Race was coded to indicate Black, White, or Other, and Hispanic ethnicity was coded by an indicator variable.

The variables used to measure depression were the depressive symptoms of 1) sadness, 2) hopelessness, 3) nervousness, 4) restlessness, 5) feelings that everything was an effort, or 6) worthlessness. Any subject report of having had felt in the last 30 days an emotion used to measure depression (1) A little of the time, (2) Some of the time, or (3) Most of the time, was categorized as depressed. These emotions are criteria in the Center for Epidemiologic Studies- Depression (CES-D) scale, as are the past history of 30 days, and the frequency of feelings (Center for Epidemiologic Studies Depression Scale [CDS-D], 2004). Any subject report of not having felt any of these feelings in the past 30 days was indicated by (0) none of the time, and was likewise coded as not depressed. A composite of the six depressive symptom variables was created by taking an average of each subject's self-reported levels. Depression was indicated by the resultant average score per subject. A subject must have reported at least one of the following feelings of sadness, hopelessness, nervousness, restlessness, that everything was an effort, or worthlessness, "all of the time", "some of the time", or "most of the time" to have been coded as depressed. Alcohol use was indicted as current drinker or not current drinker.

The category of "current drinker" was further broken down into categories to indicate frequency of drinking: current infrequent; current light; current moderate; and current heavy. These levels were determined by the frequency with which the individual consumed alcohol within the past 30 days (http://www.treatment.org/documents/pdf/chapter6_7.pdf). (See Appendix I for more detailed information on all variables used for this study.)

Only medically advised (telephone call) or treated (doctor's visit) repeat child unintentional injuries that occurred in or around the child's home were assessed. NHIS respondents were asked about injury incidence within a three month time frame. Repeat injury was defined as having had more than one medically treated injury in the past year. Therefore, a multiplier of four was used to calculate an annual incidence of injury consistent with current literature (Dowd, et al., 1996; NHIS Survey Description, p.42;. One variable were thus created: repeat injury (yes/ no).

Methods

CDC's use of a multi-cluster sampling design for the NHIS necessitated the use of STATA statistical software to accurately compute a variance estimate. However, due to restrictions, SPSS was used for all analyses with the knowledge that the variance estimation would be inaccurate, but the estimates of the parameters would be valid. Henceforth, the results of SPSS backward stepwise logistic regression are accepted, with the understanding that the variance estimation is inaccurate (inflated) according to S. Bae (personal communication, November 30, 2004).

The following inclusion/ exclusion criteria were used as a basis for analysis: Single family household; children ages 1-17 years; and child unintentional injuries that had occurred in or around the home. Exclusion criteria consists of multiple family households, children aged younger than one year, and child injuries that occurred any place other than in or around the child's home. Single family household inclusion criteria are important in controlling for any possible confounding influence of other household members, particularly the effect of more than one primary caregiver on the child's environment. These influences are potential confounders and are therefore, considered exclusion criteria; only single family households will be used for the purposes of this study. This study's focus was on maternal depression and other mediating factors on unintentional home injuries of all children, excluding infants. Since this study's focus is on the influences on the home environment that pertain to injuries, only injuries that occur in or around the child's home were included in the analyses.

Data Analysis

Preliminary steps of analyses included merging datafiles, recoding the variables and otherwise preparing one datafile for analyses for the purposes of this current study. Descriptive statistics were performed on all of the independent variables. There was no need to check for assumptions as this is not required by the logistic regression analysis procedure. Logistic regression and backward stepwise logistic regression were used for the statistical analyses of research objectives one and two, respectively. Regarding the second research objective, when the model of predictors is statistically significant,

backward stepwise procedure ensures that all the predictors in the model are statistically significant.

Limitations

The limitations of this study include data based on subject recall. Reporting inaccuracies including recall bias, non-response or "unknowns" could be the result of errors in memory or reluctance to divulge sensitive information. In addition, the NHIS data yields a very short injury history of three months. Therefore, "repeat" injuries are very narrowly defined, and thus underestimated. There are likely more children with injuries, albeit repeat injuries that did not occur in the small fraction of only three months out of one year.

Another important limitation has to do with differentiating unintentional and intentional injuries among subjects. There is no assured method of differentiating the two types of injuries; we can only estimate the proportion of intentional child injuries to all child injuries based on national CDC data: only 5.60% of all fatal and non-fatal injuries among children ages 1-17 are intentional (excluding self-harm), and can be categorized as intentional injuries (U.S. Department of Health and Human Services, 2004). In addition, the method of defining maternal depression through the use of depression symptomology could very well have overestimated the actual prevalence of maternal depressive symptoms. Also, analyzing the one composite variable of depressive symptoms that was created to measure depression as a dichotomous variable forfeited the opportunity to get a real picture of maternal depression symptomology in this sample.

CHAPTER IV

RESULTS

The purpose of this study was two-fold: to investigate maternal depression as a predictor of repeat child unintentional injury, and to determine the importance of well established risk factors as predictors of repeat child unintentional injury. Inclusion/ exclusion criteria reduced the sample size to 6857 cases. The average age of the mother was 35.85 years and the average age of the father was 37.51. The data are categorized according to family (See Table 1, p. 26), maternal (See Table 2, p. 27), child injury characteristics (See Table 3, p. 27), and statistical results (See Table 4, p.28).

Logistic regression was used to investigate the first research objective, the influence of maternal depression on repeat child unintentional home injuries. Maternal depression was found to predict child unintentional home injuries at pvalue= .024 (OR: 1.273, 95% CI 1.033-1.569). Results reveal that mothers who reported feeling sad, nervous, restless, hopeless, that everything in their lives was an effort, or worthless at least a little of the time, have nearly 30% greater likelihood of their child experiencing a repeat unintentional injury at home compared with mothers who reported none of the above symptoms of depression.

The purpose of the second research objective was to rank the most important current risk factors according to statistical significance in predicting child unintentional injury. Backward stepwise logistic regression of independent variables maternal

depression, Hispanic ethnicity, black race, low income, low education, current maternal drinking, and dependent variable child repeat home injuries was performed. The significant model of predictors, in order of statistical significance at alpha level .05, are maternal depression (p- value=.062), Hispanic ethnicity (pvalue= .000), Black (pvalue= .005), low-income (pvalue= .028). This final model was significant (pvalue= .000) at .05 alpha significance level. This final set of predictors is significantly more accurate in predicting repeat child unintentional injury than the model with no predictors.

These results are consistent and inconsistent with others' findings. As mentioned previously, Hispanic ethnicity, maternal depression and both low-income and low-education levels have been found to be associated with unintentional injury. Hispanic ethnicity is usually found to be a protective factor (CDC WISQARS, 2004). However, black race is usually found to be a risk factor for injury, not a protective factor as has been found in this current study. Consistent with other research, as previously mentioned, maternal depression, and low-income levels are strong risk factors for child unintentional injury in the home.

Table 1

Sample Family Characteristics   (*N* =6,857)

Variable	Mean (SD)/ Freq.	Range	*N* (%)
Mother age	35.85	18-65	
Father age	37.51	18-65	
Race			
Black			1260 (18.4%)
White			4902 (71.5%)
Other			695 (10.1%)
Ethnicity			
Non-Hispanic			5130 (74.8%)
Hispanic			1727 (25.2%)
Family Income			
Below poverty threshold			1649 (24.0%)
Below 25K			1687 (24.6%)
Above 25K			5170 (75.4%)
Education Level			
High school grad or equivalent and below			2723 (39.7%)
At least some college			4134 (60.3%)

Table 2
Maternal Characteristics

Variable	*N* (%)
Depression	
Yes	3591 (52.4%)
No	3266 (47.6%)
Current drinker	
Yes	3718 (54.2%)
No	3139 (45.8%)

Table 3
Child Injury Characteristics

	Injured	Not Injured
Age		
Overall mean	8.89 years	8.97 years
Sex		
M	58.6%	41.4%
F	41.4%	58.6%

Table 4

Statistical Result of Predictors

Predictor	Wald	Pvalue	OR	95% CI
Maternal Depression	3.480	.062	1.231	.990-1.531
Hispanic	14.185	.000	.375	.225-.625
Black	7.791	.005	.472	.278-.799
Low Income	4.822	.028	1.549	1.048-2.289

CHAPTER V

CONCLUSION AND IMPLICATIONS

The focus of this study is the influence of maternal depression and other risk factors of child unintentional injury. This study has found that maternal depression predicts child unintentional injury in the home. Hispanic ethnicity, black race, maternal depression, and low-income, as a model of predictors, significantly predict repeat child unintentional injury in the home better than a model with no predictors. Hispanic origin and black race have been found to be protective factors, and maternal depression and low income have been found to be predictors, or risk factors, of repeat child unintentional injury in the home. It has been found in this current study that some of the usual and expected risk factors are present, yet others yield seemingly conflicting results. Maternal depressive symptoms, as used in this study to measure depression, have been found to be statistically significant in predicting repeat child unintentional injury in the home. However, not all of the usual risk factors for child unintentional injury, according to the literature on the subject, were found to predict repeat childhood injury. Specifically, black race was found to be a protective factor in repeat unintentional injury among children. This could be explained by the fact that race alone is not associated with injury outcome, but only when associated with other low SES factors (Pomerantz et al., 2001). The explanation could be that this sample consists of only a small proportion of low-

income participants, and low-income which was found to be a significant predictor. Therefore, black race could be excluded based on the possibility that the black participants in this sample do not have the usual associated risk factors of low-income and low education. In fact, roughly 40% of black participants were found to be low-income (39.44%) or living in poverty (38.49%). However, other risk factors were found to be consistent with the current literature.

Maternal depression and low-income status were both found to significantly predict repeat unintentional injury, consistent with the literature. This implies that samples in populations at risk for repeat child unintentional injury should be examined more closely based solely on income levels, instead of based solely on race with the assumption of low SES levels; low SES cannot be automatically assumed with non-white racial status as this current study has made clear. As it is the purpose of this project to identify the underlying determinants of child injury and the job of public health to improve the health of the public, addressing the root and cause of the problem, in this case, is paramount to preventing injuries, yet may be outside of the purview of injury prevention. While recommending and supporting the appropriate treatment of depression, public health practitioners, or injury prevention workers can more immediately intervene by altering the environment to improve safety.

Researchers and injury prevention specialists have found that the vast majority of injuries can be prevented by defining underlying determinants of injuries, whether they be in the "built" environment, some social and/ or behavioral aspect of one's environment (i.e. parental/ caregiver supervision), or physical, cognitive, or other disability or

limitation. It is well recognized that the likelihood of reduction of unintentional injury

lies in "automatic" (Christoffel and Gallagher, 1999) changes that require little or no

effort on the part of the subject. Automatic changes include using prescription medicine

bottles with child-safety caps and are more likely to reduce childhood injury because

using products designed with inherent safety features requires little or no behavior change

on the part of the individual and has been shown to be most effective in reducing injury

occurrence (Christoffel and Gallagher, 1999). It is important that prevention efforts be

focused on populations that exhibit underlying social and behavioral determinants of

child injury, such as maternal depression and low SES. Since there has been found, for

example, an increased number of household hazards in the homes of depressed mothers,

such efforts may include appliances designed to avoid injury: for example, irons that shut

off automatically after a certain period of time of non-use. In addition, mother who

indicate a presence of depression and/ or are low-income could have their homes safety

proofed as a one-time intervention by injury prevention professionals as a way of taking

precautions against injury in the home. Educating depressed parents and finding and

intervening in the weakest areas of safety could improve safety among this population.

This study has shed some light on maternal depression and repeat child

unintentional injury in the home, in regards to 1) consistently finding maternal depression

to predict repeat child unintentional injury, and 2) in bringing to light the much

acknowledged fact that race alone is not a predictor of injury- but the associated SES

factors so often coupled with non-white race. This information helps to narrow the target

in specifying populations for whom prevention efforts can be aimed, and therefore,

hopefully, more efficiently address the injury problem of our children.

APPENDIX I

VARIABLE DESCRIPTIONS

Research Objective One: The Relationship between Maternal Depression and Child Injury

Maternal depression: The base question for the following variables is: "During the PAST 30 DAYS, how often did you feel…"

	Variable	Description
1.	**>SAD<**	So sad that nothing could cheer you up?
2.	**>NERVOUS>**	Nervous?
3.	**>RESTLESS>**	Restless or fidgety?
4.	**>HOPELESS<**	Hopeless?
5.	**>EFFORT<**	Felt that everything was an effort?
6.	**>WORTHLS<**	Worthless?

Response choices for each variable 1-6 above are on a 5-point Likert scale: (1) All of the time, (2) Most of the time, (3) Some of the time, (4) Little of the time, (5) None of the time, (7) Refused, and (9) Don't know.

Child Injury Variables

	Variable	Description
1.	>PX<	Person number of each child per family
2.	>AGE_P<	Age of child
3.	>SEX<	Sex of child(ren)
4.	>IPEPNO<	Number of injury/ poisonings
5.	>WHERN1< >WHERN2<	"Where {were/ was} {you/ subject name} when the injury/ poison happened?" Home Inside or Home Outside
6.	>CAUSNEW<	"Enter the first appropriate box which describes the cause of the person's injury/ poisoning from the list below."

Research Objective Two: Risk Factors as Predictors of Child Unintentional Injury

The second investigation is to identify risk factors as predictors of repeat CUI and to determine the best model of predictors of repeat CUI. The following variables and questions will be used:

	Variable	Description
1.	>**FINCGRP**<	"What is your best estimate of {your/ subject's name} earnings before taxes and deductions from ALL jobs and businesses in?"
2.	>**EDUC**<	"What is the HIGHEST level of school {you/ subject name} {have/ has} completed or the highest degree {you/ {subject name} {have/ has} received?"
3.	>**RCDT1P_I**<	"What race {does/ do} {name/ you} consider {himself/ herself/ yourself} to be?"
4.	>**RACREC_I**<	Race re-code: Black/ White/ Other
5.	> **ORIGIN_I**<	Hispanic origin or not
6.	>**AGE_P**<	Age of mother: "Age"
7.	>**ALCSTAT1**<	Recode of drinking status: Never, former, current
8.	>**ALC7STAT**<	Recode of drinking status: Further breakdown of drinking status
9.	>**SEX**<	Sex of child
10.	>**IPEPNO**<	Number of injury/ poisoning

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