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Changing the negative behavioral and developmental outcomes to a toxic prenatal environment through parent education

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2008

ABSTRACT

Changing the Negative Behavioral and Development Outcomes to a Toxic Prenatal
Environment through Maternal Education

by

Angela Eileen Laughlin Lebedev

M. Ed., Cameron University, 1998
B.S., Indiana State University, 1985

Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor
of Philosophy
Education

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ABSTRACT

The purpose of this study was to evaluate the effectiveness of current education materials on changing maternal smoking attitudes. Children are affected by prenatal exposure to tobacco smoke. Although there are educational efforts to discourage pregnant women from smoking, the practice continues in a significant number of pregnancies. New materials, based on current research, were also evaluated for effectiveness. The theoretical framework for this study was adult learning theory presented by Knowles which made the assumption that an individual is shaped by environmental systems, that adult learning is affected by previous knowledge they bring to the learning and that adults must have a motive for change. The study sought to determine if mothers are presented with the latest research-based information about the effects of smoking upon their unborn child what extent will it change the attitude of smoking while pregnant. The research design was a quantitative, one-group pretest-posttest design. The target individuals, mothers of young children, were surveyed with direct questions that yielded measurable data. The data obtained through the participant surveys were analyzed using a paired analysis of variance, comparing pretest-posttest responses and demographic variables. The results of the study showed an affect of education on changing attitudes and for this participant group, demographic characteristics did not influence that change. Through educating mothers on the long-term negative outcomes to their children of smoking during pregnancy, the hope is that this study changed their attitude, understanding and thereby changes their behavior. The result of this research provided educational information that may change the attitude towards mothers smoking during pregnancy.

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DEDICATION

I dedicate this dissertation to my children, Alan, Sarah, Laura and Alexander for their love, encouragement, support and just putting up with me throughout this process.

I also dedicate this to all my babies, those who have already had a special place in my professional life and for all those who are yet to come.

ACKNOWLEDGMENTS

I acknowledge the hand of a loving Heavenly Father in all that I do and in all that I am. Without Him, I would not have been able to transverse this difficult path. I acknowledge all my knowledge, skills and abilities are gifts from Him to help me in my passage through this mortal existence. I also acknowledge that these gifts were given to me in order for me to be His hands here on earth, to help make the lives of His children better.

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Chapter 1: INTRODUCTION TO THE STUDY

Introduction

The focus of this study was to evaluate a parent education method to eliminate or decrease the negative developmental and behavioral outcomes to the developing child from prenatal exposure to a toxin. A fetus is affected into childhood and adulthood when exposed to toxic chemicals, such as tobacco smoke, while in utero (Green, 2003). The primary focus of the study was to determine if the educational materials given to mothers concerning the hazards of prenatal exposure to toxic chemicals that are ingested or inhaled by the pregnant mother are effective. Effectiveness was determined by the level of change that occurred within the study participant group in regards to the statements regarding prenatal smoking. Another factor to be taken into account when determining effectiveness was how likely the mother is to continue to smoke during pregnancy after being exposed to the educational material. Although pregnant mothers can be exposed to a variety of toxins, this study focused on maternal cigarette smoking, which will be shown in chapter 2 to have significant affects on cognition and other brain developmental matters, and how to decrease or eliminate occurrences of this exposure.

When problematic situations occur in a young child's development, educators, therapists, and other professionals work to intervene and provide services to help that child achieve his/her potential (Brewer, 1995). This study takes a different stance on early childhood education from intervention to prevention.

New and recent knowledge of how the brain develops guided this study (Mayo, 2005). The understanding that the intricate circuitry of the brain is affected during the

fetal stage, prior to an individual being considered part of the early childhood population is crucial to the study (Mead, 2007). This study focused on using new knowledge and understanding of how children grow, develop and learn based on prenatal environmental influences (Myers, 2006).

The foundation of adult capacities begins in fetal life. With scientific and medical advances, gaining a better understanding of how the human fetus develops and a better understanding of how various situations and exposures affect this development is possible (Ellis, 2001). Prior to recent research, societal knowledge indicated that fetuses were affected by exposure to certain chemicals, and mothers were warned that such exposure might cause damage to their children (Blitch, 2007). New discoveries have enlightened our understanding that such exposure has a decisive and specific impact on the life of the child (Pediatrics, 2004). This study provided additional support to those discoveries, evaluated current practices, and made recommendations for improvement of those practices.

This chapter presents background information of the problem, the purpose of the study, as well as the significance and social ramifications of the study. In the second chapter relevant literature and research are be presented. The methodology that was used in this study is included in chapter three. Outcomes to this study are included in chapters 4 and 5.

Background of the Problem

The impact of toxic substance exposure to the developing human brain and body is significant. Early exposure to substances such as nicotine and other drugs affect the synaptic and neurotransmitter activity in the brain (Mathias, 1998). Children can be left with behavioral, developmental, and mental disabilities due to such exposure (Mathis, 1998, Pressinger, 2005, Shore, 1997).

Both the fetus and the mother's lives are put at risk when the mother smokes during pregnancy. According to the United States Public Health Service (2007) there would be a 10% drop in infant deaths if all pregnant women stopped smoking. Within one cigarette there are over 2,500 chemicals that are considered dangerous to the developing child (Green, 2003). Smoking during pregnancy can have a serious affect on how the fetus grows (Biltch, 2007). When born the child has double the chance of having a low birth weight if the mother has smoked (Biltch). Many health risks are associated with low-birth weight (Green). Cigarette smoking can jeopardize the life of both the fetus and the mother by causing placental abruption (Wyatt, 2004). Placental abruption occurs when the placenta separates from the uterine wall during the pregnancy (Wyatt). Other serious health factors related to prenatal smoking are: increase risk of premature birth, which increases the likelihood of cerebral palsy (Wyatt,), learning disabilities and mental retardation and increase of birth defects such as cleft palate. Additionally, children who were exposed to maternal cigarette smoking during pregnancy have an increased risk of long-term problems such as behavioral difficulties, asthma and

learning difficulties (Bilich, 2007). Because Plessinger's (2005) and Bilich's research indicated that the maternal smoking behaviors still occur despite current educational methods being used, the purpose of this study was to evaluate education materials effectiveness on changing maternal smoking attitudes.

Early in the 20th century there was not much concern over smoking during pregnancy. It was believed that the placenta filtered out anything that could be harmful to the fetus (Greene, 2003). Additionally, smoking was generally more accepted and less of a health concern prior to the research and warnings in the 1970s (Phillip Morris, 2006).

Although there are many education programs and literature available to pregnant women concerning the risks of smoking during pregnancy, the problem of mothers smoking during pregnancy remains significant and widespread (CDHS, 2005). This study proposed a way to help reduce the prenatal exposure to cigarette smoking through education of expectant mothers.

Problem Statement

The research problem addressed in this study was that even with the presentation of current educational materials referencing negative outcomes to smoking during pregnancy, a significant number of women still smoke while pregnant. Children are affected by exposure to toxic chemicals, such as tobacco smoke, while in the utero environment. Although there have been efforts to discourage pregnant women from smoking, the practice still continues in a significant number of pregnancies (CDHS, 2005). In some areas of the United States, as many as one quarter of the women smoke

during pregnancy. Stronger educational practices, enriched with newer and more detailed information, are a factor in this study. This study presented information to mothers concerning this behavior and was able to change attitudes.

Nature of the Study

The study focused on finding out if, when presented with current knowledge, beyond that which is typically known about the affects and outcomes of maternal smoking during pregnancy will the attitudes of mothers towards the behavior change. A qualitative pretest-posttest method to evaluate if educational materials can change the attitude of mothers concerning smoking during pregnancy will be used in this study. Although it is generally understood throughout society that smoking during pregnancy is unhealthy (Green 2003), there is a suspected gap in that knowledge with relationship to the understanding of the long-term affects to the developmental, academic, behavioral, and mental well being of the prenatally-exposed individual. Thus the research questions are as follows:

Research Question: Are educational materials reflecting the latest research-based information, information pertaining to the developmental, academic behavioral and metal well-being of an individual who was exposed during fetal development to the toxins in cigarette smoke, presented to mothers, effective in changing their attitudes towards smoking during pregnancy?

Null Hypothesis: There will be no significant difference between not having material exposure and exposure to educational materials on attitudes to maternal smoking behaviors.

Alternative Hypothesis: There will be a significant difference between not having exposure to and having exposure to educational materials on attitude to maternal smoking.

Subquestion: Do factors such as age, educational level of the mother, income, and level of smoking affect how the mother perceives and responds to current educational materials?

Null Hypothesis: There will be no significant relationship between age, educational level of the mother, level of smoking, the income level and the mother's perception of educational materials.

Alternative Hypothesis: There will be a significant relationship between age, the educational level of the mother, level of smoking, the income level and the mother's perception of educational materials.

Purpose of Study

The purpose of this qualitative study was to determine if education would affect the attitude of mothers toward smoking during pregnancy. The prenatal environment an individual was provided affects an individual's ability to learn, to think as well as having other outcomes to their life (Ellis, 2001). Historically, it was thought that harmful substances, those that would do damage to the developing child, were filtered out by the

placenta. Medical science has since proven this to be incorrect (Pressinger, 2005). The mother, through her intake of helpful or harmful substances, creates a world in which her fetus grows. The growth of the brain during fetal life is crucial to that individual's future development (Shore, 1997).

Current research indicated that the earliest years of life have a more significant effect on the life span than previously considered (Sood, 2001). While the fields of education and psychology are recognizing the importance of development and education in the early years, the foundation for those years needs to be considered (Brewer, 1995). Prenatal life has gained recognition as an important, if not the most important part of life in relationship to growth, development, cognitive, and social/emotional long-term outcomes (Wyatt, 2004).

An issue that has been debated concerning early childhood is whether outcomes are a result of nature (genetic predisposition), nurture (environment circumstance) or a combination of the two. The environment, being a significant factor, has a decisive impact on the individual (Yolton, 2005). The prenatal environment provides not only the cognitive environment which the fetus grows, but also the physical surroundings that affect health, growth and development.

Many children, significantly more than in the past, display delayed or deviated development (Pressinger, 2005). This phenomenon may have occurred because professionals and parents are more likely to recognize delays or deviations than they could in the past or has the frequency of occurrences of prenatal exposure to cigarette smoke actually increased (Mathais, 1998). Regardless, the prevention of such

difficulties, particularly those that have long-term effects on the development of prosocial abilities need to be considered, not just from an early childhood standpoint but from a perspective that may reflect the actual cause of such difficulties, the prenatal environment.

Society, in general, may not be able to prevent all deviations from the accepted normal development, but prevention of known causes of deviations should be a goal of all education, medical and mental health professionals. During the early years of life, birth to age 8 years, the current focus appears to be on intervention (ITEIP, 2005). Maternal smoking during pregnancy has been shown to have a significant effect on learning (Yolton 2005). The intent of this study was to develop an indisputable intervention that will have a concise impact on this devastating effect on learning.

Human development is derived from genetic predisposition and environmental conditions these are the key factors in the acquisition of particular behavioral and social abilities, or the lack of development of these pro-social abilities (Brewer, 1995). This lack is often met with attempts to rectify by altering or enriching the learning environment of the child (Barnett, 1998, Brewer, 1995). The problematic situation may be that the maternal education materials are not effective and result is a continuation of the behavior that causes a deviation of brain or physiological development within the fetus due to exposure to and growth within a toxic prenatal environment.

The researcher's intention was to eliminate the most common toxin (Pressinger, 2005), cigarette exposure, to the prenatal environments by improving the understanding

of mothers, who may not be aware of the significance their actions have on their offspring's future. Such toxins will be shown through the literature review to have a negative effect on the behavioral and developmental outcomes to the child, and to have a significant negative impact on that individual's learning and life.

The purpose of this study was to determine the effectiveness education materials that present current knowledge on changing maternal smoking attitudes. Additionally, the purpose was to determine how to further implement or develop materials that will be more effective.

Theoretical Framework

The adult learning theoretical base, presented by Malcolm Knowles (Lieb, 1991) provides the framework for this study. The relationship between the individual's environment and his behavior is reciprocal. The adult learning theory makes the assumption that an individual's health is shaped by several environmental systems including those with whom the individual associates, the individual's cultural beliefs, their economic situation and the physical world in which that individual lives. In order for a health promotion effort to be effective, the program must address those systems. Additionally, individual's behavior should be expected to differ based on the environment (Alcalay, 2000).

An assumption was that most of the participants had a basic understanding that it is generally unhealthy to smoke while pregnant. This assumption provides a link to

Knowles' (1950) adult learning theory in that it should be considered that adults bring prerequisite knowledge to the learning experience. Another link to Knowles' adult learning theory is the recognition that adults are goal- and relevancy-oriented. Adult learners must see a reason or a value in the learning (Lieb, 1991). Typically mothers have the goal of having healthy, intelligent, and well-adjusted children. Motivation is also a key aspect of adult learning (Knowles, 1950). There are at least six factors that serve as motivational elements to adults (Knowles). Two of these factors, social relationships and social welfare, played a key factor in the outcome to this research and the extent to which it affects society (Knowles). The mothers, who participated in the study, who were not smokers, will be the vessel in which additional social change will occur. The desired outcome to their exposure to new educational materials is that they will feel compelled to share the information with those with whom they have a social relationship in order to improve the quality of life for children.

Adult learning needs to be guided towards desired outcomes. One of these outcomes, according to Knowles (1950) is that adults learn to react to causes of behavior rather than the symptoms. The solution to the presented problem is to have mothers discontinue smoking while pregnant. Educational materials should provide motive to change the behavior (Knowles, 1950).

The adult learning theory provided that adult learners need to be allowed to direct themselves. Autonomy is the key to establishing adult participation in learning (Knowles, 1950). In addition, people have different capacities for action in varying environments because environments differ in the resources they provide to individuals

(Knowles). Furthermore, the learner's perspectives concerning the topic, as well as their interest in the topic need to be considered. The topic needs to have some relevance to the learner, thus the study will be directed at those who may be affected by the topic, those individuals who are currently pregnant and those who are more likely to become pregnant. Knowing that an adult learner will have accumulated knowledge on the subject through life experiences is also a crucial aspect of the adult learning theory (Knowles, 1950).

The study model involved data collection by the researcher through individual study. In the study model, the individuals who participated were in an adult environment within an early childhood education program. These two factors may have influenced the process of the health promotion: the agreement to discontinue smoking during pregnancy or the acknowledgement that smoking during pregnancy poses a far greater risk to the fetus than the participant initially was aware. When the participants returned to their environment and relationships they have in their community, the influence of that environment may have an impact on the behavior in spite of the education materials.

Assumptions and Limitations

The limitation of the study is that the outcomes of the study are limited to the population of the study, to be described in the methodology section, being studied, although some outcomes may be generalized to the population as a whole. The generalization should be limited to those living in the same cultural and social-economic environment. This study is based on individuals who live on the Kitsap Peninsula and

surrounding area in the state of Washington in the United States which is an industrialized country with readily available medical care and education. The limitation is that the study cannot be generalized to the population as a whole because only a specific segment of the population is being studied.

The assumptions of the study are based on the researcher assuming that these facts are probably true and must be made or the study would not have been able to progress. The assumption was made by the researcher that developmental progress, as outlined by current child growth and development data, is normal, desirable by the parent of the child and obtainable by an individual who is typically developing. This assumption can also be carried through to consider that a participant's desire would be to have all children to be born lacking any preventable physical deterrents that would limit or inhibit their development and learning.

The assumption of participant honesty was also made. Consideration was given concerning that this is a sensitive topic and mothers may not want to accept the information and admit, even to themselves, that their actions cause harm to their child. The sensitivity of this topic is a potential weakness of the study, as answers may have been manipulated by participants to show less maternal smoking than actually occurred.

The philosophical assumptions made concerning this study were: (a) individuals typically want to do the right thing, and (b) only through a change in the environment will a change in behavior occur. The consideration of the study was that the educational materials previously used and any that will be proposed will change the mental awareness of the individual and cause an effective positive alteration in behavior. Thus a limitation

of the study was the assumption that if an educational method produces a change in attitudes towards a behavior that it is expected the behavior would also change.

Scope and Delimitation

The study evaluated current educational materials and their effectiveness in deterring mothers from smoking during pregnancy. A delimitation of the study was that the focus will be on one toxin, cigarette smoke and only two of the hundreds of substances within cigarette smoke. Another delimitation of the study was the population participating.

Definition of Terms

The following is a list of terms that will be defined for this study:

Developmental Concern: Parent, teacher or researcher has indicated by their observation or assessment that a child may have failed to meet developmental milestones or have a delay or deviation from normal development. (Brewer, 1995)

Developmental Milestones: Achievements, accomplishments and goals that are set for infants and children based on relationship to chronological age. The milestones that will be used in this study are those that are currently accepted by early childhood educators based on the developmental theories of Erikson (1963) (social/emotional), Piaget (1972)(cognitive) and currently accepted developmental guidelines (physical).

Such milestones are considered for this study to give a reference point to relate developmental delays and other concerns about children (Brewer, 1995).

Previously Used Education Materials: This refers to currently used brochures that are given to pregnant women and available in doctor's offices and community centers (Wyatt, 2004).

Toxins: Any substance that has the potential for harm to the human body. Although several commonly seen prenatal toxins will be presented as reference, one toxin, cigarette smoke, and two of the hundreds of substances within cigarette smoke (nicotine and carbon monoxide) are the primary toxins referenced in this study (Tvedten, 2003).

Additional terms are defined within context.

Significance of Study

The significance of the study is related to recent knowledge of early brain development that has sparked interest in early childhood education. Affecting a positive outcome during the first years of life, including the fetal development period, is becoming a critical focus of researchers, educators and other professionals (Shore, 1997). As the brain develops, cognitive and behavioral development also occurs (Myers, 2006). Additionally, brain development that occurs prior to the early childhood years is being considered in this study as equally if not a more important aspect than that which occurs in any other time period in the lifespan (DiFranza, 2004). This study contributed to the awareness of toxic influences on fetal and child development among pregnant women,

and dedicated further research and education to the prevention of early childhood behavioral, cognitive, and learning disorders if it is found that educational materials have an impact on the attitudes of mothers regarding smoking. Through effective maternal education the exposure to the toxins in cigarettes can be eliminated thus the negative outcomes avoided.

The significance of the problem and the focus of this dissertation are to effect change. The study measured if current educational materials should be enhanced or altered to make them more effective in preventing maternal smoking and thus fetal exposure to the toxins in cigarettes. The desired change was that fewer children are born after having been exposed to the toxins of cigarette smoke, chiefly nicotine and carbon monoxide. The outcomes of such exposure are explained later in the study and are significant enough to cause detriment to an individual's development.

Social Contributions of the Study

The contribution to society that this study will provide was the evaluation of current education methods. The development of a maternal education recommendation will educate those that receive it with current knowledge regarding the outcomes of women smoking while pregnant. The presentation was intended to alleviate fetal exposure to the toxins in cigarette smoke, although the limitations may be to the population studied and their immediate contacts. If only one child is protected from this toxic exposure, the value of the study is extensive but the desired outcome was to have a

wide-spread positive change due to the participants sharing the information gained with others.

Society is affected by the difficulties of the individual. Special services, such as intervention, education and therapy, are often needed for individuals that have special needs (Brewer, 1995). Educators and other professionals strive to assist these individuals in achieving their optimum potential (Brewer). This study proposed that the ultimate goal of society should

be that each individual begins his or her life as whole, strong and capable as possible.

Children are often burdened with disabilities and challenges to their learning. They also experience a plethora of behavioral and emotional challenges (Brady, 1994). Some of these challenges will continue throughout their lives (Calloway, 2006). Current research indicates that the sooner the difficulty is noted, and the sooner the intervention occurs, the better the outcome for the individual (Brewer, 1995, Shore, 1997). Early childhood education is consistently gaining in societal view as important in the overall development of the individual.

Exposure to toxins, including the focus of this study mothers smoking during pregnancy, has negative outcomes. General understanding is that the baby might be smaller at birth or have respiratory problems (Green, 2003). The general population does not appear to understand the significance to learning, behavioral, and emotional health this negative action of the mother can have on the child (Green). Through this study, the extent of the knowledge a population of mothers has, has been evaluated in terms of its impact on the smoking behavior of the pregnant women.

The proposal is that prevention, rather than intervention, be considered another role of educators, therapists and health care professionals. Intervention occurs when a child, who has been damaged, receives therapy and educational supports. Currently this is the primary focus of educators. The proposal is that educators re-evaluate their role, and make prevention, through education, the primary focus, reducing the need for intervention.

Organization of the Study

While chapter 1 gave an introduction to the study and presented the problem statement and proposed resolution, chapter 2 will give foundation knowledge of the problem through a review of the literature and recent research findings. Chapter 3 explains how the study was conducted. The concluding chapters of the final work present data gained through the study, draw conclusions based on that data and analyze the results of the study. A proposal of further research is part of the final chapter. The study presentation will conclude with a list of references used.

Chapter 2: REVIEW OF LITERATURE

This study gained its information from a review of related literature that includes various studies of prenatal toxins. Chapter 2 introduces the concepts of accepted child development and various common toxic exposures in an effort to correlate and explain these topics. Because the problem of mother's smoking during pregnancy has a focus that is both medical and educational, the two topic areas must be intertwined in order for an effective study to be conducted and concluded. Information concerning the medical and psychological aspects of human development is important and intermingled with the educational aspects. The strategy used to determine the literature that will be reviewed was first to consider the aspect of affect, which is child development, learning and behavior and secondly to consider those variables, similar to the focus, that have an affect on development, learning and behavior. The third consideration was to present fully literature and research that reflects the focus, which is exposure prenatally to cigarette toxins. The literature review will provide necessary data and foundation in order to evaluate the study. This chapter will conclude with a presentation of the intricate details, as well as current research on the focus topic: maternal smoking during pregnancy.

The variables

Critical to this study is the understanding of typical, what is accepted as normal, human development from conception throughout the months of infancy and early childhood. Many resources, theories and opinions can be reflected upon to help one gain an understanding. Primarily those which will be focused on here are the theories of Erikson (1963) and Piaget (1972), as well as current information on fetal and early childhood brain development (Brewer, 1995).

Behavioral and Cognitive Development

Behavioral outcomes, as well as mental health outcomes to children exposed to toxins prenatally are the prime focus of the study. These outcomes require attention on the psychosocial developmental theories of Erikson(1963) and the cognitive developmental theories of Piaget (1972). These theories outlined what is currently considered as typical and desirable child development.

Both body and brain development are life long processes beginning at the point of conception. Human development hinges on the interplay between that which is genetically pre-designed and the environment that is provided for the individual (Shore, 1997). Current knowledge in neuroscience has allowed opportunities for understanding that were not available in the past (Pressinger, 2005).

Early care has a decisive impact on the individual. Although the human brain has a capacity to change, there are critical time periods in which some

elements can be changed. (Shore, 1997). During prenatal development the child's brain grows extensively, from a mass of cells to a functioning organ capable of not only sustaining life, but also of learning. The neurons, or brain cells, are grown during the fetal stage, primarily from conception to 7-8 months gestation (Shore). From that point, through birth and the first several months of life, the neurons are pruned and many die (Shore).

The connections in the brain, the synapses, are primarily developed after birth in relationship to environmental stimulus. During the first 3 years of life, these synapses are created. They are reinforced during early childhood, preschool years and beyond. This is the physiological pattern of normal, typical brain development. These physical changes in the brain allow for cognitive development and learning. To further understand cognitive development the theories of Jean Piaget can be referenced (Piaget, 1972).

Piaget (1972) identified a stage of cognitive development, which he called sensorimotor. This identified the intellectual development, as well as the process for learning, of infants and toddlers. Through interaction with the environment and other individuals, and the usage of the senses, infants learn about the world around them. Typical developmental milestones that occur during this stage are: the recognition of object permanence, generalization of activities to a wider range of situations, and mental coordination of lengthy

chains of behaviors (Piaget, 1955). The ability to have these thoughts increases the individual's capacity to learn, as well as, their capacity to have interaction and relationships with other individuals. Children in this stage of cognitive development do not yet have the capacity to think in concrete terms, nor are they able to think logically or abstractly. Spatial reasoning tasks and classification are also cognitive tasks not associated with this stage of development.

Older infants, who exhibit delays in cognitive development, may show distress at a toy covered with a blanket or when another item/person is not within site. They may either not respond or show frustration when a problematic situation arises. For example, they desire a toy from a container or shelf, but are unable to figure out how to get it even though their physical skill level indicates they have the capability. Behavioral and developmental growth are affected by both the health and environmental factors. There is a typical pattern and outcome to cognitive growth which hinges on children learning through their senses (Brewer, 1995).

Social and Emotional Development

Another key functional area in infant development, one this study reflected upon, is the social/emotional aspect. For baseline knowledge in this area, the work and theories of Erikson (1963) are considered. Infants, during the first 2 years of life develop a sense of trust in the world (Brewer, 1995). With a positive

sense of trust an infant feels that they have power and value. With a negative sense of trust, the infant feels that no matter what he does, he cannot effect change, or get his needs met.

Both cognitive and social/emotional development hinge on the physical development of the brain. Recent research findings concerning early brain development have not only heightened knowledge, but have led to an ever-increasing recognition in the importance of early childhood education and intervention services for very young children (Shore, 1997). This recognition is causing changes in practice and policy with relationship to early childhood education (Brewer, 1995, Shore, 1997).

New Technology Gives Insights

Breakthroughs in neuroscience have occurred due to the development of new research tools such as brain imaging technology using the Magnetic Resonance Imaging (MRI) (Shore, 1997). New insights into how the brain works has also increased in recent years because of the Positron Emission Tomography (PET) scan (Shore). This device allows scientists to record with precision the activity levels in various parts of the brain as well as observe the brain structure in considerable detail.

Studies with such instruments have provided scientists, doctors, and educators the knowledge of which parts of the brain are particularly active during the first years of life. This enables them to draw conclusion about the patterns of brain development and neurological functioning (Shore, 1997). While gaining this understanding, we can also gain insight into situations where dysfunction occurs (Pressinger, 2005).

Through this acquisition of knowledge the following key findings have occurred:

1. Although both genetic and environmental factors influence development when it comes to brain development neuroscientist have shown that prenatal environment plays a significant role because all brain cells are developed prior to birth.
2. Responsive care, received during early life and the attachment the child forms with their significant adult, is a critical factor in determining how that individual will respond to stress later in life.
3. There are certain life components that, even though the human brain has the ability to compensate for problems, must occur in a timely fashion or . these components include care, nutrition, education and intervention.
4. The brain can be more greatly affected in the early years, positively or negatively, than any other time in an individual's life. (Shore, 1997, p. 15-40).

Neuroscience has developed to a point that sciences knows when there are risks to the developing brain. For example, when a 14-day-old fetus is exposed to cocaine or radiation they are more likely to have a negative outcome than a fetus that is exposed on the 30th day (Eylrer, 2000). This knowledge has far-reaching implications for the need for parental education, as most expectant mothers do not know they are pregnant during the time of the most crucial risk. Thus educating mothers who may become pregnant by presenting the educational materials to all mothers and those women who may have

contact with other women who potentially could become pregnant is an important part of this study.

In a Yale University study, Rakic (1991) and his colleagues noted the vulnerability of the cerebral cortex within days of conception (Shore, 1997). As the brain cells develop they must find their way up the cerebral wall in a precise process in order for normal development to occur. The contact that these cells make as they climb up the cortical wall activates them in a way that will define that individual cell's purpose. If anything interrupts this journey, adverse environmental condition such as lack of nutrition or drug exposure, the effects to the developing child can be devastating. Some negatively affected cells will just go astray and die but if the cell ends up with inappropriate placement within the brain, and forms inappropriate synapses, the child may have a neurological disorder such as epilepsy, schizophrenia or autism. Cell migration interruptions and deviations help to explain why, at least in part, why maternal prenatal substance abuse has a permanent impact on the infant (Shore, 1997).

Smoking and the Fetal Brain

The developing brain is particularly vulnerable to exposure to nicotine and drugs whether in utero or the postnatal environment, such as a caregiver smoking cigarettes or crack cocaine around the infant. Knowledge based on brain development studies (Shore, 1997) showed that these conditions have an even more dramatic effect on young children than was previously thought. Essentially because this exposure has an adverse impact on brain development, as well as respiratory and other physical conditions children whose

mothers smoked cigarettes during pregnancy have a higher rate of behavioral problems in preschool and beyond. The nicotine in tobacco does cross the placenta and affect brain development (Wyatt, 2004). It can alter the brain's biochemistry by affecting the chemicals that allow connectivity between the brain cell. Nicotine also interferes with the reabsorption of serotonin, which increases this neurotransmitter's presence in the brain (Shore, 1997).

When this occurs, the brain cells are bathed in serotonin, and there is an increase in the level of excitation in the brain. This can alter the structure of the brain, and these changes can have long-term consequences even if the fetus is exposed to low levels of nicotine (Pressinger, 2005).

Because of these effects, children exposed to nicotine during fetal and early years are more likely to have impairments or delays, as well as behavioral changes. Nicotine causes learning efficiency to be decreased and motor hyper-activity to be increased (Pressinger, 2005). A University of Chicago study showed that male children of mothers who smoked during pregnancy are more likely to develop conduct disorders later in life than those males whose mothers did not smoke. (Mathias, 1998)

Human development, herein referring to fetal and infant development, depends on a variety of factors. The early child development field has often made reference to the balance between nature and nurture (Brewer, 1995). When considering the relationship between prenatal exposure to cigarette smoke and the outcomes to the brain, the dichotomy is resolved, at least with reference to brain development. Nature presides in the development of the physical structure, the neurons, while nurture presides in the

development of the synapses. Both elements are crucial to the development of a healthy brain. A child's brain is neither an empty book to be written upon, nor is it an immutable circuitry controlled by a genetic predisposition.

Controversies concerning global warming and exposure to toxic chemicals during the early years of life present a wide range illustration of the complexity of factors influencing fetal and infant development (Barnet, 1998). With the multitude of environmental factors that can influence the physiological structure of the brain, it is difficult for researchers and other professionals working with children to isolate one factor as being causal for a particular condition. In order to proceed in doing an evaluation that reflects one's influence, one must gain an understanding of the influences all factors, not just the one being studied, have on the developing brain. Various environmental factors will be presented later in this review.

Other Factors

Common environmental factors, other than toxic exposure, affect the development of the human brain. Nutrition plays an important role in the development of the brain (Macones, 2005). If nutrition is not complete, or is in a form that cannot be processed and used within the young digestive system, there can be detriment not only to the body but the developing brain. Environment relating to nurturing care also affects development, as well as, exposure to stimulating activities. All these are factors that need to be taken into consideration when looking at the outcomes to prenatal toxic exposure, so that such influence can be isolated.

Although public attention has been captured by prenatal drug exposure, exposure to alcohol during fetal life is more prevalent and may have a more serious impact to the child (Brady, 1994, Sood, 2001). Immediate effects of alcohol exposure include: pre-term birth, increased risk of fetal death and a smaller than normal birth size and weight. Long-term effects of alcohol exposure during gestation are divided into two categories: Alcohol-Related Birth Defects and Fetal Alcohol Syndrome (Brady, 1994).

For a diagnosis of Fetal Alcohol Syndrome (FAS) a child must have the following three characteristics:

1. Indications of developmental delay, intellectual impairment, neurological abnormality. All of which indicate that the central nervous system has been affected.
2. Any two of the following facial abnormalities: small head size, flat/long upper lip, flattened nose bridge, narrow eye slits, under-developed mid-face.
3. Growth retardation, either before or after birth (Ellis, 2001).

Other abnormalities that are associated with FAS include: shortened fingers, hernias, profusion of facial hair, heart mummies, and other cardiovascular problems, respiratory dysfunction, and kidney troubles (Brady, 1994).

Many children with FAS have delayed motor development that often never normalizes (Brady, 1994). A follow-up study in Gotenburg, Sweden with older children that were prenatally exposed to alcohol showed that these children have difficulties in visual perception, spatial relations, mathematics, memory, attention and drawing logical conclusions (Brady, 1994). A quarter of the children in the study

attended a school for the mentally retarded, while almost half had some kind of special education. The study showed a correlation between the severity of neuropsychological problems and the degree of prenatal alcohol exposure (Aronson, 1998). A number of children with Alcohol-Related Birth Defects (ARBD) is double that with FAS. These children may have the physical defects of FAS, cognitive deficits, growth retardation and neurobehavioral outcomes such as memory deficits, attention deficits, problem solving difficulties, distractibility, poor organizational skills and lower IQ. A follow-up study focusing on two-year-old children showed delays in language development as a direct result of prenatal exposure to alcohol (Autti-Ramo, 1992).

Childhood behavior was the focus of another study of young children prenatally exposed to alcohol. The amount of alcohol consumed and other exposure elements were considered (Brady, 1994). The Achenbach Child Behavior Checklist was used as an assessment tool because of its widespread clinical use in research. The findings to that study were that children with any prenatal alcohol exposure had higher scores on Internalizing (Anxious/Depressed and Withdrawn) and Externalizing (Aggressive and Delinquent) (Sood, 2001).

Other behavioral outcomes can be noted in a study of older children whose mothers abused alcohol during pregnancy. This study indicated that many exposed children; half as indicated by this study, are later diagnosed as having attention deficit hyperactivity disorder or an autistic spectrum problem (Aronson, 1997).

Two other situations of prenatal exposure will be presented in this review as variables to be considered when focusing on the outcomes to maternal smoking. Both of

these variables have detrimental outcomes to the developing child. The first being external to the mother, the second internal. Prenatal exposure to environmental toxins can have a serious effect on the developing fetus (Chamberlain, 1994). Cancer-causing agents or carcinogens can cross the placenta and promote childhood cancers. Teratogens, which are agents that cause malformation of a fetus, can cause growth retardation, birth defects and death, while mutagens can damage genetic codes, causing chromosomal abnormalities

Some women are exposed to the toxins occupationally during pregnancy. Birnbaum (1994) noted that women exposed to solvents during their first trimester of pregnancy had significantly more major congenital malformations, approximately 10% of the women exposed, then would occur in unexposed populations. There are some occupations that pose a risk to fetal development. Such occupations risks the mother and fetus's exposure to solvents include factory workers, textile industries, as well as laboratory technicians (Khattak, 1999).

In addition to toxins the mothers may deliberately expose their fetus to, there are toxins that the mother is exposed to that are in her environment. Correlations between babies born with smaller than normal heads and lower than normal birth weight and environmental contaminations have been found in a study conducted in New York City (Birnbaum, 1994). Noting that small head size and low birth weight signify other complications of prenatal life and affect post natal development, this finding can be troubling (Tvedten, 2003).

Another source of environmental toxins is the presence of mercury. Mercury in maternal diets, even low levels, slows the electrical signals related to hearing in the brains of children who were prenatally exposed (Grandjean, 2004). Additionally, as teenagers, these children still showed impaired neurological regulation of heart rate. This can be attributed to mercury toxicity in the brain stem. This information comes from a study by the Environmental Protection Agency (EPA) in 2003. The new data suggested that one in six newborns have a mercury level that exceeds the EPA's safe limit. Mercury is toxic to the human brain. Prenatal exposure has effects that are lasting and permanent. Brain cells don't get a second chance to develop (Grandjean). Exposure to environmental chemicals, such as dioxins, which are cancer-causing agents that occur in herbicides, and Polychlorinated biphenyl (PCB), which are highly toxic chemical compounds, are associated with endocrine alterations. The unborn are at high risk for this damage because of their rapid growth (Birnbaum, 1994).

The second situation that needs to be considered a variable is prenatal maternal stress and mental health. Many animal studies have been conducted to demonstrate the effects of maternal stress on the early programming of brain functions and ultimately the behavior of the offspring (Mulder, 2002). A recent human study in the Netherlands was done to compare human prenatal stress and the outcomes to child development. The study showed that high stress and anxiety levels contributed to preterm labor and miscarriage as well as having a malformed or growth-retarded baby. There was evidence also that prenatal exposure to stress can be related to long-term functional disorders

The emotional relationship between the mother and fetus does affect the psychophysiology of the fetus as well as the physical development. For example, maternal-fetal distress syndrome has been shown to evoke cries indicative of pain, anger and rage in both the pre-born and the newborn (Holmes, 1984). Adults who have hysterical or depressive reactions can be linked to this reactive state to emotional state of their mother during pregnancy (Lipton, 1995). These conclusions are not new, as there were ancient and medieval references to the existence of such a syndrome (Maret, 1992). A study conducted with severe behavior/ emotional disordered children found the highest correlation of predictive factor on children's behavior was maternal cigarette smoking followed close by maternal stress (Odent, 1994). Other studies reinforce that maternal stress can be connected with attention disorders, autism, psychosis, schizophrenia and psychiatric disorders in general (Lipton, 1995). The biological reason for these outcomes is the neuroendocrinological interactions, essentially the interaction between the nervous system and the endocrine system (Lipton, 1995). A group of hormones called catecholamines (epinephrine, norepinephrine and dopamine) are biochemically induced into the fetal system. In studies done with animals injected with catecholamines, the animals reacted in seconds with anxiety and fear without the presence of any fear or anxiety-producing stimuli (Maret, 1982).

The focus toxin

Depending on source of information, the frequency of maternal smoking ranges from 10% to 25% of all pregnant mothers (CDHS, 2005, Eliot, 1999). Regardless of

which end of the rating spectrum one concurs, prenatal exposure to maternal smoking is the most prevalent toxic exposure during fetal life (DiFranza, 2004). With such a large percentage of children being exposed to this toxin, the outcome to society as a whole is extensive.

Outcomes to Prenatal Smoking

The outcomes to maternal smoking can be divided into two categories. First, the outcomes that have an adverse reproductive consequence and secondly, those that are complications for the baby (Chamerlain, 1994). Each of these outcomes, along with the reason for their occurrence, shall be presented in this review. A presentation of individual studies conducted on the subject will also be part of this literature review.

One of the most notable outcomes to maternal smoking is that babies born to smokers are smaller than those born to nonsmokers, typically half a pound lighter (Eliot, 1994). The significance in this lies not only in that smaller babies have a lower survival rate, but in the reason that lower birth weight is an outcome to smoking. Nicotine, the chief alkaloid in tobacco reduces the oxygen supply, as well as the nutrients to the fetal tissues. Such deprivation can have even longer-term effects than low birth weight. Nicotine also decreases the blood flow to the uterus by 3-40%, thus depriving the developing baby even further (Chamberlain, 1994).

As the mother smokes, nicotine is induced into the fetal circulation system and drastically alters breathing movements. The fetus experiences periods of apnea alternating with extremely rapid breathing (Green, 2003). These pre-birth actions appear to be one of the reasons infants of mothers who smoked during pregnancy have a higher

risk of sudden infant death syndrome due to the altered breathing pattern prior to birth (Eliot, 1999).

Nicotine effects can be noticed in every trimester of pregnancy. Death is one constant, from spontaneous abortion in the first trimester to a 33% risk of fetal death after 20 weeks gestation to a high risk of neonatal death in the first 28 days of life (Mead, 2007). Respiratory problems are a result because nicotine interferes with the basic lung structures construction, including microvilli in the baby's lungs and the formation of the lung's elastic tissue Green, 2003). This leads to rigidity in the neonatal lungs much like emphysema (Chamerlain, 1994).

There are numerous potentially harmful chemicals contained in cigarette smoke. Nicotine and carbon monoxide are the two most commonly known (Phillip Morris, 2006). Carbon monoxide decreases the amount of oxygen to the fetus, just as nicotine does, but it does so by displacing the oxygen in the mother's circulation (Green, 2003). Less oxygen results in slower growth in fetal organs.

Outcomes to Behavior

A focus of this dissertation is the behavioral outcomes of prenatal exposure to maternal smoking, although the researcher recognizes that serious physiological outcomes do affect behavior. Behavior, as defined for this review, is a culmination of the emotional, social and intellectual development aspects of a person's being. Some of the behavioral and mental problems are linked to nicotine exposure (Chamberlain, 1994).

The remainder of this literature review will focus on the outcomes to the brain and behavior, as well as the studies done concerning these issues.

It is suspected that nicotine causes neural damage because it binds to one class of neurotransmitters (Shore, 1997). Most neurotransmitters act to promote the growth of brain cells, in addition to their role in synaptic communication. Exposure in utero to nicotine interferes with the neurotransmitters' signals. This is attributed to the child's later behavioral problems such as attention deficits and altered arousal states (Eliot, 1999).

Children, who had poor intrauterine growth, risk a lasting effect to subsequent growth and development. Because of the profound alterations in the neurotransmitters' disposition, the neuropathways continue to be disrupted after birth. Because tobacco smoke is composed of thousands of potentially toxic substances to the fetal brain, the contribution of individual chemicals is unknown (DiFranza, 2004).

In a study conducted by the Department of Psychology, University of Saskatoon, Canada, children who were hyperkinetic, which is characterized by impulsivity, short attention span, extreme restlessness, abnormal and excessive amounts of activity, were found to be offspring of mothers who smoked an average of 14 cigarettes daily during pregnancy. The children of mothers who did not smoke during pregnancy did not have the hyperactivity disorder. Although there are many poisonous compounds in cigarette smoke, the researchers in this study suspect that the accumulation of carbon monoxide in the blood stream of the fetus leads to serious restrictions of oxygen in the developing child. The study found that carboxyhemoglobin, which is hemoglobin mixed with carbon

monoxide instead of oxygen, is found in the developing fetus at twice the level it is found in the mother (Pressinger, 2005). Additionally, the harm from second hand smoke is also a problem after birth and appeared to have yet another link to hyperactive disorders.

Children's performance on achievement and intelligence tests has been shown to be affected adversely by prenatal exposure to maternal smoking. Additionally their school performance tends to be 3 to 5 months delayed in the subject areas of reading, mathematics and general abilities when they have been born to mothers who smoked 10 or more cigarettes per day. In a study that assessed children who were born to mothers who smoked during some pregnancies but not during others, which will help alleviate some of the other environmental and genetic variables, the children who were born from smoking pregnancies performed worse on intelligence tests than did their siblings who were born from non-smoking pregnancies. During infancy children who are born to smoking mothers have been found to have hearing deficits, particularly relating to their auditory processing and the threshold of sound. By preschool years, the language development of these children is adversely affected. These findings are related to the amount of smoking that occurred, but show that mothers who smoked more than 10 cigarettes daily have children whose hearing and language deficits continue through the child's 12th year (DiFranza, 2004). The same level of maternal smoking was also shown to decrease the child's score on the Stanford-Binet test of IQ by 4.35 (controlling for other factors).

One study that considered the behavioral and temperamental difficulties in children of mothers who smoked during pregnancy, also the inattention, hyperactivity

and poorer school adjustment linked to maternal smoking, may be linked additionally to the personality, behavior and social status of the parents. The study observed the differences in child development in children of smoking parents and the children of parents who didn't smoke. The researchers emphasized that smokers differ in terms of behavior, personality and social status from those who do not smoke (Kronstadt, 1991. These differences need to be taken into consideration, but seldom are, in research conducted on children of parents who smoke prenatally and postnatally).

A study using a sample population of 5,683 children focused on the outcomes to tobacco exposure during fetal development and childhood. Because previous studies had limitations due to the methodology, this study used standardized tests to assess visual construction abilities, mathematics, reading, working and short-term memory. Using this large population enabled the researchers to investigate tobacco exposure's affect on the children's cognitive skills. Because the study spanned a six-year time period, the researchers could also calculate long-term effects. The presence of cotinine (a metabolite of nicotine) was the focus of the study. The outcomes to this study were the concentrations of cotinine in the child varied by race, ethnicity, poverty index, region of the country, blood lead levels, and parent educational level. The presence of cotinine is significantly associated with lower scores in visual construction abilities, math and reading. The study estimates that more than 21.9 million children are at risk for reading deficits due to tobacco exposure (Yolton, 2005).

Children, whose mother's didn't smoke themselves but were subjected to second-hand smoke during pregnancy, also showed ill effects of this exposure. In a study

conducted at Columbia's Center for Children's Environmental Health, 2-year olds who were born to mothers who were exposed to second-hand smoke during pregnancy had lower scores on tests that measured cognitive development when compared to children of mothers who were not exposed. The amount of delay was twice as likely to have a score of less than 80 on a test where the average is 100. This is indicative of a developmental delay (Wyatt, 2004).

In another study focusing on the effects of second-hand smoke during fetal development mothers living in various parts of New York City were interviewed and then the umbilical cord blood was tested at the time of delivery. The umbilical cord blood of mothers who were exposed to second hand smoke showed significant levels of cotinine in the blood. The findings reinforce the consideration to prevent serious negative developmental outcomes to children by limiting their exposure to second-hand smoke during fetal growth (Whytt, 2004).

Rate of Incident by Variables

California Department of Health Services reports cigarette smoking as a significant and modifiable risk factor during pregnancy. This report linked maternal smoking with low birth weight, premature birth and sudden infant death syndrome. The report also stated that maternal smoking increases the child's chance of having to be admitted to a Neonatal Intensive Care Unit by 20%. The focus of the report was to determine the biographic make-up of the women who smoked during pregnancy. What the report found was that women who did not graduate high school were more likely to

smoke during pregnancy than women with any other level of education. In comparison to women with a college degree, women not graduating high school were 2.5 times more likely to smoke during pregnancy. The younger the mother is the more likely she is to smoke during pregnancy (California Department of Health Services, 2005). There appears to be some relationship between smoking during pregnancy and maternal age. Mothers who are 15- 24 years old at the time of the pregnancy have a 12.8 % likelihood of smoking while pregnant, while others in the 24-35 year old age group and mothers who are over 35 have an 8.3 % and 7.9 % likelihood of smoking respectively.

Poverty level also influenced maternal smoking. There is not a steady decline as income increases, although those with the least income smoke during pregnancy at a rate more than twice as high as those with 4 times poverty level income. A maternal level at or below poverty level appears to indicate a 13.6 % rate of smoking while pregnant while those mothers who are at just above poverty level are 10.6%. The out-of-sequence statistic with relationship to smoking and poverty level is those mothers who are at 201-300% of poverty smoke during pregnancy at a 12.9 % rate. But those who are at a 301-400% poverty level continue the decline in the correlation between income and smoking rates with a 5.6% and those over 401% the poverty smoke at the rate of 4.8 % (California Department of Health Services, 2005).

The insurance coverage that the mother had, which can be linked to poverty level, also was considered. Those who were on state-funded medical services, as well as those who were uninsured had rates of 12.8% and 11.3% respectively. While those with private insurance smoked at a rate of 7.1 %.

Race of mother also appeared to play a role in the rate of maternal smoking. Mothers, who are African American, are more likely to smoke during pregnancy with a rate of 17.1% of them doing so. European American mothers have a 15.3 %, while both Hispanic and Asian/Pacific Islander mothers having the lowest rates of 5.1% and 3.6% respectfully (California Department of Health Services, 2005).

Another factor that seems to have a relationship to maternal smoking is when the mother started receiving prenatal care. Those mothers who started prenatal care in their first trimester were smokers 8.5% of the time, while those who started prenatal care in the second or third trimester were smokers 15.3 % of the time. The overall smoking rate of all the women (N=531,285) was 9.8% (CDHS, 2005, p.1-2).

Nine thousand children were part of a British study to determine the effects of mother's smoking during pregnancy. The children were divided into three groups, those who had no exposure, those that had exposure to ten cigarettes daily and those that had exposure to more than 10 cigarettes daily. When the children were 7-years-old they were given tests to evaluate their reading and math ability, as well as their general physical measurements. Researchers allowed for variables associated with biological and social factors. The results showed that the children of mothers who smoked more than ten cigarettes daily during pregnancy were an average of one centimeter shorter and were between 3 and 5 months behind in their reading and math skills. When 11-year-old children were tested, the children of prenatal smokers where shown to be 1 month behind in reading skills and 5 months behind in math skills, after adjusting for other variables (Pressinger, 2005).

Out of 11 studies conducted on children of mothers who smoked during pregnancy, 10 concluded that there is an increase in behavioral problems during childhood associated with maternal prenatal smoking, even after controlling for potential confounders. These studies were conducted on children from newborn through adolescence years. The behavioral problems included attention deficit hyperactivity disorder-like behaviors, as well as, hypertonicity, startles and tremors in the youngest group of subjects. In the 2-year-old subgroup, children were shown to have more negativity and had externalizing behavior problems. Studies use both parent and teacher reports to eliminate the potential problem that mothers who smoke are less tolerant of children's behavior problems and more likely to report that the child has difficulty. The studies revealed that there is a relationship between the dose of cigarette exposure and the problematic behaviors. The more cigarettes smoked the more severe the problems. Additionally, a correlation between prenatal smoking and the need for conduct disorder psychiatric counseling for 7 to 12 year old boys was made (DiFranza, 2004). In a study that considered these same affects, the more cigarettes a mother smoked during pregnancy the greater the chance her child would demonstrate severe behavior difficulties when the child got older. Smoking a pack of cigarettes a day is associated with twice the risk of a child being anxious, having conflict with others and being disobedient. Smoking less than a pack of cigarettes a day was also shown to increase these problems but not at as high of a rate (Pressinger, 2005).

Auditory processing, the ability to listen to what the teacher says and follow directions, is an additional deficit to children whose mothers smoked during pregnancy

according to a study conducted in 1994 in Ottawa, Canada. This study found an overall poorer performance associated with central auditory processing tasks in children who were prenatally exposed to cigarette smoke. The skills that were assessed in this study were listening skills in a noisy setting and a skill that requires a child to attend to simultaneous information in ears, auditory processing, memory and word discrimination. Another finding in this study was that children who are exposed to passive, second-hand smoke prior to and after birth also perform more poorly than children of non-smokers (Pressinger, 2005).

The problems of children of mothers who smoked during pregnancy, especially the behaviorally and academically linked difficulties, appear to stem from damage to the brain cell quality. When looking at the dendrites, which are the parts of the cell that transmits and receives impulses, the nicotine exposed ones are shorter, thus not allowing the connectivity of a normal dendrite. Reports on this topic indicate learning and memory deficits in children who were exposed to nicotine during fetal growth. Physiological changes in the cerebral cortex are also associated with prenatal nicotine exposure. These alterations are seen as a significantly reduced thickness of the cerebral cortex, smaller cerebral cortex neurons and generally overall reduced brain weight. This research links prenatal exposure to cigarette smoking with attention deficits, hyperactivity, learning disabilities and a lower IQ (Pressinger, 2005).

Children of mothers who smoked are still being affected later in life. In a study of 12,068 14-year-olds whose mothers smoked while pregnant, these children were assessed for health, growth, school performance and their various habits (smoking,

drinking and participation in sports). When considering out all other factors that influence these outcomes (parental height, age, social class, occupation, as well as, the child's gender and number of siblings) the children of prenatal smokers were still shown to be shorter in height by 1 centimeter and have poorer school performance than those students whose mothers did not smoke (Pressinger, 2005).

Adult Behavior and Learning

The motivation of this study was to affect positive change on the lives of young children. In order to do so the behavior of pregnant adults must be changed. The focus of the study was on women whose behaviors during pregnancy, ingestion of inhalation of substances, such as study cigarette smoke, have a detrimental affect on the fetus. This affect can have lifelong influence on the behavioral, developmental and mental health, as well as the physical health of the child.

There are two aspects of adult behavior that need to be considered in this study. The first is how and why the behavior is initiated and is perpetuated and the second is to examine adult learning models to affect a positive change in the behavior through education.

Why Women Continue to Smoke During Pregnancy

An issue concerning smoking behaviors is the perpetuation of a behavior that is considered to be harmful to one's health. According to the Philip Morris company there

is, “overwhelming medical and scientific consensus that cigarette smoking is addictive.” (Philip Morris USA, 2006, p. 1). Of frequent smokers, 90% meet the criteria by major public health organizations for addiction. Even with optimal medical care and a strong desire to quit smoking, only half of patients are able to stop smoking for a week and the long-term failure rate for this group is eighty-percent. To emphasize the power of this addiction Philip Morris presented the following information:

1. Within half an hour after awakening, two-thirds of smokers will have their first cigarette.
2. Those who smoke more than a pack a day, 84.3% have tried unsuccessfully to reduce the number of cigarettes they smoke.
3. When a smoker makes a serious attempt to quit, they have less than a five-percent chance of being a non-smoker one year later. Additionally 15 million people try to quit each year in the United States but only 30% are successful.
4. Of those individuals who have undergone lung cancer surgery, half will continue to smoke. Even those who have had their larynxes removed, 40% will smoke again (Philip Morris, 2006, p.2).

Established information concludes that smoking is both addictive and harmful (DiFranza, 2004, Philip Morris, 2006, Pressinger, 2005), yet individuals still begin to participate in this activity. To understand why this occurs, which will also guide the route in which educational methods are used, a social-ecology framework is necessary.

Educational Programs to Reduce Smoking

The psychology of the use of cigarettes, and then the resulting dependence typically begins in childhood or adolescence (Corbett, 2001).

Interpersonal, individual, organizational, population, and community factors affect comprehensive environmental and social influences on the initiation of smoking behaviors. The most promising educational methods aimed at eliminating the occurrence of smoking are community projects, restrictive policies and media campaigns designed to eliminate the initiation of the behavior (Corbett, 2001). Some of these same strategies, although they may be less effective at causing a discontinuation once the behavior has been initiated, can be used in the social-ecological design of educational materials aimed at discontinuation of maternal smoking during pregnancy.

There are numerous programs to assist pregnant women in discontinuing smoking. According to the American Cancer Society (2006) they have hotline phone numbers available, as well as the national organization offering such services. Many medical clinics offer programs to help women stop smoking during pregnancy.

This study explored whether education will change the adult behaviors of pregnant women whose smoking has been shown to adversely affect their children. While the other sections of the literature review focused on prenatal toxins in general, the primary focus toxin, child development and the initiation and perpetuation smoking during pregnancy, and thereby fetal exposure to the focus toxin. The following section will present theories, principles and models of adult learning.

Theoretical Base

Knowles (1950), who pioneered the field of adult learning, identified characteristics of adult learners. The first characteristic of adult learners is that learners need to be allowed to direct themselves. This autonomy is key to establishing and maintaining adult participation. Obtaining the learner's perspectives concerning what is to be taught and allowing them to focus on topics that reflect their interests. Allowing learners to act as group leaders and facilitators will also promote the needed autonomy. The second characteristic that Knowles identified is that the instructor needs to capitalize on the fact that adults have a foundation of knowledge accumulated through life experiences. The learner will need to connect the new information to this knowledge base. Thirdly, adult learners need to have a clearly defined goal, thus the goals and objectives for the course or lesson should be presented early. The fourth principle of adult learning is that adults must see a reason for the instruction. The course or lesson needs to be relevancy-oriented. Adult learners are also practical. This is the fifth characteristic. The lesson must be useful in relationship to their work or life. And finally, instructors must be respectful to adult learners and acknowledge them as equals, as well as allowing them to voice opinions freely (Knowles, 1950).

In order to effectively induce learning those who educate adults should, according to Knowles(1950): provide a learning climate of cooperation, diagnose the needs and interests of the learner, base objectives on these needs and interests,

create opportunities for mutual planning, provide sequential activities, select instructional methods based on the learner and evaluate the learning while it is occurring to reconsider the needs before further planning and instruction takes place (Dover, 2006).

Motivating an adult to learn is another aspect that adult educators need to consider. There are at least six factors cited as sources for motivating adult learning (Knowles, 1950). The first motivator is to form a social relationship, such as friendships or other associations. Another motivator can be a need to comply with a supervisor's instruction or fulfill the expectations of another person. A third motivator is to provide for social welfare such as service to the community, or to improve an aspect of society. The fourth factor that can be a motivator for adult learning is for professional advancement, such as obtaining a higher job status or maintain the same level of knowledge as a competitor (Knowles, 1950). An additional motivator is for stimulation to relieve boredom, a break from routine or a contrast to other aspects of life. And the sixth factor that motivates adults is cognitive interest. The adult is motivated to learn for the sake of learning, for gaining knowledge and to satisfy a curiosity (Lieb, 1991).

In addition to these motivational factors, adult educators must establish an open, friendly atmosphere, set an appropriate level of importance for the topic that does not cause too much tension, and set a level of challenge that is not too high to cause frustration and not so low that participants are bored. Ensuring that the learners have not been intimidated or offended is also an important role of the adult educator in facilitating a learning atmosphere (Lieb, 1991).

According to Rogers (Dover, 2006), a U.S. psychologist, all individuals have an inborn desire to learn. Rogers' contribution to the adult education theory was his experiential theory of learning. In this he defined two categories of learning: significant, which addresses the needs of the learner, and meaningless. Significant, also known as experiential, is where the knowledge can be applied to the life of the learner. Meaningless, also referred to as cognitive learning, is knowledge gained through an activity such as memorization of tables of facts. Rogers stated that the role of the adult educator is to facilitate learning by first setting a climate for learning that is positive and then providing clarity as to the purpose of the lesson. The adult educator should also, according to Rodgers, provide organized learning resources, balance the emotional and intellectual components of the contents and, although not a dominating component of the discussions, share thoughts and feelings with the participants (Dover, 2006).

With regards to experiential learning, Montessori is similar to those used in early childhood education, can be an alternative to other types of adult education methods. Due to the age of information and technology, as well as educational trends focusing on adult experiential learning, the Montessori methods allowing an adult education model that uses learner-centered, learner-directed personal computer interactivity are all considerations that can be interwoven into a Montessori adult education model (Hamilton, 1999). Didactic materials for an adult education environment may include many alternative education techniques that provide an alternative to lecture and presentation styles of adult education. Using a method of inquiry style complements Montessori's idea of scientific pedagogy. This aids the learner in seeing education as

more than a simple application of problem-solving but as an application of critical thinking. With a reflective adult educator, who remains non-judgmental during the whole learning process, the knowledge gained can be directed in a manner in which the desired outcome can be obtained. In this reflection, feedback can be given to the learner to promote additional learning. The crucial aspect of this model is that learners are not expected to have specific right answers, as the term 'right' is relative to the learner. This model allows the learner to have competence in their own learning and experiences, which is a crucial aspect in adult learning (Hamilton, 1999).

In her analysis of lifelong learning, Cross (1981) presented characteristics of adults as learners (Cross, 1981). This model integrated the theoretical framework of Knowles with the lifespan psychology and Roger's experiential learning. The characteristics of adult learners consist of both personal and situational characteristics. Those that are personal include: developmental stage, life phases and aging. Within those aspects there are factors that contribute or hinder adult learning. For example, aging can result in deterioration of motor abilities such as hearing, eyesight and reaction time, while aging also can enhance some abilities such as reasoning, vocabulary and decision-making skills. The characteristics that are situational related to life events such as marriage, employment situations, and family events which may involve transitions, as well as plateaus, that are not directly related to age. Additionally, situational characteristics that affect learning are: whether the learning is voluntary or compulsory and how well the learning is administratively facilitated. Administrative facilitations can include such factors as the procedures within the learning event, the schedule of the

event, and where the event is located. From the recognition of these adult learner characteristics, Cross developed principles for adult learning (Cross). These principles include many of the factors that have been previously stated in this section. First, capitalize on the participants' experiences. Then, adapt to the age-limitations of the learners. Thirdly, she stated that adult educators should challenge the learners to increasingly advance in their personal development. And finally, Cross advised that educators should give adults as much choice as possible in the programs, organization and availability of learning opportunities.

Just as Rogers and Cross (1981) presented guidance to the adult educator, The role of the adult educator can be defined as helping learners to examine the assumptions that are the underlying factors in their feelings, beliefs and actions. Additionally, the adult educator's role is to help the learners assess the consequences of their assumptions, as well as to explore alternative assumptions and to test these assumptions through reflective dialog (Dover, 2006).

Therefore, a number of models can be used to describe and predict adult learning behaviors. In comparing and contrasting particularly the models of Rogers and Knowles (1950), Jackson (1996) introduced the behaviorist theories into the field of adult learning. The purpose of any model is to describe an aspect in order to understand it. From a behaviorist perspective learning is regarded in terms that can be observed and measured. In order to measure success of an adult learning session, or of an adult learning study, the amount of learning that has occurred must be determined. In the work of Knowles and Rogers, the adult learner is a self-actualized, self-directed and active participant that

learns through a series of relationships. It is also realized that anyone who does not wish to learn will not learn. Therefore, in the behaviorist model of adult learning the individual must be empowered to learn and there must be a direct impact on the learner that is pervasive and measurable (Jackson, 1996).

Learning itself can be defined as an act of gaining skills or knowledge. Learning helps individuals gain new abilities. As humans learn they build new neural pathways and increase connections in the brain. When children learn they build cell assemblies and sequences, but when adults learn they make new arrangements of these sequences (Conner, 2004).

In general, humans are uncomfortable with change, and learning involves change. But the brain will search for and respond to novelty and will resist what it feels is meaningless stimuli (Jackson, 1996). Learning is a life long process where learners constantly attempt to make sense of experiences and find meanings. The human mind learns from everything it perceives. In order to promote adult learning, the educator must capitalize on the learners natural styles and provide an environment conducive to the way that adults learn (Conner, 2004).

Summary

The review of literature presented information pertaining to typical child development. Variables to a healthy prenatal environment and outcomes due to those

variables and the subsequent section focused on the topic toxin, maternal smoking during pregnancy comprised the second section. The outcomes, based on current literature and research, to fetal exposure to cigarette smoking were also presented in this literature review. This information was used to create an informational brochure as part of the study process.

With 10-25% of children in the U.S. being affected by the focus toxin (CDHS, 2005, Eliot, 1999), erasing this exposure can have an affect on society. Time and other resources are dedicated to intervention services for behavioral, cognitive, social and emotional challenges the cigarette-exposed children can go to other educational programs and services when the are no more children who have been cigarette-exposed. Beyond saving resources, alleviating the challenges, frustrations and determent to children is the ultimate goal of this study. This change is proposed to be made through a change in the behavior of adults who affect outcomes to the children. The change in adult behaviors is achieved through educational methods which have also been addressed in this section.

This literature review provided information that forms the foundation information in which the study will be based. In the next chapter the method that was used to promote maternal education and the system in which that method was evaluated will be outlined in more detail. The reason for choosing the method of review will also be presented. The method and design of the proposed study will be followed by a list of the references used in this study. In chapter one, an introduction to the problem and study was given. Chapter 2 presented a review of literature on the topic, and insight into current literature. In the third chapter, the focus will be on the design of the study.

Chapter 3: METHODOLOGY

This chapter presents the research design and participant information. How the data were collected and analyzed is also part of this chapter. The purpose of this study was to evaluate the effectiveness of current education materials on changing maternal smoking attitudes and compare the changes in attitudes of participants once they have been exposed to newly-created maternal education materials that focus on the behavioral, developmental and mental health outcomes to children exposed to maternal smoking during pregnancy.

The prenatal environment has a significant affect on the capacity, ability, health, and thought of an individual. As presented in the previous chapter, maternal smoking during pregnancy has an effect that is not only immediate but also long term. It is a consideration of this study that, through the introduction of maternal education materials, which include a better understanding of how the mothers' actions during pregnancy, namely cigarette smoking, have a long-term effect on their children, a mother will discontinue her use of cigarettes during pregnancy.

This study was a quantitative, one-group pretest-posttest design. This method was chosen because it would yield measurable data that would indicate if the participants had a change in attitude from prior to their exposure to the educational materials to after exposure to the materials. The participants were surveyed with direct questions that will yield measurable data. The researcher prepared and conducted the study with the aid of a

research assistant. An assumption was that most of the participants have a basic understanding that it is generally an unhealthy activity to participate in smoking while pregnant but will not have knowledge of the extent that smoking can affect a child's behavior, developmental and mental health in a long-term and pervasive way.

Design

Through a one-page letter of invitation, prospective participants were presented with the basic information concerning why the study is being conducted and to give consent to participate in the study. This letter also revealed any potential harm, the emotional distress that could occur as a result of the study, plus provides contact information should questions or problems occur. The study treatment included exposing all participants to the educational materials with assessment of prior knowledge compared to an assessment of post knowledge. To help improve internal validity and eliminate researcher bias, a research assistant will be presenting and collecting materials during the study. Ensuring that all participants received the same materials, in the same location and supervised by the same research assistant helped to improve reliability of the study. The researcher provided the study materials to the research assistant, and briefed him on the procedures concerning conducting the study and possible participant situations. The participants came to an adult training classroom located in their child's child development center. Validity of the study was enhanced by using participants that the topic of the study is relevant to. To ensure participation was convenient to the participants the child development center was chosen. The study was conducted during typical times that the parents would be in the center to pick up their child.

The participants were given survey 1 which contained the demographic information portion and an evaluation of their attitudes towards maternal smoking during pregnancy. At the conclusion of survey 1, participants returned the survey to a bin, and then the research assistant provided the participant with the maternal education brochure and survey 2. Survey 2 provided the same reflection questions as survey 1 concerning attitudes towards smoking during pregnancy. After completing survey 2, participants returned both survey 2 and brochure to the same bin in which they submitted the previously used materials.

The surveys were designed based on the research questions. Demographic information was collected on survey one based on the research question: Do factors such as age, educational level, income and level of smoking affect the participant's attitude change when they are exposed to the education materials? Thus a question concerning age of the participant is presented. The participant was also asked a question concerning the highest level of education completed. For this particular question a wide range of educational achievements from junior high school completion to post-graduate degree are indicated as choices to help promote the perception of acceptance and accomplishment, as well as give a clearer picture of the participant population than one would have if choices were less broad or inclusive. The income demographic information was based on household income. The ranges were selected based on the poverty level income in the United States, the median income in the region being studied and 80% of the median income in the region. The 80th percentile was chosen because that is the cut-off for

public assistance with housing improvements in the region. The living wage in the region was also considered when choosing the range selection.

Because the study topic is prenatal exposure to cigarette smoking, a demographic question concerning the participant's level of smoking was also part of the survey.

Role of Researcher

The role of the researcher in the data collection procedures was to prepare the materials for the study, provide the initial contact with prospective participants through an invitation letter, to select and advise a research assistant and analyze the data once the study was completed.

Questions

Research Question: Are educational materials, presented to mothers, effective in changing their attitudes towards smoking during pregnancy and to what extent is there a difference in attitude change between not having exposure to the parent education materials and exposure to new materials that reflect the latest research-based information, information pertaining to the developmental, academic, behavioral and mental well-being of an individual who was exposed during fetal development to the toxins in cigarette smoke?

Null Hypothesis: There will be no significant difference between not having exposure to and having exposure to educational materials on the attitudes toward maternal smoking behaviors.

Alternative Hypothesis: There will be a significant difference between not having exposure to and having exposure to new educational materials on attitudes towards maternal smoking behaviors.

Subquestion: Do factors such as age, educational level, income and level of smoking affect the participant's attitude change when they are exposed to the education materials?

Null Hypothesis: There will be no significant relationship between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials.

Alternative Hypothesis: There will a significant relationship between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials.

Context of the Study

The context of the study was to collect information pertaining to maternal education brochures and their effectiveness to change the mother's attitude toward smoking while pregnant. The outcome to the child of a mother smoking during pregnancy is significant. The hypothesis of the researcher was that if mothers were more aware of the outcomes the behavior of smoking while pregnant would the behavior would significantly decrease, and thereby prevent the negative outcomes to a child's developmental, mental and behavioral health.

To gain access to the participants in this study the researcher prepared a letter of introduction and invitation, which potential participants were given when they picked up

their child from the child development center. Because of the large quantity of parents who received the letter simultaneously, the researcher will not be personally presenting the letter. Teachers and other staff members familiar with the potential participants distributed the letter. The researcher did not have contact with individual participants unless a participant personally contacted the researcher.

Measures of Ethical Protection of Participants

Because harm to a child, especially one's own child (Lipton, 1995), is a sensitive subject, participation in this study may have been difficult for some individuals. In ethical consideration, one has to understand that cigarette smoking is addictive and difficult to discontinue (Phillip Morris, 2006) and that the participants may, for the first time, be exposed to the information that their behavior has caused detrimental and long-term negative outcomes to their child's development, learning, behavior and mental health. In working with participants, the research assistant was aware of any out-of-the-ordinary behaviors, and respond with compassion. The participants were able to, while completing the surveys, ask the research assistant questions for clarification of the materials used in the study. He was briefed to respond to questions in generally, he was also prompted on ways to respond to concerns, when they arose.

Confidentiality is a key component of this study. Participants, who expressed concerns, were reassured that their survey responses will not be correlated with their identity, and that the outcome to the study is for research purposes only, and not to be used as an accusation of their purposeful harm to their child.

Prior to participation in the study individuals, who were invited to participate, were given information concerning the risks and benefits of participation. After that information was provided the individuals made the decision to participate, and there were no penalties or coercion for non-participation. All participation was voluntary, neither the researcher, research assistant nor any of the child development center employees made any stipulations that will encourage or discourage particular individuals to participate in the study. In order to help ensure study validity all participants were given the same study materials in the same setting.

Participants were seen by each other during the study thus study participation will not be completely anonymous. Additionally, the research assistant had knowledge of the participants who take part of the study, but since he has no relationship to the participants, he will only be able to identify them by sight, not by name.

The surveys were prepared with numeric codes to correlate an individual's first survey with their second survey. These codes are not linked to the participant's identity.

Participant Selection Criteria

The population of participants for the study was mothers who have a child enrolled in an early childhood education program. The program is available to working families or if a parent is attending school. If the participant population was limited, if not enough mothers respond to the invitation to participate, then a plan to use additional

programs with a similar parent and child population was considered. Additional program participation was not needed. The purpose of the early childhood program is to provide care and education to young children who are 6 weeks to 5 years old. This program is located in a segment of western Washington State, Kitsap Peninsula and the surrounding area. These mothers had variety of smoking habits. The participants were contacted by the researcher through an introduction and invitation letter. Ethnicity, race, culture, age, level of smoking, education and age of the child, as long as the child of the participant is 5 years or younger, were not factors considered when selecting participants, but some of these variables were used as variables when evaluating the data from the surveys.

The population was selected because it contains mothers of young or unborn children. The researcher gained access to the group through her professional affiliations with the directors of the programs. The selection of mothers of children in child development programs that serve child populations 0-5 years of age is to ensure recent information was gathered, as well as, to have an effect on the population most likely to continue to reproduce. And those who are more likely to have acquaintances that would benefit from the knowledge gained.

All mothers with children in the program were offered the opportunity to participate in the study. This procedure ensured that the researcher is not choosing the specific participants. Using a normogram developed by Gore and Altman (2006) the goal sample size is one-hundred participants (Ajeneye, 2006). A sample size of 60 was considered with a relationship to the population rate of 70% but an increase of the sample size to 80 participants reduced the likelihood of a false conclusion that there is difference

between the no-intervention and the intervention, as well as provide a 75% relationship to the population. The researcher was willing to accept the one in four chance that a sample size of 80 with an 75% relationship will yield, that there is no difference between the effects of the parental education materials and no materials in changing the attitude of mothers toward smoking during pregnancy. A sample size of 80 should also allow the ease of data processing while being a large enough sample to provide a strong level of generalization to the population as a whole (Ajeneeye, 2006).

Because of the nature of the subject, stronger methods of presentation such as a parent meeting and direct individual contact with mothers was considered, but a less invasive approach was concluded by the researcher to be more appropriate with this population. This consideration was explored further in the ethical considerations section of this chapter.

Data Collected

Data were collected during participant exposure to a maternal education brochure and prior to exposure to this brochure. The participants were first asked to complete a survey prior to exposure to this brochure and then presented with the brochure and were asked to respond to a second survey. The surveys contained the same information, although the first survey also included demographic information about the participant's age, education level, income and level of smoking.

The study was conducted in an adult classroom. The researcher was not be present in order to alleviate the possibly of researcher bias affecting the outcome of the study or

the analyzing of the data. A research assistant provided the initial survey to the participants. Participants, without any further interaction with the research assistant, completed this survey. Once completed, the survey was placed in a bin that is provided in the classroom. The research assistant then gave the participant the second survey and the parent education brochure. The participant then followed the identical procedure with this second survey as she did with the first. Although there are no individually identifying information on the surveys, each survey is coded with a number. This number was used only to pair the two surveys completed by an individual participant with each other. The effectiveness of the brochure in altering the attitudes of smoking while pregnant will be determined by the responses on the survey.

Procedures for Analyzing Data

Data from the surveys were collected and compiled into charts as a precursor to further evaluation. In both surveys the same questions were asked of an individual participant, thus using an analysis of variance (ANOVA) the data will be analyzed. The demographic variables were analyzed by dividing the surveys into sub-groups and correlating the data using a comparison between sub-groups. For example, the responses of the mothers who are in the teenage sub-group were compared to the responses of mothers who are in the other age groups to note any variation that may be attributed to the age of the mother.

Through the analysis of the data from the surveys the research questions were answered and one of the hypotheses given was concluded as accurate. If discrepancies

arose in the collection or analyzing processes, the related surveys were discarded and not considered in the outcome presentation.

Methodology Chapter Summary

While previous chapters presented background material for this study, this chapter presented information concerning how the study is going to be conducted. The methods that were used to recruit participants, as well as how they were protected from harm, was also presented. Study design and procedure was explained. And how the data were evaluated has also been a part of this chapter.

The subsequent chapters will provide information concerning the study's outcomes and the data collected. Additionally the outcomes to the data analysis, plus recommendations for the use of the data, and implications for further study will be presented in chapters 4 and 5.

Chapter 4: RESULTS

The purpose of this quantitative study was to change the negative behavioral and development outcomes to a toxic prenatal by presenting parent educational materials aimed at changing the attitudes of mothers towards smoking during pregnancy. Using a pretest- posttest survey with 80 participants, all who are mothers of young children the primary research question, was evaluated. These mothers were given a pretest survey to evaluate the mother's current attitudes towards the behavior of smoking during pregnancy and the harm it does to the child. Next, the mothers were given a parent education brochure containing information pertaining to current research and the developmental, mental and behavioral outcomes to the child of a mother who smoked during pregnancy. A post-test survey was then given to the participants. Results of this study are contained with this chapter.

The research question was: Are educational materials, presented to mothers, effective in changing their attitudes towards smoking during pregnancy and to what extent is there a difference in attitude change between not having exposure to the parent education materials and exposure to new materials that reflect the latest research-based information, information pertaining to the developmental, academic, behavioral and mental well-being of an individual who was exposed during fetal development to the toxins in cigarette smoke? Two hypotheses were considered one being the null hypothesis: There will be no significant difference between not having exposure to and

having exposure to educational materials on the attitudes toward maternal smoking behaviors. The other being an alternative hypothesis: There will be a significant difference between not having exposure to and having exposure to new educational materials on attitudes towards maternal smoking behaviors. An additional research question was also considered by using demographic information disclosed by participants at the onset of the study. The additional research question is: Do factors such as age, educational level, income and level of smoking affect the participant's attitude change when they are exposed to the education materials? This question also was considered with two possible outcome hypotheses. The first being the null hypothesis: There will be no significant relationship between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials. The second is the alternative hypothesis: There will be a significant relationship between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials.

The study was conducted at an early childhood center with the use of a research assistant. The research assistant was present during the completion of all the surveys. The assistant also ensured that each participant received and completed an authorization for use of their survey data. Over the course of the data collection period, 80 individuals participated in the study.

After completing the authorization, each participant was given the first survey which also included the demographic page. After completing this survey and placing it in a box, the research assistant then provided the participant with a copy of the brochure and

the second survey. The effectiveness of the brochure in altering the attitudes of smoking while pregnant was determined by comparing the responses on the two surveys using an analysis of variance.

Research Tools and Data Collection Instruments

The brochure that the participants received and were instructed to read prior to completing the second survey is contained in Appendix A. The surveys used in the study are contained in Appendix B. In both surveys the same questions were asked of an individual participant with the exception of the first question on the second survey being a general educational question: Does this brochure contain any information that you were not aware of prior to looking at this brochure? The data obtained through the comparison of the responses to the first survey and the second have been analyzed using an analysis of variance. This data was taken from raw survey form and placed in spreadsheets to assist with analysis. The overall outcome to the study was that educational materials containing current knowledge did have an affect on the attitudes of the participants of smoking during pregnancy and that they now believe, after participating in the study, that this maternal behavior does have negative and long-term outcomes to a child's mental health, learning, and behavior. That outcome data will be more thoroughly explained in a subsequent section in this chapter. The demographic variables have been analyzed by dividing the surveys into subgroups and correlating the data using a comparison of the subgroups. Through the analysis of the data from the surveys, by comparing the data obtained on survey 1 with that on survey 2, along with considering the demographic

information, the research questions have been answered and one of the hypotheses either sided as the true hypothesis has been determined as necessary to draw a conclusion.

Data Analysis

The key factor that needed to be considered in relationship to the primary research question concerns a change in attitude towards smoking during pregnancy with relationship to causing harm to the unborn child. Another factor in analyzing the effectiveness of the education brochure was to determine if participants gained knowledge they previously did not have concerning the dangers to the unborn child of smoking during pregnancy. These factors were evaluated by comparing the data gained from questions 4-8 in survey one with the data gained from questions 5-9 in survey two. This yielded information pertaining to the change in attitude towards smoking during pregnancy. The study did show that there was a significant number of participants, 15 of the 17 indicating no harm on the pretest, had an attitude change between the pretest and posttest.

Those participants who indicated positively on the first survey, the pretest, that maternal smoking during pregnancy did harm the unborn child also indicated on the second survey, the post-test, that the harm occurred. Thus the group that needed to be considered foremost in evaluating the effectiveness of the education brochure were those participants who in the pretest, the first survey, felt that no harm was done to the unborn child by the mother smoking during pregnancy. The surveys of these individual were compared. Of those who indicated in their first survey that maternal smoking did not

harm the unborn child 85% indicated on their second survey that it did harm the unborn child. Therefore in the 13 pairings of surveys where there was initially indicated that no harm is done, but later indicated a change of attitude, a variance of $P=.85$ can be considered significant.

The only demographic correlation in those who had no change in their attitude towards smoking during pregnancy (those individuals who indicated it did not harm the child in both their first and second survey) is that it is significant that all of those indicating this conclusion are nonsmokers. The overall outcome to that particular demographic is that 10% of the participants were smokers which is slightly lower than the overall female population percentage of smokers in Washington State which is 18 % (CDC, 2005).

The other factor in determining whether the educational brochure was affective was to consider how many of the participants stated they gained knowledge they did not have prior to being exposed to the brochure. The responses to question 1 on the second survey, Does this brochure contain any information that you were not aware of prior to looking at this brochure? are needed to evaluate if the participants did in fact gain any knowledge from being exposed to the brochure. Of the 80 individuals participating, 49 indicated that they did gain knowledge by being exposed to the brochure. This would indicate a variance of $P=.61$ when the variable of previous knowledge is compared to exposed knowledge. This variance can also be considered as significant.

A third factor in attitude of the participants toward smoking while pregnant is with regards to whether they feel that a mother has the choice and right to smoke while

she is pregnant. This question was posed both in the first survey and in the second after being exposed to the brochure. In the initial survey 40% of the participants indicated the mother does have the right to smoke during pregnancy if she chooses. The subsequent survey only yielded a change in attitude when pairing the values from survey one with those in survey two that relates to $P=.13$, which is not a significant change. Although among those participants who indicated in the demographic section that they are smokers, the change in attitude towards whether the mother has the choice and right to smoke during pregnancy with regards to their responses on the first survey compared to their response on the second survey was more significant with a paired value of $P=.5$ which can be considered as significant.

In considering these three factors with relationship to the primary research question, the alternative hypothesis was accepted. There is a significant difference between not having exposure to and having exposure to new educational materials on attitudes towards maternal smoking behaviors.

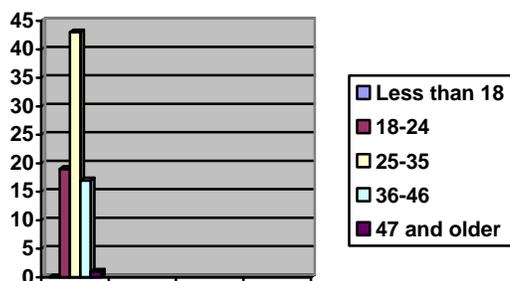
The demographic analysis and thereby the resolution of the secondary research question will be addressed in the next section.

Tables and Figures

The following tables show the demographic make-up of those who participated in the research beginning with the age of the participant. The age demographic was divided into five categories, individuals under 18 years old, those between 18-24, 25-35, 36-46 and those over 47 years old. The outcome to this demographic shows a peak in the 25-35

age group, with the two surrounding age groups at less than half of the peak, and the extreme ends with minimal occurrence.

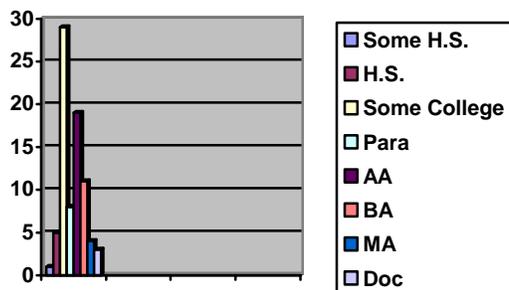
Age of Participant



This figure shows the various age groups the participants were divided into.

This second figure represents the demographic make-up in the participant population with relationship to educational level completed by that participant. As indicated in this table, there were no participants with less than high school attendance, and only one who did not graduate high school. There is a peak which represents 38% of the participant population which indicated that they have some college experience. The next most frequently occurring education demographic is of those participants who have completed an Associate's Degree. The higher end of the education demographic spectrum shows that there are 3 individuals who have earned a doctorate or professional degree.

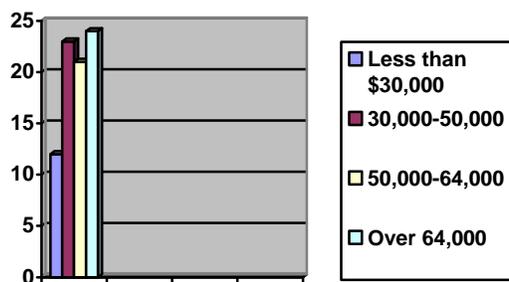
Highest Level of Education Completed



This figure shows the various education levels the participants were divided into.

The following figure shows the demographic of household income in relationship to the participant population. As indicated, the upper three tiers show an almost equal distribution, while the lower income level is approximately half in comparison to the upper three.

Household Income



This figure shows the various income levels the participants were divided into.

As the figure above indicate, the population of participants varied with regards to age, education and income although because of the nature of the target group, mothers of children age 5 years or younger, the population did appear to center around the middle years with regards to age. With regards to education, and only one participant indicated that they had not completed high school. The remainder of the participant population had at least high school completion.

In relating the demographics to the survey outcomes, those who smoke tended to feel that the mother has a right to do so while pregnant at a higher rate than those who do not smoke. Half of those who smoke felt the mother has a right to smoke during pregnancy if she choose to, while just a little over a third of those participants who do not smoke felt the mother has that right. Of those who changed their attitude towards the mother's right to smoke if she chooses to there is no significant relationship between age, education, smoking level or income.

With regards to change in attitudes whether the mother who smokes during pregnancy harms her unborn child, 13% of the participants with higher education, a Bachelor's degree or higher did have a change of attitude where they went from feeling it does no harm to a feeling that it does harm the child while 16% of those participants with a high school education or less had the same change of attitude. This is not a significant difference.

In considering the demographic factors with regards to change of attitude from feeling there is no harm to an attitude that it does cause harm, the following was

determined using the formula as expressed in terms of the F ratio which compares the expected variation of the entire group with the found variation as a factor of $F = (\text{found variation}) / (\text{expected variation})$. The expected variation is based on the overall occurrence in the general population of participants of a particular demographic and the found variation is that same demographic in the sub-set of those who were affected by the exposure to the brochure and realized a change of attitude.

The subquestion was: Do factors such as age, educational level of the mother, income and level of smoking affect how the mother perceives and responds to current educational material? The results of the study determined the null hypothesis to be accepted. There will be no significant relationship between age, educational level of the mother, level of smoking, the income level and mother's perception of the educational materials.

The specific outcome of the secondary research question with relationship to the null hypothesis being accepted is when the F ratio is expected to be about 1.

With regards to age and affected change in attitude, almost all of those affected with an attitude change were 18-35 which is inclusive of the two most prevalent age groups of participants who typically had at least some college experience. When compared to the overall ratio of participants the F ratio for the age group including individuals who are in the sub-set 18-24 years old, the F ratio is .5 which does not support the null hypothesis. Additionally, the F ratio for the next sub-set, individuals in the 25-35 the F ratio is .9 which does support the null hypothesis which is that there will

be no significant relationship between age, educational level of the mother, level of smoking, income level and the mother's perception of the educational materials.

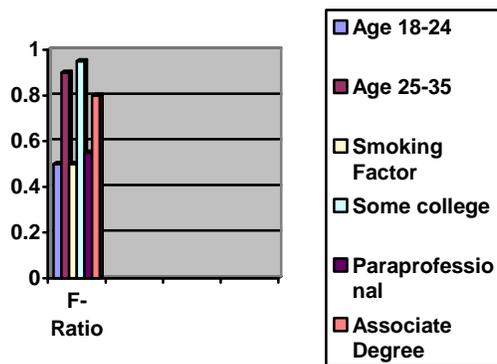
When considering the second demographic, if the participant considers herself to be a smoker or nonsmoker, and correlating this factor with affected change in attitude, the F factor is .5 which does not support the null hypothesis. When considering all the factors concurrently, the factor of being a smoker or non-smoker does not completely support the null hypothesis, that there is no significant relationship between the demographics of the participants and their perception of the educational materials. With regards to the subquestion and smoking level, the support of the alternative hypothesis, there will a significant relationship between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials, is minimal.

Educational level was also a considered demographic with regards to the secondary research question. For those individuals who have some college and had a change in attitude based on the exposure to the brochure the F ratio is .95 which does support the null hypothesis. For those who have a high school diploma the F ratio is .55 and for those who have a paraprofessional certificate the F ratio is also .55 which does not support the null hypothesis. The F ratio for the other sub-set with relationship to education is for those who have an Associate Degree, and that ratio also indicates that it does not support the null hypothesis at .8. Thus the null hypothesis, which is that there will be no significant relationship between age, educational level of the mother, level of

smoking, the income level and the mother's perception of the educational materials, was accepted.

The last demographic indicator was income. For those participants whose attitude was changed and were in the lowest income group the F ratio is .5. For those in the income group that is below the medium income for the local area, but not in poverty, the F ratio is .7 and for those who are in the medium income level the F ratio is .9. There were no individuals in the highest income group that had an affected change in attitude.

When considering the overall demographic relationship to change in attitude or achievement there is not significant evidence that age, education level or income had a correlation to the change in attitude, although the factor of whether the participant smokes or not does appear to have a correlation to the change in attitude. Thus the null hypothesis, there will be no significant relationship between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials, is primarily accepted. The figure below summarizes some of the conditions stated in the preceding paragraphs that indicate the null hypothesis is not supported with the understanding that in order for the null hypothesis to be supported the F ratio is expected to be about 1.



This figure show a variety of demographics with relationship to change.

As noted above, none of the factors indicate an F ratio of 1, although some are close.

Further study, with regards to the demographic focus is recommended. Research targeting certain demographic groups may yield a different outcome to the secondary research question, when compared to this study group.

Conclusion

In conclusion, the following analyses were interpreted from the data gained through the study. With regards to the primary research question it has been determined that the alternative hypothesis is true. When educational materials are presented to mothers, they are effective in changing their attitudes towards smoking during pregnancy. With regards to the subquestion it has been determined that there is no significant relationship between the demographic factors of age, income, and education and change in attitude, thus the null hypothesis is true, that there is no significant relationship

between age, education level, level of smoking, income level and the effectiveness of changing attitude when exposed to education materials.

Chapter 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Overview

Children may be affected by prenatal exposure to tobacco smoke. Although there are educational efforts to discourage pregnant women from smoking, the practice continues in a significant number of pregnancies. Depending on the source of the data, it is considered that in 10-25% of pregnancies the mother does smoke (CDHS, 2005, Eliot, 1999). This makes prenatal exposure to maternal smoking the most prevalent toxic exposure during fetal development (DiFranza, 2004). The purpose of this study was to evaluate the effectiveness of parent education materials on changing maternal smoking attitudes. The results shown by the study is that parent education materials do have an affect on changing attitudes towards maternal smoking during pregnancy.

The study was completed by using a pretest-posttest method using surveys and presenting participants with an educational brochure that outlined the behavioral, developmental and mental health outcomes to the child of a mother who smokes during pregnancy. The primary question to be answered was: If educational methods are affective in changing attitudes towards smoking during pregnancy and if demographic factors such as age and education affect if an individual will have an affective change in attitude?

The findings of the study were that the affect to the participants was to change their attitude towards smoking during pregnancy through the use of educational materials but demographic factors did not appear to have an affect on who had an attitude change.

Interpretation of Findings

In considering the primary research question: Are educational materials presented to mothers effective in changing their attitudes towards smoking during pregnancy? As discussed in chapter 4, the findings showed that attitudes towards maternal smoking during pregnancy can be changed with education. Whether this translates into action that elevates the behavior, is up to what action the individual with the attitude change takes. When considering the adult learning theory of Knowles (1950), the characteristics of adult learners is key to ensuring a successful outcome to this educational endeavor, whether these participants and others who subsequently will be exposed to this educational brochure will not only change their attitude towards maternal smoking during pregnancy but also will take action as a result of this learning. Factors in the adult learning theory that related to this study were first, the researcher considered when preparing the materials used in the study that the participants would be motivated in their actions to do what is best for their child, and secondly that the participants brought to the study some precursor knowledge of both child development and of the outcomes of smoking is generally unhealthy. The factor of respecting that adults should have control over their own learning, by allowing independent access and self-direction, was also part

of this study's reflection of the adult learning theory. In the adult learning theory the first characteristic of learners is that they need to be allowed to direct themselves.

For this study and the subsequent learners, autonomy was the key. They were allowed to take and use the brochure as they see fit. Their perspectives on what they learn were important to how they use the information. Allowing them to focus on the elements of the topic that are important to them was also essential to adult learning. Another aspect of adult learning that was provided in this study and also available to subsequent learners is that it capitalized on a knowledge base that the participant already has. Adult learners come to learning with this base that needs to be accepted and built upon. This project gave the participants a worthwhile objective to also further motivate their change in attitude which is the protection of young children from a harmful substance. Thus a purpose and motivation was established early on in the study and in the brochure (Knowles, 1991).

With regards to the primary research question, considering the responses of the participants in relationship to their initial responses on the pre-test and their responses on the post-test after being exposed to the educational brochure, there were only three of the 80 participants who indicated that they felt, at some level, that harm did not befall a child who was exposed to cigarette smoke during pregnancy. The participant attitude change, those who did not feel there was harm from maternal smoking prior to their exposure to the brochure and then did feel there was harm after exposure to the brochure amounted to a significantly higher population of individuals. Participants were over three-times more likely to change their attitude after exposure to the brochure. The factor of the participant

attitude change among this group of 80 individuals showed that the alternative hypothesis which was; There will be a significant difference between not having exposure to and having exposure to educational materials on attitude to maternal smoking, is accepted.

The outcome to the secondary research question is that the null hypothesis appears to be true. There will be no significant relationship between age, educational level of the mother, level of smoking, the income level and the mother's perception of educational materials. This means, at least with reference to this study's participants, demographic factors did not influence the affect of exposure to the education brochure. There are no significant indicators, defined as an F-ratio being at least one when the factors are compared to the overall demographics of the group that any of the participant demographics appear to have an affect on how their attitudes change after exposure to the educational materials.

Implications for Social Change

Following the study, several of the participants did seek out the researcher to discuss the topic. Those that did appear to be motivated and influenced by what they had learned. Many were adamant to share the brochure with others, whom they felt needed the information. The contribution to society that this study provided was the evaluation of whether education methods are successful in changing attitudes towards maternal smoking during pregnancy. The education is intended to alleviate fetal exposure to the toxins in cigarette smoke. If only one child is protected from this toxic exposure, the

value of the study is extensive but the desired outcome is to have a wide-spread positive change due to the participants sharing the information they gained with others.

Additionally, by making available the brochure on a more widespread basis, the affect could be more prevalent.

Society is affected by the difficulties of the individual. Special services are often needed for individuals who have special needs. Educators and other professionals strive to assist these individuals in achieving their optimum potential. The ultimate goal of society should be that each individual begins his or her life as whole, strong and as capable as possible.

Through the use of education to change the attitudes of individuals and also help them gain knowledge as to the behavioral, mental health and educational outcomes to a child of a mother who smokes during pregnancy, this study hoped to influence social change by allowing children to begin life in the best possible condition ready to develop, learn and become productive members of society. It is also the hope that because of this positive outcome to a healthy prenatal environment, future citizens will have mental functions that are keen and able, rather than challenged and disabled. This change can have an extensive affect on the future of humanity supporting the developmental growth of healthy individuals are free to discover, invent and meet the challenges of the world. This change would begin at the community level with distribution of educational brochures.

Recommendation for Action

The next steps for action are already in place, as those who participated in the study share their new knowledge with coworkers, friends, and family. The education brochure used in the study will be distributed to local community resources, as well as in other early childhood programs serving families. The information contained in the study brochure is not only important to families but also to those who care for families, such as medical practitioners and educators. An outcome to this study, through the action and assistance of community partnerships that is the brochure will be available to the general public. Many pregnant mothers and potentially pregnant mothers will be exposed to the knowledge that their actions during pregnancy with regards to smoking not only have a short-term affect on their child but have long-term developmental outcomes.

Recommendation for Further Study

As indicated, there was little evidence within this participant group that demographics such as age, education and income level have an affect on attitude change. The researcher suspects that by using a more targeted group of individuals with specific demographics that more influence for change can occur. The participant group for this study may have been too homogenous with regards to the demographics since it did not include many participants in the lower age or education demographic. Further study is recommended, not necessarily using new questions but to target specific groups of participants such as those who are in lower income brackets, have less than a high school

education and are in the younger age brackets. This targeting may yield a higher level of change in attitude.

A second study could also be done using the original participants, targeting those who specifically indicated that they are smokers. This secondary study could track if those individuals who were affected by an attitude change, would also show a behavior change should they become pregnant.

Conclusion

Allowing children to begin life with the healthiest mind and body possible should be a goal for all. Educators need to understand the consequences to children of toxic exposure so that they can not only recognize and assist children in reaching developmental goals but also can aid families in changing behaviors that have these devastating outcomes to a child's mental, developmental, behavioral and academic health. Along with providing intervention, educators need to also focus on prevention. As early childhood advocates early educators should support optimal developmental conditions for all students which begins at conception. A focus of this dissertation was the behavioral outcomes of prenatal exposure to maternal smoking, although it is recognized that serious physiological outcomes do affect behavior. Some of the behavioral and mental problems are linked to nicotine exposure (Chamberlain, 1994). It is suspected that nicotine causes neural damage because it binds to one class of neurotransmitters. Most neurotransmitters act to promote the growth of brain cells, in addition to their role in synaptic communication. Exposure in utero to nicotine interferes with the neurotransmitters' signals. This is attributed to the child's later behavioral

problems such as attention deficits and altered arousal states (Eliot, 1999). Preventing the devastating long-term affects to the brain, and therefore preventing behavioral, learning and mental disabilities that even the very young can suffer from as a result of their mothers smoking during pregnancy has been the goal of this study.

The cost to society in loss of individual potential and in the need to provide intervention and support to those affected by a toxic prenatal environment is high, and the cost to the individual child is even higher. By changing the attitudes of individuals within a society towards maternal smoking behaviors, the hope is that societal pressure, along with the goal to give our children the best possible beginning to life, will provide future generations the potential for optimal growth and development.

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Appendix A: PowerPoint Attachment

Appendix B

SURVEY 1*Survey 1: page 1 of 3*

Demographic Information:

Please indicate your current age. Mark one choice.

- A. Under 18 years.
- B. 18-24 years.
- C. 25-35 years.
- D. 36-46 years.
- E. 47 years or older.

Would you consider yourself? (Please mark one choice.)

- A. A light smoker (1-10 cigarettes a day).
- B. A moderate smoker (10-20 cigarettes a day).
- C. A heavy smoker (20+ cigarettes a day).
- D. An occasional smoker (every once in a while).
- E. A non-smoker.

What is the highest grade you completed? (Please mark one choice.)

- A. less than junior high school completion.
- B. completed junior high school.
- C. some high school.
- D. high school graduate.
- E. some technical school/ some college.
- F. earned a technical or paraprofessional certificate (CNA, CDA, etc.)
- G. Associate's Degree (AA, ATA, etc.)
- H. Bachelor's Degree (BA, BS, B.Ed., etc.)
- I. Master's Degree (MA, MS, M.Ed., etc.)
- J. Professional Post-Graduate Degree (MD, DDS, Ph.D, JD, Ed.D, etc.)

What do you estimate is your total household income?

- A. Less than \$30,000 per year.
- B. Between \$30,000 and \$50,000 per year.
- C. Between \$50,000 and \$64,000 per year.
- D. Over \$64,000 per year.

Survey 1: page 2 of 3

Please respond to the following questions by selecting 'yes' or 'no' to each question. Some questions are similar to others. If you are having difficulty and would like a question explained further, please don't hesitate to ask the research assistant.

1. If you were pregnant or planning on becoming pregnant, would you be likely to cut down on the number of cigarettes you smoke?

- yes
- no

2. If you were pregnant or planning on becoming pregnant, would you be likely to discontinue smoking?

- yes
- no

3. Do you feel it is the mother's choice and right to smoke during pregnancy?

- yes
- no

4. Do you feel that mothers who smoke during pregnancy cause physical harm to their unborn child?

- yes
- no

5. Do you feel that smoking during pregnancy has an effect on the child's learning?

- yes
- no

6. Do you feel that smoking during pregnancy has an effect on the child's behavior?

- yes
- no

7. Do you feel that smoking during pregnancy has an effect on the child's learning in school?

- yes
- no

8. Do you feel that smoking during pregnancy has any long-term developmental effects on the child?

- yes
- no

You are finished with the first part of the survey. Please place it in the bin provided. The second part of the survey is available from the researcher. Please ensure the second part of your survey is coded with the same number as the first part.

SURVEY 2*Survey 2: page 1 of 2*

Please read the brochure provided with this survey and respond to the following questions.

1. Does this brochure contain any information that you were not aware of prior to looking at this brochure?

- yes
- no

2. If you were pregnant or planning on becoming pregnant, would you be likely to cut down on the number of cigarettes you smoke?

- yes
- no

3. If you were pregnant or planning on becoming pregnant, would you be likely to discontinue smoking?

- yes
- no

4. Do you feel it is the mother's choice and right to smoke during pregnancy?

- yes
- no

5. Do you feel that mothers who smoke during pregnancy cause physical harm to their unborn child?

- yes
- no

6. Do you feel that smoking during pregnancy has an effect on the child's learning?

- yes
- no

Survey 2: page 2 of 2

7. Do you feel that smoking during pregnancy has an effect on the child's behavior?

- yes
- no

8. Do you feel that smoking during pregnancy has an effect on the child's learning in school?

- yes
- no

9. Do you feel that smoking during pregnancy has any long-term developmental effects on the child?

- yes
- no

Please return this survey in the bin provided.
Thank you for your participation in this study.

Dear Parent,

Thank you for your interest in taking part in this study. The study is one of the final steps in my doctoral program. It will give important facts on how well parent education brochures work.

It will take you about 20 minutes to complete the two surveys. First you will fill in some information about yourself and attitudes toward certain behaviors. After you are finished return the survey and flyer to me. Then, I will give you the second survey and another flyer to read. There are only a few questions. If you need help, please ask. I can explain what a question means. When you are finished, the surveys will be placed in a bin.

Your name will not be on the survey. There will be a number in the upper right corner of your two surveys. The same number will be used each time. In the study your name will not be used.

There is no physical risk to you but some people may be upset because of some of the information in the brochure. The brochure contains only child related information. If you do feel stress, you will be able to quit if you want to.

As a thank-you, you will get a gift card to Fred Meyer's after you hand in both surveys.

- The researcher for this program is Angela Lebedev
- Angela's faculty advisor is Dr. Maryanne Longo.
- You may contact her by email maryanne.longo@waldenu.edu or telephone (1-856-437-6387).
- The Research Participant Advocate at Walden University is Leilani Endicott (1-800-925-3368 X 1210).

Please read and sign below. Return this letter with your survey. I will make you a copy of this letter. Thank you for helping me do this study.

Sincerely,

Angela Lebedev

Please sign: I consent to participate in this study and for my survey responses to be used.

Signature _____ Date _____
Curriculum Vitae

Angela E. L. Lebedev
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Education:

Ph. D. 2000-Present University	Early Childhood Education (Anticipate graduation 2008)	Walden
M. Ed. 1995-1998 University	Early Childhood Education	Cameron
B. S. 1981-1985 University	Education: Major, Music	Indiana State

Experience:

Children and Youth Services/ Child Development Services- 1701 Series
 Department of Defense
 March 1993 to Present

3/93 to 2/98 Department of the Army Children and Youth Services
 1993-1994 School Age Program Director (GS07)
 1994-1996 Child Development Center Assistant Director (GS07)
 1996-1998 Training and Curriculum Specialist (GS09)

2/98 to Present Department of the Navy Child Development Services
 1998-1999 Child Development Center Director (GS09)
 1999-Present Training and Curriculum Specialist (GS09)