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A study examining the importance of early intervention on premature development

Suzanne F. Appleby

Rowan University

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A STUDY EXAMINING THE IMPORTANCE OF EARLY INTERVENTION ON PREMATURE DEVELOPMENT

by
Suzanne F. Appleby

A Thesis
Submitted in partial fulfillment of the requirements of the Master of Arts Degree of The Graduate School at Rowan University April 18, 2000

Approved by ___________________________ Professor

Date Approved 5/4/00
Every year, thousands of babies are born prematurely or at low birth weight. As a result, many of these children are confronted with health and developmental issues. The purpose of this study was to examine the importance of early intervention on premature development. It was hypothesized that premature children, who were initially denied early intervention services, would eventually be in need of services at a later time, and these children would be in need more than full-term children. The present study consisted of a sample of fifty-four children: twenty-seven pre-term and twenty-seven full-term. The subjects were collected from the Child Development Center in Southern New Jersey. All children were initially denied early intervention services. The variables collected in the study include: date of birth, gender, race, prenatal care, complications during pregnancy, reasons for denial into intervention program, and a follow-up. Results indicated a significant correlation between gestational weeks and follow-up. The null hypothesis was rejected, as the study revealed that premature children were not only in need for services, but in need more than full-term children.
MINI-ABSTRACT

Suzanne F. Appleby
A Study Examining the Importance of Early Intervention on Premature Development
2000
Dr. Roberta Dihoff
Dr. John Klanderman
School Psychology Program

Every year, thousands of babies are born prematurely or at low birth weight. As a result, many of these children are confronted with health and developmental issues. The purpose of this study was to examine the importance of early intervention on premature development. The results of this study reveal that premature children, who are initially denied early intervention, are not only in need of these services later, but are in need more than full-term children.
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On a personal note, I would like to give special thanks to my family and fiancé, Darrin Pulman, who have provided invaluable emotional support.
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CHAPTER I.
INTRODUCTION

Need

Due to the increase of developmental and financial implications on prematurity, it’s incumbent of psychologists, and society, to better understand the importance of early intervention. Nearly one in fourteen infants are born prematurely in the United States and in 7.3% of all births, infants weigh less than five and a half pounds (Berk, 1997). Pre-term birth can result from many factors. Some of these causes include mother’s lifestyle (smoking, use of alcohol/drugs, poor nutrition, stress, poor prenatal care), hormonal imbalances, abnormalities of internal organs or structures and chronic illness or infection. Prematurity seems to be most prevalent among poverty-stricken ethnic minorities. Children reared in severely deprived homes “show delays in early motor milestones, engage in immature play, and are overly fearful of new situations that present attractive opportunities for exploration (Berk, 1997).” These children will eventually catch up in motor functioning; however, their mental development will remain considerably behind throughout their life.

Early Intervention Programs attempt to assist children with developmental delays or disabilities through the use of therapy. Psychologists use many tools in assessing and determining a child’s eligibility for early intervention services. If the outcome of the assessment yields a consistency between the functioning level of the child and their age (or adjusted age), then services are denied. Prediction of future developmental delays is
impossible and many children, especially premature children, who are denied services, may show adverse effects later in life. These effects may include slowed development, learning disabilities, behavior disorders, lower IQ scores, and/or problems with physical coordination (Feldman, 1999). It is important to understand the necessity of early intervention in the developing child.

**Purpose**

“Every year in the United States, over 400,000 babies are born prematurely or at a low birth weight (AAPI, 1998-1990).” As a result, many of these children are confronted with health and developmental issues. Early intervention services provide quality support to families in meeting the needs of children, age birth to three years, who have delays or disabilities. The purpose of this study is to examine the importance of early intervention on premature development.

**Hypotheses**

Since developmental delays are not always predictable in early development, it is believed that many children do not receive the necessary treatment for achieving to their highest potential. It is hypothesized that premature children who were initially denied early intervention services, will eventually need some kind of intervention at a later time. It is also hypothesized that premature children will be in more need of early intervention than full-term children.
Theory/Background

There are several research studies regarding the development of the brain and cognitive abilities. The newest research suggests that “a child’s brain grows up to 90% of its adult capacity within the first three years of life, and that brain patterns created during these early years affect individuals throughout their life (Permanente, 1999).” It is now becoming largely recognized that the first three years of life are the most important developmentally.

By the time a child is born, they will have about one hundred billion brain cells. The connections between the cells occur within the first three years of life, determining the emotional, social and intellectual nature of the child. The network of connections between cells is referred to as the “wiring” of the brain. Although brain development is mostly pre-determined genetically, the continual activation of new connections is also a result of outside stimulation. Stimulation is necessary and essential for establishing healthy brain development. By the time a child reaches age three, the brain has formed one hundred trillion connections (twice as many as an adult); however, around age eleven, the brain begins its elimination of unused connections. This “getting rid of” process leads to a more efficient system (Permanente, 1999).

The importance of care giving in brain development is also being considered a significant element in the development of a healthy brain. Experiences shared between child and caregivers are considered part of this “outside stimulus.” If a child is provided with consistent and responsive care giving, the effect on development will be positive. Recent research suggests that a child that is deprived of stimulation will result in brain
development that is twenty to thirty percent smaller than a highly stimulated child (Feldman, 1999). Environment is very influential on the processes of growth.

New Jersey Intervention Services

In 1975, the U.S. Congress passed the Individuals with Disabilities Education Act (IDEA), the first major legislation that requires special education for all school-aged children with disabilities. In 1986, Public Law 99-457 was passed as an extension to IDEA mandating, for states that choose to participate, family centered early intervention services for infants and toddlers with disabilities, from birth to three years of age. This law also recognizes that young children depend on their families for care; therefore, if the child is to be helped, the family must also be helped as well. These services, which include evaluation and assessment, service coordination, and the development, review and evaluation of individualized educational plans, are to be provided to eligible children and their families at public expense.

To determine eligibility, a developmental delay is defined as a delay of thirty-three percent (33%) in one and/or twenty-five percent (25%) in two or more developmental areas. The areas of concern for developmental delay are: physical (gross and fine motor, sensory), cognitive, communication, social/emotional, and adaptive skills. For infants born before thirty-eight weeks gestation, percentages are calculated based on corrected age. The corrected age is based on a forty-week pregnancy term. To prevent any form of discrimination in the procedure of determining eligibility, evaluation materials are administered in the native language of the parents. Translators and/or interpreters are provided when necessary.
When a child is considered eligible, developmental services are provided by a multidisciplinary team of specialized professionals. These services are designed in the form of an Individualized Family Service Plan (IFSP). The IFSP is a document that identifies the family’s strengths and needs in relation to the child’s development. This plan states the goals for the child, family, and team of professionals to work toward. An IFSP is usually conducted in the natural environment for many reasons. The most important reason is to provide support for the family and the child in the real places where they need to use their developing skills. An IFSP may be conducted in a short time of one hour per week, or as long as a couple hours a few times per week. The amount of services is strictly dependent upon the individual’s need for the services. Children receiving these services are periodically evaluated to determine progression. When the child appears to be functioning age appropriately, services will then be terminated.

**Definitions**

*Prematurity*- refers to the birth of a baby, three or more weeks before the end of a full term 40-week pregnancy. This term also applies to any child who is born weighing less than five and a half pounds, or 2,500 grams.

*Early Intervention*- refers to the planning and delivery of family-centered early childhood developmental therapy. Children are assessed in the major developmental areas: gross motor, fine motor, communication, sensory, cognitive, social-emotional, self-help and feeding. If performance is lacking in any of these
areas, services are recommended and rendered to aid in progression. The services are a collaborative effort involving family and professionals.

*Adjusted Age*—children born prematurely are given the opportunity to "catch up" developmentally, they are not held accountable for the early birth. Instead, their age is adjusted as if they were really born on their due date. For example, if a child is born two months premature and is currently six months old, he would be expected to perform on the level of a four-month old child.

*Apgar Score*—a quick method of assessing the clinical status of a newborn infant. It is comprised of five components: heart rate, respiratory effort, muscle tone, reflex irritability, and color.

**Assumptions**

In performing research, it is important to recognize and acknowledge the assumptions made by the researcher. It is assumed that there will be a consistency of the environment, consistency of the psychological evaluations in determining the need for services, and an accuracy of the data within the records.

**Limitations**

A limitation of this study was the size and number of the sample. The sample only consisted of twenty-seven premature children and twenty-seven full-term children. The size of this sample was the result of another limitation, accessibility. Many of the children that were referred to the Child Development Center were in foster care. In performing the follow-up study, it was difficult to trace the foster children who had
relocated without a forwarding address and phone number. Some of the subjects had to be discarded as part of the study because of this reason.

**Overview**

In the following chapter, literature that is relevant and significant to this research is reviewed. The previously conducted studies support the importance of this research study. The succeeding chapters further discuss the design of the study, analysis of the collected results, and a summary/conclusions of the entire research study followed by a discussion.
CHAPTER II.
LITERATURE REVIEW

The literature review section is designed to examine and discuss former research. There are several pertinent issues to explore within prematurity: factors that may contribute to premature birth, outcomes of prematurity, and the effectiveness of early intervention. Although there are many more issues that are recognized, the ones listed will be discussed because of their relevance to this study.

FACTORS THAT MAY CONTRIBUTE TO PREMATURE BIRTH

Prenatal Care involves several elements. The care of the pregnant woman is very important to maintain good health. In some cases, women develop complications during pregnancy; therefore, it is necessary to continue check-up visits. There are many potential hazards that can be minimized with treatment. Prenatal care provides an opportunity for the mother to learn how to take care of herself, what to expect during delivery, and how to take care of her new baby.

Many factors influence the quality of prenatal care and the benefits reaped from it. The pregnant body goes through a series of adjustments, which requires changes in habits. For example, nutritional (Battaglia and Thureen, 1998) and sleep/rest requirements increase during pregnancy. There are also habits that will need to cease with pregnancy. Some of these habits include the use of alcohol (a teratogenic, causing developmental malformations in the fetus), smoking tobacco (lowers birth weight of fetus...
and is associated with several negative effects, such as Sudden Infant Death Syndrome and miscarriage), illegal drug abuse (will result in a range of developmental malformations in the growing fetus and can lead to several handicaps), caffeine (may result in low birth weight of the fetus), and over-the-counter medications (may affect fetal development).

**Effects of Substance Abuse**

Susan Anderson (1994) researched the effects of drug abuse on neonates. Anderson defines this abuse as, "continued use despite recognition of a persistent or recurrent social, occupational, psychological, or physical problem that is caused or exacerbated by the use of [a] psychoactive substance." In this research, the prevalence of substance abuse among pregnant women was carefully examined. According to the National Institute of Drug Abuse Statistics, Anderson cites that between ten and twenty-four percent of all pregnancies, in 1992, involved drug and alcohol abuse.

Anderson found that the effects of substance abuse on neonates might result in three possible problems: neurobehavioral changes, congenital abnormalities, and neonatal and infant medical complications. Alcohol contributes to a decrease in birth weight, facial anomalies (for example, an elongated face), problems with the central nervous system (mental retardation, attention deficit, behavioral disruption, withdrawal symptoms, etc.), irritability, cardiac anomalies, joint defects, and genital anomalies. These are just a few examples of possible outcomes of alcohol abuse. Drug abuse can cause cardiac anomalies, intrauterine growth retardation, decrease in birth weight, smaller head sizes, cerebral infarction, sudden infant death syndrome, decreased motor
development, abnormal defects of the brain, problems with eating and sleeping, and even sometimes results in death.

Anderson then discusses how substance abuse can cause pre-term labor. The premature infant born to a substance-abusing mother will develop some degree of respiratory distress syndrome. This syndrome then creates a rippling effect within the whole respiratory system, resulting in respiratory failure. The infant must then be subjected to several different forms of treatment to improve their health status.

The physical and neurological effects associated with drug-affected infants usually leads to longer hospital stays. The University Medical Center in Florida (Chiu, Vaughn, Carzoli, 1990) conducted a study that was specific to drug-exposed infants. This Medical Center is the only facility that cares for the population in Jacksonville, Florida. Ninety percent of the hospital’s five thousand births are from lower socioeconomic status. The findings indicated that two hundred and seven infants, out of five thousand thirty six, were born to cocaine-abusing mothers. Twenty-five of the two hundred and seven went to the neonatal intensive care unit, while one hundred and eighty two went to the normal nursery. The average stay in the normal nursery for babies of cocaine-abusing mothers was six to seven days, in compared to the average two to three day stay of a normal healthy baby. Forty-five percent of the hospital days for babies subjected to cocaine were due to a social hold (the baby remained there until an investigation was completed to determine home placement.

The total hospital bills consisted of room, physician, laboratory, radiology, and pharmacy charges. The cocaine-affected infants’ bills in the normal nursery averaged $1225, in comparison to the bill for normal newborns $424. The one hundred and eighty
two cocaine-affected infants were admitted to the normal nursery and had bills exceeding $145,782 for one year. The average stay of babies admitted into the neonatal intensive care unit was 21.5 days. The average cost of the cocaine-affected baby was $36,481, for a total of $912,025. It is obvious through this study that there are many financial implications concerning drug abuse during pregnancy. Parental education was offered as a possible solution to this economic impact.

Kelley, Walsh, and Thompson (1991) studied birth outcomes, health problems, and neglect with prenatal exposure to cocaine. Thirty children who were exposed prenatally to cocaine were compared to thirty children who were not exposed. It was found that cocaine-exposed infants were more likely to have mothers who received inadequate prenatal care, have adverse birth outcomes including prematurity and retarded intrauterine growth, and have health problems beyond the newborn period including small stature and hypertonia. More cocaine-exposed children were placed in foster homes due to maternal neglect.

McDonald, Armstrong, and Sloan (1992) analyzed data from a survey of occupational and other factors in pregnancy to assess the effects of cigarette, alcohol, and coffee consumption on pregnancy outcome. The risk of low birth weight for gestational age was found to increase significantly with smoking. Occasional consumers of alcohol had a slightly reduced risk relative to total abstinence. Risks also increased slightly with coffee consumption.
Effects of Prenatal Care

Hulsey, Patrick, Alexander, and Ebeling (1991) studied prenatal care and prematurity to determine if there was an association between the two. In their study, they examined patterns of prenatal care and the outcomes of pregnancy in 6,176 pregnancies. They used a logistic regression procedure to control for differences in each individual prenatal care case (i.e. mother's age, marital status, race, education, and method of payment). The results of this study suggest that prenatal care was associated with significant reductions in the number of premature or low birth-weight children born. There were fewer infants born prematurely to mothers who received prenatal care versus mothers who received no prenatal care. This data concludes that there is a direct benefit of prenatal care in the delivery of a healthy newborn.

Nesbitt, Connell, Hart, and Rosenblatt (1990) studied accessibility to obstetric care units in rural areas. In this study, hospital discharge data from 33 rural hospital service areas in Washington State were categorized by the extent to which patients left their local communities for obstetrical care. Results indicated that women from communities with relatively few obstetrical providers, in proportion to number of births, were less likely to deliver in their local community hospitals than women in rural community hospitals with greater numbers of physicians, in proportion to number of births. Women who were less likely to deliver within their community experienced a greater proportion of complicated deliveries, higher rates of prematurity, and higher costs of prenatal care than women who delivered in their local hospital.
**Effects of Physical Activity**

Pivarnik (1998) examined previously conducted research in the potential effects of maternal physical activity on birth weight. The amount of physical activity was critically examined in terms of both occupational and leisure. Prior studies have yielded the conclusion that physical activity is related to unfavorable birth outcomes. Results of the relationship between leisure time physical activity and birth weight are mixed. Evidence indicates that participation in moderate to vigorous activity throughout pregnancy will increase birth weight, while more severe regimens will decrease birth weight. It was concluded that further research on caloric balance along with physical activity should be researched in order to achieve more accurate results. The relationship between calorie consumption and expended energy will help to determine whether physical activity has an affect on birth outcome.

**Effects of Poverty**

Since prematurity seems to be most prevalent among poverty-stricken families, it is necessary to include research on the effects of poverty. For example, “mothers who have low socioeconomic status (SES) are more likely to give birth to a low birth weight premature infant, resulting in a double hazard: as low birth weight infants are at heightened risk for mental retardation due to attentional and motoric sequelae associated with prematurity as from poor quality parent-infant relationships (Escalona, 1982).” Watson, Kirby, Kelleher, and Bradley (1996) investigated the relationship between poverty on the home environment. Twenty percent of children in the United States live in poverty (Hernandez, 1993) and there are an increasing number of infants that survive
the neonatal period, this study was aimed at understanding how poverty contributes to developmental challenges.

The subjects in this study were taken from a previous study. In the previous study, low-birth weight premature infants were enrolled in the Infant Health and Development Program (IHDP). The infants that were in the control group and did not receive intervention were used for this study to avoid any confounding intervention effects. Poverty was based on household income: $7,500 for families of two, $15,000 for families of four, five or six, and $25,000 for families of eight or more. If the families were below these levels, they were considered to be living in poverty. They were then separated into two groups, the experimental (chronically poor) and the control group (non-poor).

Cognitive and behavioral assessments were performed at regular intervals throughout the study. Home visits were made and the quality of parenting and the environment were assessed. Intellectual functioning was determined using the Bayley Scales for Infant Development. Child temperament was assessed using the Bates Infant Characteristic Questionnaire. The Home Observation for Measurement of the Environment (HOME) Inventory was designed to assess the quantity of cognitive, social, and emotional support that was available to the child.

The results found that cognitive, behavioral, and HOME scores were significantly lower for the chronically poor sample. This indicated that poverty was affecting more than just parenting, but also the care-giving environment. In this study, poor children were being reared in less stimulating and responsive environments. Watson, Kirby, Kelleher, and Bradley confirm the assumption that poverty has a direct effect on
development. They propose that poor families are less able to provide stimulating environments and adequate nurturance because of poverty.

Bradley, Whiteside, Mundfrom, Casey, and Kelleher, and Pope (1994) examined the contribution of early intervention and early care-giving experiences to resilience in low-birth weight, premature children living in poverty. In their study, they found that premature (LBW) children born into poverty have a poor prognosis of functioning within normal ranges in all domains of development. However, those reared in a more structured setting and participated in intervention, more often showed early signs of resiliency. Brooks-Gunn, Klebanov, and Liaw (1995) examined the learning, physical, and emotional environment of the home in the context of poverty. In their study, they found that poor families experienced more multiple risk factors and lower HOME scores. Early intervention services were associated with higher learning scores; however, physical and emotional environment scores stayed the same. It can be concluded from these research findings that poverty and the environment are significant in contributing negatively in early development.

OUTCOMES OF PREMATURITY

There are many problems that may result from premature birth. Some common developmental problems include: developmental delay, cerebral palsy, growth issues, sensory impairment (vision, hearing, touch), mental retardation, learning disabilities, and behavioral challenges (feeding, sleep, attention problems). Studies on the effects of premature birth on children's physical, cognitive, and academic performance have consistently found that many prematurely born children are at a significant disadvantage
compared to their full-term counterparts (Barrera, Rosenbaum, and Cunningham, 1986, 1987; Siegel, 1982).

Saigal (1995) reviews the long-term outcome of very low birth weight infants in kindergarten and beyond. This article addresses the outcome on the dimensions of health status, growth, emotional and behavioral status, cognitive abilities, and school achievement. The paper concludes that premature children become more resilient to chronic illness as they age, in comparison with the recurrent illness in infancy. As these children enter school they remain on the somewhat smaller side in terms of growth, tend to have lower IQ’s and a higher than normal occurrence of attentional and academic difficulties. Saigal emphasizes that most premature children are in need of additional educational intervention in the long-term.

**Effects on Cognitive Development**

"The Center for Disease Control and Prevention estimated that over 300,000 individuals in the United States, under age 21, are so poorly developed cognitively as to have mental retardation (IQ<70) that could have been prevented through early and continuing intervention (Ramey, 1998)." Ramey and Ramey (1998) designed a research study attempting to improve cognitive development through the use of early intervention. They hypothesized that provision of theoretically critical experiences can potentially prevent progressive cognitive delay.

Three different intervention strategies were assessed by assigning children randomly, to an experimental or control group. The intervention programs were the Abecedarian Project and Project CARE. These programs consist of multiple services that
include early childhood education, special instruction, family counseling, home visits, health and medical services. The philosophy of these programs is to provide individualized services to meet the needs of the children and their families.

The projects were the Abecedarian Project and Project Care. These randomized and controlled studies enrolled children at birth who were healthy, but came from very poor and undereducated families. The criterion for admission into these groups was a score indicating extreme risk on a high-risk index inventory. Children were then randomly assigned to one of two conditions, experimental or control groups. Children in the control group received pediatric follow-up services and were provided with unlimited iron-fortified formula. They were also entitled to social work services and home visits. The experimental, or intervention groups, received the same services; however, they also received an early childhood education program. This early childhood education program was the Infant Health and Development Program (IHDP).

Measures of cognitive and social functioning were collected at periodic intervals during the first three years of life, using the Bayley mental development indices (MDIs) and the Stanford-Binet IQ scores. In both programs, the Abecedarian and CARE, there is an increase in MDI/IQ for the children in the experimental group. This data was found significant at the \( P < 0.05 \). Consistent with this data and the randomized structure of this study, is the notion that early intervention has preventive power. Ramey and Ramey conclude by affirming the issue of early intervention and its efficacy. Intensive early intervention was found to have a meaningful and positive outcome.

The results found by Ramey and Ramey are similar to other findings that have researched prematurity and cognitive development. The work of Siegel (1984) was
concerned with the possibility of learning disabilities that might not emerge until the preschool years. Siegel suggested that one should not rely exclusively on intelligence scores in determining risk for school problems. He found that a majority of former preterm infants, later found to have learning difficulties and behavior problems, had normal IQ scores. It wasn’t until school age, that these disabilities emerged.

Brooks-Gunn, Klebanov, Liaw, and Spiker (1993) found significant results in their study, "Enhancing the development of low-birth weight, premature infants: Changes in cognition and behavior over the first three years." The Infant Health and Development Program (IHDP) was used to test the efficacy of educational and family support services, during the first three years of life, on reducing the incidence of developmental delay. Effects on the intervention of cognitive and behavior problem scores were examined during the three years. Significant intervention effects were seen on cognitive scores, and behavior problem scores were significantly lower for the intervention group. It can be determined from these research studies, that early intervention programs have a positive effect on cognitive development in premature children.

Findlay, and Lui (1991) studied sensorimotor profiles in very low birth weight infants at four months adjusted age. Several scales were used to determine appropriate performance: Uzgiris and Hunt Scales of Infant Sensorimotor Development, Visual Pursuit and Object Permanence Scale, Spatial Relations Scale, and the Schemes for Relating to Objects. Infants were low birth weight, 24 to 25 weeks gestation, and were without any major handicap. The findings suggest that low birth weight infants, without
any major handicap, are noted to develop later perceptual deficits particularly in visually medicated skills. These results call for further investigation.

Searight, and Handal (1986) reviewed research showing that premature birth is associated with a substantial increase of cognitive-developmental disorders as well as elevated rates of failure-to-thrive syndrome, child abuse, and sudden infant death syndrome. The data concludes that prematurity serves as an early warning signal for later dysfunction. Two forms of prevention are then discussed within this research. The first form of prevention would be emotional support and education for the parents, and the second, health care to prevent premature birth.

**Effects on Language Development**

Does prematurity negatively affect language development? This question has been researched for many years and has yet to provide a solid answer. Some studies have suggested that language development in premature children is delayed in comparison to full-term children, while other studies consider the delay to be mild, and therefore expected because of the prematurity.

Duncan, Schneider, and Robertson (1996) assessed the language skills of five to seven year old children who were born prematurely. The subjects consisted of forty premature children and forty full-term children. All children did not have any severe handicaps or impairments (such as: cerebral palsy, epilepsy, visual or sensorineural hearing impairments, or IQ scores less than one standard deviation below the mean). Subjects were matched for age, gender, and socioeconomic status. Four language tests were administered to determine any delays. The tests used were: The Bus Story, the
Action Picture Test, the Recalling Sentences subtest of the Clinical Evaluation of Language Fundamentals-Revised (CELF-R), and the expressive portion of the Northwestern Syntax Screening Test (NSST).

The results of this study revealed that the premature group scored significantly lower on all language measures, especially on sentence complexity and short-term memory for syntax skills being particularly weak. A higher percentage of premature children scored within the clinical range on all tests. These results suggest that language development is affected by premature birth.

Several studies have found similar results, suggesting that prematurity has adverse effects on language development. DeHirsch, Jansky, and Langford (1964) studied the oral language performance of premature children. Hubatch, Johnson, Kistler, Burns and Moneka (1985) researched early language abilities of high-risk children. Siegel (1994) studied the long-term prognosis of pre-term infants. Bailey and Wolery (1998) assessed infants and preschoolers with handicaps. In all of these studies, results indicated that language development is delayed in premature children. Many premature children have learning disabilities in perceptual and motor functioning, language and reading.

Other studies, on the other hand, have reached contradictory results. Aram, Hack, Hawkins, Weissman, and Borawski-Clark (1991) studied very low-birth weight children and speech and language development. They reported that language impairment is not more frequent in premature infants in comparison with full-term infants. Another position on the language issue holds that language developmental differences, if observed, do not persist beyond two to three years of age (Greenberg and Crnic, 1988).
It is clear that the studies previously mentioned, vary in terms of conclusions and results. With all of the standpoints on language development, it is necessary to continue research. One cannot simply make the assumption that prematurity negatively affects language development. For this reason, all positions on this issue were mentioned for consideration.

EFFECTIVENESS OF EARLY INTERVENTION

The effectiveness of early intervention strategies has been questioned to the extent of their reliability upon developmental progression. Research studies have addressed issues concerning sustained benefits of intervention, including those applied to premature and/or low birth weight children. Each school year, many children begin their educational exploration, unprepared in meeting the intellectual demands. This struggle can result in very low self-esteem and motivation, acceptance of failure. This has left many questioning the use of early intervention as a preventative measure.

Early Intervention as an Effective Tool

Berlin, Brooks-Gunn, McCarton, and McCormick (1998) examined early intervention in enhanced development. They state, “The first 3 years of human life comprise a longer period of immaturity and dependence than is experienced by any other species. At the same time, this period is characterized by rapid and dramatic physical and mental developments. These developments are increasingly being viewed as the principal building blocks of adult cognitive and emotional functioning.” Early
intervention programs attempt to respond to any risk factors that may contribute to developmental hindrance.

In their study, infants were categorized into two groups dependent on birth weight: lighter low birth weight children (less than 2,001 grams) and heavier low birth weight children (2,001-2,500 grams). These children were then randomly assigned into one of two groups: intervention group or follow-up only group. Children involved in the intervention group participated in the Infant Health and Development Program (IHDP). This program offers services from infancy to the adjusted age of three years. The IHDP involved home visits, child development center educational visits, and parent group sessions for the families.

Each child was assessed regularly in monthly intervals, including health/growth development and demographic information. Cognitive assessments were performed yearly, and socioemotional assessments were made between the ages of two and three years. Assessments continued after the program had ended for accuracy and consistency of the findings. There were three scales used to measure the cognitive development of these children: the Bayley Scales of Infant Development, the Stanford-Binet Intelligence Scale, and the Peabody Picture Vocabulary Test. The Richman-Graham Behavior Checklist and the Child Behavior Checklist were used to measure the child’s behavior throughout the study.

Using these scales, significant effects emerged for the children assigned to the intervention treatment group. Intervention group children scored significantly higher than the follow-up group children on IQ scores, and yet, further investigation amongst low birth weight children versus heavier low birth weight children, indicates that
intervention was favored consistently by the heavier birth weight children. On socioemotional development, parents of children in the intervention group reported fewer instances of behavioral problems than parents of follow-up children. Intervention children scored higher on task persistence, enthusiasm, competence and involvement.

According to this study, intervention played a noteworthy role within the family structure. There were fewer reports of depression by parents; employment was more likely and sustained longer periods of time. Changes in parenting were observed in terms of intellectual stimulation, warmth in the environment, and assistance in helping the child with problem-solving, and disciplinary action. Using the Home Observation Measurement of the Environment, researchers found intervention family homes to be more supportive and higher emotional functioning than the follow-up group family homes.

This study strengthens the argument that intervention plays a key role in developmental potential outcome. Several small studies have found similar results. Ramey, Campbell, and Ramey (1999) focused on early intervention and the ways in which it improves intellectual development over time. Barnett (1995) observed the long-term effects of early childhood programs on social outcomes and school outcomes. Yoshikawa (1995) observed the long-term effects of early childhood programs on social outcomes and delinquency. All of these studies have found comparable results as the previously discussed research by Berlin, Brooks-Gunn, McCarton, and McCormick (1998). Early intervention programs have shown significantly positive outcome effects within this context. Although most of the children appeared to benefit from intervention,
the children who were at higher-risk initially tended to benefit the most from early intervention services.

Gross, Spiker, and Haynes (1997) researched the Infant Health and Development Program, in helping low birth weight premature infants. Since premature children are considered at-risk for developmental disorders, early intervention was examined to determine whether this program could improve or prevent a possible negative outcome. The study included almost one thousand infants from several cities in the United States. The infants were then placed in one of two groups: the experimental group or the control group. Results revealed that children in the experimental/intervention group had significantly higher IQ scores, greater cognitive development, and fewer behavioral problems than the children in the control group.

Blair, Ramey, and Hardin (1995) found similar results in their study using the Infant Health and Development Program to determine intellectual development in low birth weight children. The Infant Health and Development Program was an eight-site randomized controlled trial of comprehensive early intervention low birth weight, premature infants during the first three years of life in which intellectual development was an outcome of major importance. At 24 and 36 months, but not at 12 months, higher Mental Development Index and IQ were associated with higher levels of participation in the intervention. In a longitudinal analysis of the data, the researchers found that the intellectual development of children in the intervention group was associated with each of the following modalities: the number of home visits received, the days attended at the child centers, and the number of parent meetings attended. The child’s background
characteristics were not related to the outcome. The results help support that early intervention may possibly be associated with greater cognitive development.

Barrera, Kitching, Cunningham, and Rosenbaum (1990) investigated the long-term effects of early home intervention on very low birth weight and high birth weight pre-term infants at five years of age. There were two intervention treatment groups: parent-infant intervention (to improve the quality of interaction between the parent and child) and developmental planning intervention (to improve the infants developmental level of functioning). Outcome measures were obtained on the children’s development and the care-taking environment. Results indicated that the children in the treatment groups scored significantly higher on expressive language, comprehension, personal-social skills, and visual-motor skills, than those children in the control group. Barrera, Kitching, Cunningham, and Rosenbaum concluded that their study provides evidence of the long-term benefits of early home intervention with biologically at-risk children.

Although most pre-term children will eventually develop all of the skills that full-term children acquire, some significant differences are apparent in motor, social, and cognitive behaviors. These differences become the target areas for the Early Partners Curriculum. Sparling, Lewis, Ramey, Wasik, Bryant, and LaVange (1991) researched the Early Partners Curriculum to help premature, low birth weight infants. The Early Partners is a curriculum emphasizing adult-infant interactions, emphasizes factors that are of particular relevance to the development of low birth weight children. Analysis of the results indicated that measures of rate at which the curriculum was delivered added significantly to the prediction of IQ. An IQ advantage was associated with receiving an average quantity of curriculum activities. The IQ of the low birth weight children
increased thirteen points, and the IQ for heavier low birth weight children increased six points.

Research done by Barrera, Rosenbaum, and Cunningham (1986) studied the early home intervention with low birth weight infants and their parents. In this study, fifty-nine pre-term infants were randomly assigned to either a developmental intervention group or a parent-infant intervention group. Twenty-four full-term children were assigned to the control group, which received no treatment or intervention. The use of the different intervention groups was to determine what treatment, if any, had a greater impact on the child. Results indicated that both intervention approaches were very affective in the developmental aspect of the child; however, the parent-infant intervention group appeared to yield the greatest impact (McCarton, Wallace, Bennett, 1996).

The effects of experience of early intervention on low birth weight, premature children, was studied by Liaw, Meisels, and Brooks-Gunn (1995). In this study, children were observed in two settings of early intervention: the home, and the childcare center. The early intervention services were aimed at reducing developmental delay in low birth weight children within the first three years of life. The effects of the experience were measured by the degree of exposure, the rate of program delivery, and the active experiences (parental interest and child mastery). Results indicated that the higher the number of contacts and activities presented during the intervention process, the more positively it predicted the child’s development in terms of higher IQ. The active experiences measure had a more significant effect, than the exposure or rate measures, in predicting greater cognitive development.
The Bayley-II in Determining Eligibility

In discussing early intervention, an important aspect of this program is the assessment or evaluation. Infants and children are evaluated by professional use of tests and scales designed for the specific age. The scores obtained from these tests and scales are often determinants of whether the child will receive state-funded early intervention. In assessing children, there are many issues that may possibly lead to a result that is not congruent with the child’s actual needs.

A widely used test for infants and children is the Bayley Scales for Infant Development. Since this test is used most often, it is necessary to discuss the criticisms in utilization for evaluations. This test, now revised as the Bayley-II, is primarily used to assess children who are suspected of having developmental delay(s). The Bayley-II was restandardized on a normal population of 1700 infants and toddlers in the United States. This restandardization also included premature children since a small amount of the normal population is comprised of these children.

In a Commentary (1997) discussing the use of the Bayley-II, the issue of assessing premature development is analyzed. There are two issues that are of concern in this article: the age of the child as a basis for choosing the beginning test item, and the age correction of the child in converting raw scores into standard scores (Ross, Lawson, 1997). It is noted that, “the corrected age means that the premature child does not have the same opportunity as a full-term child of the same chronological age to earn points in a higher item set. In contrast, defining the age as chronological means that the premature child could achieve a minimum of five passes in the higher age item set and be credited for all items below...which the child otherwise might have failed.” This issue of age
correction in conversion of the scores is another concern. The manual for the Bayley includes the corrected age for premature children age two to twenty-six months old; however, there is no discussion of the age at which one should stop correcting. Psychologists differ in their administration techniques of this scale, in terms of the age of the child and how long they correct for prematurity when converting raw scores to standard scores.

Siegel (1983) conducted research on correcting for prematurity in the assessment of low birth weight children. In this study, results revealed that correcting for age is most appropriate and accurate in the first few months, but does not appear to be suitable as the child gets older. Siegel, Cooper, Fitzhardinge, and Ash (1995) studied the use of the Bayley scale in diagnosing language delay in two-year old at-risk children. The results of this study found that, although subjects scored in the normal range of language development, the children had significantly delayed language. Because of this inconsistency amongst professionals in correcting for age, and the varying measures obtained from scales, it is very possible that results may be altered to some extent in determining eligibility for early intervention. In the long run, the possible misuse of scales may eventually have severe implications on growth and development.

**SUMMARY**

Two important principles in the study of early educational interventions for children at risk for delayed or retarded cognitive development are timing and intensity. High quality, intensive educational efforts beginning early in life lead to greater cognitive
gains among early intervention participants than do programs that are either less intensive or that begin later in life (Ramey, Ramey, 1992).

Research has been presented to discuss many issues surrounding prematurity. These issues include the factors that may contribute to prematurity (substance abuse, absence of prenatal care, lack of physical activity, and poverty), the effects on cognitive and language development, the effectiveness of early intervention programs, and the use of the Bayley-II in determining evaluation. The factors that may contribute to prematurity are discussed because of their relevance to pregnancy complications and prematurity. Research suggests that these factors are critical to the pregnant mother and the health and development of the unborn child. It is apparent that pregnancy is a condition that must be treated with extreme caution, in an attempt to ensure the normal health and development of the infant.

Research on cognitive development has agreeably suggested that prematurity results in delayed cognitive functioning; therefore, establishing a need for early intervention to improve learning. On language development, there are several issues that allow one to take a certain position or standpoint. Some researchers suggest that there is no correlation between premature birth and language, some believe that if there is language delay it will disappear between two and three years of age; and yet, there are still others who maintain the belief that prematurity has clear, negative effects on language development.

Research on the effectiveness of early intervention is in overwhelming agreement that there is a positive influence on the developing child; however, the scales used to determine eligibility are sometimes in question to the extent of their reliability. Overall,
it can be assumed that early intervention programs are very effective. Research suggests that they yield significantly positive results in terms of development. Most of the studies under discussion have agreed that early intervention is a necessary measure to ensure positive progression of development in the child.
CHAPTER III.
DESIGN OF THE STUDY

SAMPLE

The sample for this study was collected from the Child Development Center in Southern New Jersey. Children are referred to the center based on the assumption that the child is currently, or will be experiencing developmental delay in the following developmental areas: physical (gross and fine motor, sensory), cognitive, communication, social/emotional, and adaptive. The children are then evaluated in terms of these considerations, and with respect to gestational age, to determine initial and/or continuing eligibility for early intervention services in the areas of need. To be considered eligible the child must be thirty-three percent delayed in one area and/or twenty-five percent delayed in two or more areas of development.

The subjects were separated into two groups. The study group was twenty-seven low birth weight, pre-term infants and the control group was twenty-seven full-term infants. Each group consisted of children who were initially denied early intervention services. In some cases, the children that were initially denied were later considered eligible. There were five pre-term infants that were later eligible and four full-term infants that were later eligible, while twenty-two pre-term infants and twenty-three full-term infants remained ineligible. Because this study is concerned with initial denial into early intervention, the issue of becoming eligible later was disregarded.
In terms of demographics, most subjects were consistent in terms of socioeconomic status. The families resided in middle to low-income households, where the parent or guardian was a single or adoptive caretaker. The children ranged in age from infancy to seven years old. There were twenty-eight males and twenty-six females.

**METHOD**

This study was conducted through archival and follow-up means. The Child Development Center, in Southern New Jersey, provided records of all children that were referred to the center. All records were compiled by several qualified therapists at the Child Development Center. From these records, names were taken of children that were initially denied within the past five years. From the list of names, children were then categorized in terms of pre-term versus full-term. The records of all subjects were then carefully examined, by the researcher, for significant factors of interest. These factors include:

1. Date of birth (in terms of gestational weeks)
2. Gender
3. Race
4. Prenatal Care (received or didn’t receive)
5. Complications during Pregnancy
6. Reasons for Denial into Intervention Program
7. Follow-up Progression of Child
All of these factors were carefully recorded for review of the child's history and progression. A follow-up on the initially denied children was then conducted to further investigate the developmental progression of the child.

**DESIGN**

The results of this study were analyzed through the use of the Nonparametric test for two independent samples. This test determines if there is significance in the result: a relationship between the independent and dependent variables. A correlation test was also used to determine any relationships between the collected variables.

**TESTABLE HYPOTHESES**

There are two hypotheses that are being tested within this study.

*Null hypothesis:*

1. Premature children, who were initially denied early intervention services, will not need them later. \( \mu_1 \neq \mu_2 \)

2. Premature children will not be in more need than full-term children. \( \mu_1 \neq \mu_2 \)

*Alternate hypothesis:*

1. Premature children, who were initially denied early intervention services, will eventually need them. \( \mu_1 = \mu_2 \)

2. Premature children will be in more need than full-term children. \( \mu_1 = \mu_2 \)
CHAPTER IV. 
RESULTS

Many premature infants are confronted with health and developmental issues at birth. Early intervention services provide quality support to families and children, age birth to three years, in an attempt to address and correct any issues of concern. The purpose of this study was to examine the importance of early intervention on premature development. The independent variable in this study was the amount of weeks of gestation. Prematurity was defined as a length of gestation less than or equal to thirty-eight weeks. If the gestation period exceeded thirty-eight weeks, the child was considered full-term. The dependent variable was the follow-up, whether children have problems and are currently receiving services.

The alternative hypotheses state that, 1) premature children, who are initially denied early intervention services, will eventually need some kind of intervention at a later time, and that, 2) premature children will be in more need of early intervention than full-term children. The null hypotheses, therefore, state that, 1) premature children who were initially denied early intervention services, will not be in need of intervention at a later time, and, 2) premature children will not be in more need of early intervention than full-term children.
Descriptive Statistics

The study investigated a sample of fifty-four children, twenty-seven premature and twenty-seven full-term. There were twenty-eight males and twenty-six females. A summary of the sample is represented in Table 4.1. The mean gestational weeks was 36.463, with the minimum at 25 weeks and the maximum at 42 weeks. In terms of race, there were 22 Caucasian children, 14 African-American children, 14 Hispanic children, and 4 Asian children. Figure 4.1 is a visual breakdown of the sample according to race. Of the fifty-four children, only thirty mothers were receiving prenatal care during their pregnancy. This means that 44.4% of these children were born without any prenatal care. When looking at the variable that addressed complications during pregnancy, the results were astonishing. 77% of the entire sample of children was born with complications during pregnancy and at birth. These complications included: prematurity, drug-addiction, malformations of the body, heart problems, and respiratory problems.

Table 4.1-Summary of Sample as a whole

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEEKS</td>
<td>54</td>
<td>36.463</td>
<td>4.6772</td>
<td>25.00</td>
<td>42.00</td>
</tr>
</tbody>
</table>
ANALYSIS

Of the total fifty-four children, who were all initially denied early intervention services, twenty-four had problems and were currently receiving services (See Table 4.2). This means that forty-four percent (44.4%) of the total sample was actually in need of services. Figures 4.2 and 4.3 yield a visual representation of the relationship between the number of gestational weeks and the issue of problems later and receiving services. As gestation increases in weeks, children begin to experience less problems and lessened needs for services.
Table 4.2- The total number of children who have problems and are receiving services. (This includes premature and full-term groups)

<table>
<thead>
<tr>
<th>WEEKS</th>
<th>problems later and receiving services</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td></td>
<td>24</td>
<td>21.58</td>
<td>518.00</td>
</tr>
<tr>
<td>no</td>
<td></td>
<td>30</td>
<td>32.23</td>
<td>967.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.2-The mean number of Gestational Weeks vs. Problems later and receiving services.
The results were examined further in terms of the two groups. Of the twenty-seven premature children, who were initially denied early intervention services, sixteen of them have problems and are currently receiving services. This means that 59.2% of the sample was actually in need of services. This result is extremely significant and rejects the first null hypothesis, affirming that premature children who are initially denied early intervention services do eventually need services at a later time. For the twenty-seven full-term children, who were initially denied early intervention services, eight of them have problems and are currently receiving services. This means that 29.6% of the sample was actually in need of services. Since more premature children were in need of
later services than full-term children (59.2% vs. 29.6%), the second null hypothesis can also be rejected. It appears that premature children who are initially denied early intervention services are not only in need of these services later, but are in need of these services more than full-term children.

Table 4.3 summarizes the result of the nonparametric test for two independent samples. This test reveals that there is a relationship between the independent and dependent variables: gestational weeks, and problems later and receiving services. This significance is represented as 0.009, which can be interpreted as a profound significance at p < 0.01.

Table 4.3-NonParametric Test for Two Independent Samples

<table>
<thead>
<tr>
<th>WEEKS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>218.000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>518.000</td>
</tr>
<tr>
<td>Z</td>
<td>-2.607</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.009</td>
</tr>
</tbody>
</table>

In looking at the amount of children that are in need of services later, it was the pre-term group was further examined. The group of premature children was separated into early premature children, between twenty-five and thirty-two weeks gestation, and late premature children, between thirty-three and thirty-eight weeks gestation. In separating these groups, results were then tabulated to see which group, if any, was in more of a need of services. Of the thirteen early premature children, nine of them had
problems and were receiving services. This means that 69.2% of this sample was actually in need of services. Of the fourteen late premature group, seven of them had problems and were receiving services. This means that 50% of this sample was actually in need of services. When considering the group of premature children, the results indicate that the lower the level of gestational weeks, the greater the need for intervention. Figure 4.4 presents a visual interpretation of these results.

Several variables were collected throughout this study, and analyzed to determine if there were any correlations between them (i.e., gestational weeks, gender, race, prenatal care, complications during pregnancy, reasons for referral to intervention program, reasons for denial into intervention program, and problems later and receiving services). Table 4.4 displays the only significant correlation that was found within this experiment. It appears that the variable of gestational weeks is directly correlated with the variable of problems later and receiving services. The correlation coefficient is 0.355, and is significant at the p < 0.01 level.
Figure 4.4-Early Premature Group vs. Late Premature Group

Table 4.4-Correlation between Weeks vs. Problems later and receiving services.

<table>
<thead>
<tr>
<th>WEEKS</th>
<th>WEEKS</th>
<th>problems later and receiving services</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEEKS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>1.00</td>
<td>.355**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.008</td>
</tr>
<tr>
<td>N</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>problems later and receiving services</td>
<td>Pearson Correlation</td>
<td>.355**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.008</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>54</td>
<td>54</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
CHAPTER V.
CLOSING

Summary

Due to the increase of developmental and financial implications on prematurity, its incumbent of psychologists, and society, to better understand the importance of early intervention. Early intervention programs attempt to assist children, birth to three years of age, with developmental delays through the use of therapy. Psychologists use many tools to assess and evaluate the child’s current level of functioning in determining eligibility for services. When considered eligible, the services are provided by a multidisciplinary team of specialized professionals.

Summary of Literature

There are many factors that may contribute to complications during pregnancy, leading to, or resulting in, premature birth along with a spectrum of difficulties. The factors that are considered within the present study are substance abuse, lack of prenatal care, lack of physical activity, and poverty. Research that is concerned with these factors, have come to an agreement that there is an overwhelming negative impact upon pregnancy and the developing infant, along with severe developmental implications as the child begins to grow. These at-risk children, born into these conditions, are in desperate need for early intervention in order to improve their development.
Current research suggest that “a child’s brain grows up to 90% of its adult capacity within the first three years of life, and that brain patterns created during these early years affect individuals throughout their life (Permanente, 1999).” The first three years of life are largely recognized as the most important years with regard to cognitive development. High quality, intensive educational efforts beginning early in life lead to greater cognitive gains among early intervention participants than do programs that are either less intensive or that begin later in life (Ramey, Ramey, 1992). Early intervention is employed as an effective tool for stimulating and promoting positive and increasing growth and development within these first three years.

Research regarding the effectiveness of early intervention has positively agreed that early intervention is an asset to the at-risk child. Children who are involved in these programs experience an increase in IQ and development, in comparison with children who are not involved. The data suggests that early intervention is a necessary measure to ensure healthy and normal development. The only concern that seems to be expressed regarding intervention is the use of the scales and tests to determine eligibility into the programs. Research expresses the views of professionals, in the use of the Bayley scale, the most widely used scale. It appears that the scales are not always reliable in determining eligibility because, 1) the age of the child as a basis for beginning the test, and 2) the age adjustment in converting the raw scores to standard scores.
The Present Study

The present study examined the importance of early intervention with premature children. The sample consisted of fifty-four children: twenty-seven pre-term, and twenty-seven full-term. Prematurity was defined as a child born three or more weeks before the end of a full-term forty-week pregnancy. Many variables were considered in the present study to determine if there were any correlations between them: date of birth, gender, race, prenatal care, complications during pregnancy, reasons for denial into early intervention, and follow-up. All children were initially denied eligibility into the early intervention program within the past five years. This study conducted a follow-up analysis on the present development of these children.

Overall, results indicated a significant relationship between gestational weeks (pre-term vs. full-term) and the follow-up, whether the child had problems and was currently receiving services. From the data, it is apparent that as gestational weeks decrease, the greater the level of prematurity, there is more of a need of services. Premature children, who were initially denied services, were not only in need of services later, but more likely to be in need of services than full-term children, who were also initially denied.

Prediction of future developmental delay is impossible and many children, especially premature children, are denied eligibility; however, when taking a closer look at these initially denied children, many show adverse effects later in life. In fact, most delays are not even recognized until the child reaches school age. Once a child enters school, the developmental progression becomes very apparent in their daily functioning.
Several studies have been conducted that review prematurity, its outcome, and the role of early intervention. There appears to be a direct correlation between premature birth and cognitive development. It is suggested that prematurity results in delayed cognitive functioning, encouraging the need for early intervention. In this study, premature children appear to be assessed as ineligible for intervention services within the first three years of life, while eventually receiving services for a longer period of time later because of their unaddressed needs. Early intervention programs are not only positively correlated with increased IQ and development, but are also regarded as a necessity for healthy development of at-risk children.

**Conclusion**

As the results clearly indicate, many premature children were in need of services later, and were in more need than the full-term children. Of the fifty-four total subjects, 44% were eventually in need of services, although initially denied. When examining the pre-term versus the full-term children in terms of follow-up, the results were considerably significant. Of the twenty-seven premature children, 59.2% were having problems and receiving services. Of the twenty-seven full-term children, only 29.6% were having problems and receiving services. When taking a closer look at the premature group, subjects were again separated in terms of early premature birth, between twenty-five weeks and thirty-two weeks, and late premature birth, between thirty-three and thirty-eight weeks. The results from this aspect revealed that the earlier the prematurity, the greater the need of services. In the early premature group, 69.2% of these children were in need of services, while 50% of the late premature group was in need.
It was then concluded that the null hypotheses must be rejected. Premature children who were initially denied early intervention services were eventually in need of these services later, and they were in need of these services more than full-term children.

**Discussion**

In conducting the present study, several variables were collected to determine if there were any correlations between them and the findings. There was only one correlation that appeared significant, the relationship between gestational weeks and the follow-up; however, all of the data was instrumental to this study.

The sample in this study was collected from a Child Development Center in Southern New Jersey, in an area that may be considered poor and mostly lower class. Most of these children were born into a lower income home, whether it is biological or foster care, single or two-guardian families. Most of the mothers of these children were not receiving prenatal care, but instead continuing with their substance abuse habits. Several children were born with severe complications: prematurity, drug-addiction, malformations of the body, heart problems, and respiratory problems. These children were referred to the Center because of being considered at-risk, and/or concerns for developmental delay. It is apparent from the birth history alone that there was a great possibility that these children would be in tremendous need of intervention services. All of the children were evaluated and deemed ineligible, but the findings revealed some interesting facts.

With the risk that these children were exposed to, all of these children within this study were denied eligibility into the early intervention program. The concept that a
child is born with severe complications and a predisposition to developmental hindrance, and yet, is refused the possibility to overcome any setback and move forward is unreasonable. There seems to be a drawback(s) in the process of determining eligibility, and there are a couple explanations that may be the source of this dilemma. One explanation, like research suggests, may be the tools that are used to assess the children. If the tools were not efficient in predicting eligibility then it would explain the large numbers of children that are not eligible. Another explanation may be that the person who is administering the test does not really know what they are doing, or may make a mistake in figuring out and/or converting the scores. Since several therapists are involved in the eligibility process, it is also possible that there is an inconsistency amongst the professionals in assessing the child. One final assumption is that the criteria used to determine eligibility doesn’t allow for the premature child. If this is the reason for ineligibility, than one can only assume that it is very possible that many children are misdiagnosed.

There are a couple implications that must be considered in discussing early intervention and premature children. The first issue is the developmental component. If children are initially denied the opportunity to receive state-funded early intervention services, there may be a great possibility that these children are also being denied the opportunity to achieve to their highest possible potential. According to research, premature children have significantly lower IQ levels than their full-term counterparts. Since the first three years of life are regarded as the most important years in cognitive development, the children who do not receive services are losing a great fortune. Developmental delays are not always predictable; therefore, when the child becomes of
school age and begins to attend a regular school, it is very probable that the delays that were not apparent earlier will become clearly evident. If the child is then considered in need for services, it is likely that the child may be labeled, with regard to their specific deficit, while receiving services and/or therapy. Once a child is labeled, it is very difficult to rid of that label. This labeling may then lead to issues involving lower self-concept and self-esteem. The child may feel that they are "dumb" or "stupid," with a low feeling of self-worth. This concern of development also includes concern of the child's self-esteem.

The other concern for early intervention is the issue of financial implications. When the child is receiving services in school, it is very likely that these services will continue throughout the educational process for some time. Early intervention services are designated for the first three years of life only; whereas, school services may extend throughout the entire twelve years, or longer. High quality, intensive educational efforts beginning early in life lead to greater cognitive gains among early intervention participants than do programs that are either less intensive or that begin later in life (Ramey, Ramey, 1992). Not only is there a developmental cost, but also there is a financial cost of services over time.

**Implications for Further Research**

The present study examined a small sample of children from one child development center in a lower income area in Southern New Jersey. Future researchers may expand this study by including more children for a larger sample. Because this sample was so small, it is impossible to consider it as representative of all children in the
targeted group under study. A larger sample may yield similar results, with a possibility of a greater amount of significance within variables. Since the subjects were gathered from one specific location, it would be very advantageous for future studies to include children from several different areas with varying statuses.
REFERENCES


