

The Families First Program's Relationship to Children's School Readiness

by

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Abstract

'Families First' is a home visiting program implemented across the province of Manitoba with the goal of improving family foundations, promoting healthy child growth and development, supporting the development of strong parent child relationships and decreasing child maltreatment. Public health nurses complete a psychosocial assessment as part of their follow up with postpartum families. This assessment determines if families are offered this voluntary home visiting service. The assessment data is entered into a database maintained by the Healthy Child Manitoba Office (HCMO) of the Manitoba Provincial Government. The hypothesis for this quantitative study was that a positive relationship exists between participation in the Family First program and children's school readiness. While Families First has been evaluated regarding meeting the goals as outlined, its impact on children's school readiness was not known. The Early Development Instrument (EDI) is a tool developed and used across Manitoba by Kindergarten teachers to assess children's school readiness, with that database also maintained by HCMO. To test the hypothesis, the Families First and EDI databases were linked, and multiple regression analysis models were applied. A marginal statistically significant positive relationship between the Family's First program and school readiness was identified. Significant relationships were confirmed between school readiness and low education of the mother, alcohol use during pregnancy, social assistance, and violence between parents. Further research is necessary to understand and define the relationships.

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Dedication

To my husband Brent Perchuk, who always believes in my ability to succeed, even before I am sure of it myself.

To my children Cristin and Parker Perchuk who were generous in sharing their time with my studies, helping to celebrate my progress throughout.

To my parents, Stan and Gwen Goodridge, my most important teachers, who taught me the incredible value of education. They supported my beginning this journey, though they couldn't be here for the end.

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Chapter 1: Introduction

Background and Statement of Research Question

In 1999 the Manitoba Government, through the Healthy Child Manitoba Office, established a targeted home visiting program known as Families First. This program was delivered through existing Public Health programs already established across all regional health authorities throughout Manitoba, which provided an infrastructure to support the administration. The over arching goal of Families First is to prevent child maltreatment through meeting four objectives. These are: (i) using a systematic approach of universally screening and assessing all families entering the Public Health general program to establish which families would most benefit from this service and offering this voluntary program based on that assessment; (ii) cultivating the growth of nurturing, responsive parent-child relationships in families enrolled in the program; (iii) promoting healthy childhood growth and development for families involved; and (iv) building the foundations for strong family functioning in these families (Great Kids Inc. [GKI], 2011). The intent is that the environment and circumstances of these families will be improved by their participation and this will lead to improved child health outcomes both physically and socially, including school readiness.

Many home visiting programs with similar goals have been established since the early 1990's across Canada, the USA, and the United Kingdom (Elkan et al., 2000; Olds et al., 2004; Sweet & Applebaum, 2004). The key is to decipher if these programs have the intended effects of improving outcomes and what the indicators are of success. Evaluations of the Families First program in Manitoba (Brownell et al., 2007; Healthy

Child Manitoba, 2010) indicate a number of benefits, including increased positive parenting, decreased hostile parenting; increased sense of purpose in life, self acceptance, and environmental mastery for mothers. However, the relationship between participation in the Families First program and school readiness in Manitoba has not been explored.

The purpose of the proposed study is to add to what is known about the benefits of the Families First program in Manitoba by answering the question, “is there a relationship between families participating in the Families First program and their children’s school readiness upon entrance into Kindergarten?”

Significance of the Question

Marmot, Rose, Shipley, and Hamilton (1978) published a landmark study exploring the relationship between employment grade and coronary heart disease in British civil servants. They identified a social gradient in health, which is often credited with the birth of the study of the social determinants of health that continue to be the focus of much research to this day. This led to the present day approach to health which recognizes that any analysis of the health of the population must extend beyond an assessment of traditional health status indicators such as death, disease and disability. It must establish indicators related to mental and social well-being, quality of life, life satisfaction, income, education, employment/working conditions, and other factors known to influence health (Public Health Association of Canada [PHAC], 2011).

Educational attainment is associated with almost every measure of population health used (Braveman, Egerter, Williams, 2011; Commission on Social Determinants of Health [CSDH], 2008; PHAC, 2011). Social gradients are found in health outcomes according

to education, social status, income and community of residence and it is these gradients that are the propagating force driving health disparities (Hunter, Neiger, & West, 2011). Policy solutions to reduce health disparities across social gradients at a local level are important measures to improve health, and it is identified that a focus on education such as raising graduation and test scores among those at the bottom of the gradient would result in reduced disparities as a long term solution (Hunter et al., 2011).

Children's school readiness is an important predictor of academic achievement and has long-term consequences for population health (Janus & Offord, 2007). School readiness is not only predictive of how students will perform in the first grade and if they will benefit from initial education activities; there is strong evidence that initial academic ability is predictive of subsequent school performance or long term patterns of learning and achievement, and that initial poor performance is seldom reduced as a child moves through school (Forget-Dubois, Lemelin, Boivin, Seguin, Vitaro, & Tremblay, 2007; Guhn, Janus, & Hertzman, 2007; Shonkoff & Phillips, 2000).

There is evidence of significant inequities in school readiness, educational achievement, population health and social outcomes in Manitoba. Children who are from families with a low income status are less likely to be school ready according to the Early Development Instrument (EDI), than children from a high income status (Healthy Child Manitoba, 2009). Quite a consistent relationship exists between area-level socioeconomic status (SES) and a variety of child outcomes in Manitoba: infant mortality rates are three times as high in the lowest compared to the highest income quintile; child mortality rates are two and a half times as high; and diabetes prevalence is one and a half

times as high (Brownell et al., 2008). A social outcome of concern would be when a family is unable to look after their children so that the children are placed in foster care, which could be due to abuse and/or neglect, illness, death or conflict in their family, disability or emotional problems (Brownell et al., 2008). Brownell et al. identified that in urban areas the percentage of children in care in the lowest income quintile neighbourhoods was 34 times higher than the percentage for the highest income areas. Specific to the Winnipeg, Manitoba population where part of the proposed research data has been collected, only 27 percent of youth in lower socioeconomic status (SES) groups passed grade 12 language arts tests on time compared to 77 percent of youth from a high SES background (McCain et al., 2007). Brownell et al. (2008) found that not completing high school is a significant predictor of negative outcomes such as lower earnings, higher rates of unemployment, poorer health, higher rates of reliance on social assistance and higher rates of teen motherhood. Their report shows that the high school completion rate in rural areas was 81 percent in the highest income quintile and 67percent in the lowest; in urban areas there was a 92 percent completion rate in the highest quintile compared to 56 percent in the lowest. Thus, the evidence suggests that if the proposed study shows a relationship between Families First and school readiness, it will indicate that there is a potential for the program to positively influence long-term social and health outcomes of children related to educational achievement.

The following chapter's literature review will explore early child development; the impact and importance of the social environment including parenting, and how home visiting programs seek to influence this; Manitoba's Families First model; and school readiness as an indicator and measurement. This will be followed by a description of the

theoretical framework that will be used to guide the study, a detailed discussion of the proposed methodology, including a review of the instruments involved, and identification of ethical considerations.

Chapter 2: Literature Review

The purpose of this literature review is to provide a basic overview of the concepts involved in home visiting programs and school readiness. Early child development, social environment and parenting will be important concepts to review as these are areas home visiting seeks to affect in order to improve outcomes. One of the outcomes that has been identified is an improvement in school readiness and the literature related to this will be explored further. The literature regarding home visiting will be discussed to identify what is known about this type of intervention. The focus will then narrow to Manitoba's Families First program in particular and what has already been determined regarding its outcomes. This will provide a basis for the hypothesis that participation in the Families First program is related to school readiness. Finally, a review of school readiness will ensue as the variable whose relationship to home visiting is to be investigated. Knowing what is meant by school readiness and why it is a significant indicator of positive child outcomes will explain the value of being able to link it to participation in the Families First program.

Early Childhood and Brain Development

Early childhood development and the role it plays in long-term outcomes for individuals and populations is a significant area of research in the human sciences at this time. Considerable progress has been made in the last three decades regarding the importance of brain development as it pertains to not only the physical but to the environmental and social influences in the early years. Brain development, prenatally

and during the first five years, and the expression of genetic predisposition, is not only a product of the physical environment, but also the social environment surrounding a child (Hammock & Levitt, 2006; Schonkoff & Phillips, 2000). Postpartum experience drives maturation at the structural and functional level but the ability for the developmental processes to occur depends on the prenatal establishment of the basic brain architecture for receiving, interpreting, and acting on information (Hammock et al., 2006).

Early maternal stress can negatively affect fetal brain development prenatally (Berkman, 2009; Flinn, Nepomnaschy, Muehlenbein, & Ponzi, 2011; Glaser, 2000). It is believed that critical and enduring pathways exist from social circumstance to genetic expression and that the neuronal structure is not set as a predetermined static product but instead there is a large degree of neural plasticity in early life with sensitive developmental periods (Berkman, 2009; Denburg, & Daneman, 2010; Knudson, 2004). It follows that individuals are born with the potential for certain outcomes, but the social context in which the person exists in large part affects how those genetic predispositions are actualized in the early years (Denburg et al., 2010; Fox, Levitt, & Nelson, 2010; Hammock, & Levitt, 2006). Epigenetic factors related to the social environment and how these affect the physical development of the brain have shown in animal studies that relevant changes in brain function and behaviour, including high levels of neural plasticity markers and elaborate adult social competencies, are related to the social environment to which the animal is exposed (Branchi, 2009; Champagne, & Curley, 2005). Studies have identified that specific networks in the brain are developed based on experiences of the individual and these networks affect behaviours such as risk taking

and impulsivity (Posner, Rothbert, & Sheese, 2010). In 2000 Glaser (2000) discussed child abuse leads to a decrease in brain volume. Since then, studies have claimed that elevated cortisol levels can stimulate adaptive neurological systems, chronic stress can lead to pathological conditions in the brain and sexual abuse can change brain development, with the age of occurrence determining the region of the brain affected (Andersen, Tomada, Vincow, Valente, & Polacari, 2008; Flinn et al., 2011).

This work has reinforced the belief in early intervention programs that enhance nurturance and stimulation in the early years when brain development is greatest. The prevention of adverse childhood events and the promotion of a stimulating, nurturing environment prenatally onward that enhances brain development has the potential to alter long term physical and social outcomes, one of which could be education attainment.

Social Environment and Child Development

Evidence is described in the previous section that brain development is the result of experiences stemming from the environments that exist in the family and the community where a child is raised (GKI, 2011). The Adverse Childhood Event (ACE) study by Felitti et al. (1998) was ground breaking in linking exposure to emotional, physical, or sexual abuse and/or household dysfunction in childhood, to health risk taking behaviour and disease. The ACE study suggested specifically that the environment in the household of origin and parenting practices have a major impact on health outcomes of individuals. The ability to identify why one child will benefit from an intervention more than another, based on the risk factors in their specific environment, is believed to be the key to

intervening effectively. Most studies have shown that high risk social groups are more likely to show benefit from home visiting (Gomby, 2000).

Jutte et al.'s (2010) research in Manitoba reinforced the strength of social risk factors in predicting outcomes in health and education success. Traditional biologic predictors of health, such as birth weight and apgar scores, were compared to the predictive value of social indicators such as a child having a teen parent, having unmarried parents, and living in a family with low socioeconomic status. The authors found that social risk factors-- particularly poverty, having unmarried parents or having a teenage parent-- were stronger, more common predictors of future poor health and education outcomes, therefore increasing the size of the population affected with future poor health and education. Studying early childhood development, Denburg et al. (2010) found that children at age four who had professional parents were found to have thirty million more words than the children of families who were on welfare (Denburg et.al. 2010). They also identified that vocabulary at age three is predictive of language skill at age ten, indicating that the effects of social standing remain as children mature and progress in their education. The Families First program identifies families with social and biological risk factors and intervenes at what is believed to be the crucial time period of early childhood development (Brownell et al., 2008).

Low SES is a specific social risk factor and as it decreases, child mortality and morbidity increases (Chen, Matthews, & Boyce, 2002). A review of the literature identified that low SES in childhood is statistically associated with many adverse adult outcomes including low academic achievement, incomplete education, low adult income,

increased likelihood of divorce, low occupational status, increase in adult crime and generally lower status in other indicators of life success (Power & Hertzman, 1997; Runyan, Wattam, Ikeda, Hassan, & Rmairo, 2002; Sidebotham & Heron, 2006). A decrease in socioeconomic status has also been associated with increased family violence, abuse, and harsh and punitive parenting (Braveman & Egerter, 2008; Runyan et al., 2002; Sidebotham et al., 2006). Experiencing abuse is known to contribute to maintaining socioeconomic and health disparities as it compromises child health, cognitive function, and social skills for life (Braveman et al., 2008).

Family environment is an important social influence on child development outcomes. Supportive family environments have been shown to decrease a wide range of health risks, while abusive family interactions are associated with increased substance use, smoking, alcohol consumption, and sexual risk taking behaviour with the long term associated negative outcomes (Repetti, Taylor, & Seeman, 2002). The power of a nurturing family environment is reinforced by research that indicates a person may have a genotype for mental illness but it is their environment that triggers the expression of this gene and in a nurturing environment even those that are genetically susceptible may achieve mental health (Capsi et al., 2003). The American Academy of Pediatrics states that child health and developmental outcomes depend to a large extent on the capabilities of families to provide a nurturing, safe environment for their infants and young children (Council on Community Pediatrics, 2009). A nurturing environment is believed to support outcomes of improved cognitive development, social emotional competence, absence of psychological and behavioural problems, and increased physical health (Komro, Flay, & Biglan, 2011). These areas that have been identified as outcomes of a

nurturing environment are also indicators of school readiness based on the EDI (Janus & Offord, 2007). Developing the parent-child relationship to enhance this nurturing environment is a goal of the Families First program (GKI, 2011).

Parenting Influence on Child Development

Characteristics that can help to predict the potential for positive or negative outcomes in relation to parenting have become very important with the development of programs such as Families First. The intent of many programs is to target specific individuals or families because of the potential for poor parenting outcomes. One area that has traditionally been explored as a predictor of parenting outcomes is trauma in the parents' own life. Higher rates of trauma exposure have been related to low levels of parenting satisfaction, reports of child neglect, use of physical punishment and a history of protective service reports (Banyard, Williams, & Siegal, 2003). Histories of physical or sexual abuse in a parent's own history increases the potential for negative consequences in the parenting role, including increased punitive behaviour, aggression, physical discipline, increased risk of sexual abuse of their own children, problems in relationships with their children and a more negative view of self as parent (Banyard et al., 2003; Cohen, Hien, & Batchelder, 2008; Kim, Pears, Fisher, Connelly, & Landsverk, 2010).

These findings from a variety of studies help to guide intervention programs to target parents that may have an increased benefit from intervention compared to someone without these risk factors. Other parental attributes that have been shown to increase the risk for a child to exhibit aggression and disruptive behaviour are parental mental illness, substance and alcohol abuse, and exposure to domestic violence (Banyard et al., 2003;

Bauer, & Webster-Stratton, 2006; Cohen et al., 2008; Kim, et.al. 2010; Marcenko, Kemp, & Larson, 2000; Miller, Smyth, & Mudar, 1999; Sprang, Clark, & Bass, 2005). Parents who are young, single, socially isolated and living in poverty have been shown to be at increased risk for harsh and inconsistent parenting practices (Bauer et al., 2006; Freisthler, Merritt, & La Scala, 2006; Jutte et.al., 2010; Kim et. al., 2010). When the importance of a nurturing environment to a child's cognitive, social, emotional and physical development, is considered, the potential of parents to have the skills to provide this nurturing is important. If Families First intervenes with families that have these risk factors and is successful, a more nurturing environment should support improvement in school readiness as the indicators are very similar (see discussion below).

Studying the role that parenting, specifically parent-child attachment, plays in the outcomes of child development and behaviour is a rapidly expanding field at this time. When parent-child attachment is poor, which occurs with negligent parenting or punitive discipline for example, it can lead to the child having decreased self esteem, poor social cognition, and aggressive behaviour (Bosmans, Braet, Leeuwen, & Beyers, 2005). When a parent responds to a child's distress it has been shown to lead to increased security and self-regulation (Davidov & Grusec, 2006). As our knowledge of attachment theory expands it is becoming a valuable consideration in all aspects of parenting including intervention programs.

Home Visiting as an Intervention to Improve Outcomes

There is considerable research available in relation to home visiting programs as interventions to improve child development. As has been discussed, low SES is a

powerful predictor of poor outcomes including low education attainment. It is therefore understandable that this is one of the factors that is considered in determining where home visiting services are offered (GKI, 2011). It is why home visiting programs are intended to improve family foundations and change SES long-term for participating families, with examples being support of a return to work or completion of parent education. Research has supported that home visitation programs improve child health, increase preschool education, increase positive parenting and decrease abusive parenting (Fergusson, Grant, Horwood, & Ridder, 2006). Programs designed to enhance the parent-child relationship have been attributed to increasing home safety with a direct positive effect on school readiness in regards to a child's social competence, language, literacy, math and physical development (Schull & Anderson, 2008). Home visiting is considered by many to be the flagship of early intervention and has been attributed with improving school readiness (Daro, 2006; Schull et al., 2008; Sices & High, 2009; Sweet et al., 2004). The difficulty with research on home visiting is the lack of consistency between home visiting programs, though on the surface they may appear to have similar structures. It is very difficult to combine results to show success or merits of one program and compare their outcomes over time due to the variation and diversity in the details of how they are actually implemented (Elkan et al., 2000; Sweet et al., 2004).

One area of significant diversity is the use of various combinations of home visitors including lay home visitors, nurse home visitors, lay visitors with nurse supervisors, and trained volunteer home visitors. Various attempts have been made to determine which type of home visitor will give the most positive and cost effective results but this has led to conflicting evidence and no conclusions. A landmark study by Olds et al. (2004)

compared the effects of nurse home visitors and para-professional home visitors. This study looked at the results of a home visiting program when the children were two years old and then again two years after they completed the program. The study was a replication of two studies of the same program model in two other cities, which allowed for the opportunity to compare outcome data. In this study they found that para-professionals had a greater effect on maternal outcomes than nurses, and nurses had a greater effect on child outcomes (Olds et al., 2004). Mothers who were visited by para-professionals were less likely to be married or living with the father of their baby, worked more, had a greater sense of mastery, had improved mental health, increased maternal/child sensitivity and responsiveness, and their home environment improved in relation to being supportive of child learning (Olds, et al., 2004). Nurse-visited families had greater intervals between children, decreased enrolment in preschool but children were ready for school, had better behaviour adaptation, and the home environment improved to be supportive of child learning (Olds et al., 2004). Neither nurse nor para-professional affected the number of subsequent pregnancies, mothers' ongoing educational achievement, substance use, welfare use, or child externalizing behaviour (Olds, et al. 2004). An important result of this study is that families visited by nurse home visitors showed continued effects two years after the program but the para professional home visitor families showed no evidence of their original effects two years after the program, which brings into question sustainability (Olds et al., 2004). Another key finding was that 48 percent of para-professional visited families discontinued the program while 38 percent of nurse visited families discontinued the program, with retention being a frequent challenge in most visiting programs (Olds et al., 2004). Old's

ongoing research continues to make an important contribution to understanding what is effective in home visiting programs.

In the research involving other home visiting programs one nurse-managed program found that there was an increase in the retention of families if well educated nurses focused on building trust and coaching maternal/infant interactions, with the greatest effect achieved if this began in the prenatal period (Kearney, York, & Deatrlick, 2000). Some research has shown that home visiting programs that target high risk families, such as those with low income first-time adolescent mothers, show the greatest benefits (Howard & Brooks-Gunn, 2009). In another area it was found that the hours of supervision a home visitor received directly correlated with the likelihood the participants would stay in the program (McGuigan, Katzev, & Pratt, 2003). The Hippy program, a home visiting program in the United States, identified three distinct times of attrition from the program being the first month after entry, between the first and second year, and otherwise when there was a change in life circumstance such as a return to work (Baker, Piotrkowski, & Brooks-Gunn, 1999). This is important because if we cannot retain participants they will not receive the potential benefits. A program that trained volunteers and connected them to teen parents saw a small effect on dysfunctional parent-child interaction but no effect on social support satisfaction or the high rate of poor mental health, and it cost almost as much as a para-professional program (Barnet, Duggan, Devoe, & Burrell, 2002). A program that trained residents of a community as home visitors who had similar characteristics to the target population of parents and then had nurses supervise the home visitors found the retention of families was similar to their nurse home visiting program (Barnes-Boyd, Norr, & Nacion, 2001). Significantly more

children were fully immunized with the trained residents than with nurse home visitors and both programs showed a lower infant mortality rate than the whole city of Chicago where the program was located (Barnes-Boyd et al., 2001). The years of experience and education that a home visitor had was shown to increase the quality of the intervention and adherence to the strategies of a program (Knoche, Sheridan, Edwards, & Osborn, 2010). Home visiting programs have been shown to improve immigrant parents' investment in their children's education and ability to navigate schools in their new country (Nievar, Jacobson, Chen, Johnson, Dier, 2011). Research supports developmentally oriented anticipatory guidance in these programs with individualized content that responds to family need and uses parent-led agendas (Dworkin, 2003).

Reviews and meta-analyses have been published regarding home visiting. In one it was found that home visiting was associated with improved home environments, more effective parenting skills; decreased child behaviour problems, unintentional injury, and home hazards, increased social supports and breastfeeding rates (Kendrick et al., 2000). Sweet et al. (2004) also completed a review and meta-analysis of the literature of home visiting that concluded: there is an increased effect on parents if you do not target by income; a decreased effect on parents when you target families at risk for abuse; targeting for low birth weight yields increased effects on child cognition and parent behaviour; targeting teens increases the return of parents to education programs; and having a goal of improving maternal self help and social support leads to decreased improvements on child health. Both of these reviews added to the information available to guide the development of home visiting programs but they were inconclusive as to whether para-professionals or nurse home visitors were more successful, and they found that more

research was needed to assess for effectiveness and cost effectiveness comparisons (Kendrick et al., 2000; Sweet et al., 2004). Further conclusions were that home visitors need guidance through supervision and that complex cases may not be suitable for para-professionals, programs with a narrow focus are less effective than a broad focus, and universal surveillance will affect a larger number of people and have a greater impact on the overall population (Elkan et al., 2000).

What these reviews consistently agree on is that, while the literature gives us a wealth of information on parenting programs and outcomes, it is inconclusive in regards to what the most effective approach would be because of the diversity in approaches. It is difficult to measure the outcomes that occur, and it is hard to attribute the outcomes to a specific program as there are so many influences in the community (Kendrick et al., 2000; Sweet et al., 2004; Elkan et al., 2000). With the development and evaluation of further models, we can build on the current evidence and continue to define the most effective methods of intervention.

Given the diversity of programs, attributing school readiness or other beneficial results to home visiting programs is limited to the specific program that is studied. Knowing the variations, it is important to consider that each detail in the structure of programs could make a significant difference in its effects.

The Manitoba Families First Program

The Manitoba Families First program is one such program with its own specific model. Influenced by the abundance of evidence showing positive effects from home visiting parenting programs, the Healthy Child Manitoba office (HCMO) decided to

develop their own model of a home visiting program in 1999 (HCMO, 2010). The Families First program was modeled after the Hawaii Healthy Start Program (Heaman, Chalmers, Woodgate, & Brown, 2006). The model consists of para-professionals who receive in-depth training on the philosophy and approaches used in the program as well as training on how to use the curriculum required. The Manitoba version of the program has been influenced by other models including Hawaii and Alaska models. Manitoba incorporated a curriculum for the home visitors to follow. Healthy Families Alaska was also modeled after the Hawaii program. They had added a curriculum but its use was only encouraged as opposed to required and it was proposed that greater success could be achieved through the structure of requiring curriculum use (Duggan, et al., 2007). The para professionals are supervised by Public Health Nurses (PHNs), who are expected to meet with the home visitors regularly to provide opportunities for reflection and supervision related to working with the families they are assigned. The PHNs assigned the lead (Winnipeg) or coordinator (rural) role receive training on how the program is designed and how to enact their role. The literature reviewed supports that the Manitoba model is unique and can contribute to ongoing research in the area of home visiting. The program was developed with a plan and process for evaluation. Some of the data and research around this program has already been published in reports which can provide background for the current study.

There have been two stages of a qualitative research study published on this program. The first report (Heaman, et al., 2006) describes the results of interviewing PHNs and home visitors from the Families First program. It outlines their response to what they felt were the issues at that time with the Families First Program. The second (Woodgate,

Heaman, Chalmers, & Brown, 2007) expanded the evaluation to include interviews with parents who were participants in the program. These evaluation studies resulted in some valuable descriptive data early in the development of the program. Key issues raised by the program staff include: lead role nurses need initial and ongoing training to supervise home visitors; nurses need to be allowed time to provide quality supervision; retention strategies needed to be considered including safety, transportation and salary issues for the home visitors; the home visitors suggested that the curriculum for the program needed to be more flexible; and all staff felt the management staff needed to demonstrate greater support of the program (Woodgate et al., 2007). When interviews with parent participants in the program were added to the information in the descriptive study there were other themes that emerged. The interviews in general identified that the strength-based approach and voluntary nature of the program were considered important features; however, parents did not feel that similar life experiences or culture were attributes of their home visitor that added to their satisfaction (Heaman et al., 2006).

In 2007 the Manitoba Centre for Health Policy [MCHP] released a comprehensive report (Brownell et al., 2007) analyzing the evaluation data that Families First had compiled regarding measuring the outcomes from the program, including the period of time between January, 2000 and March, 2004. The universal screening tool Families First uses was assessed as part of the study to evaluate if it could identify clients who were at greater risk of maltreating their children. This was done by connecting the Families First evaluation data base with the government health repository and the Child and Family Services information system to see if the tool identified children who eventually ended up in care. The researchers found that the tool's specificity and

sensitivity, (i.e., its ability to identify children who are at risk for maltreatment) was moderate, according to the American Academy of Pediatrics scale. Eighteen percent of the families screened were identified by the screening tool as potential program participants (Brownell, et.al. 2007).

In the Families First program, screening leads to a more in-depth interview by the PHN using a standard format, called a Parent Survey or the Kempe Family Stress Inventory (Korfmacher, 2000), that the nurses are trained to implement. In much of the literature and research this tool is also known as the Family Stress Checklist (FSC) and will be referred to in this manner for the remainder of this thesis. If either parent in the family scores a 25 or greater on this second stage tool they are offered the program. The Families First program focuses on affecting the early years of development and families can be enrolled from the prenatal period up until the child is five years old. This is based on the crucial importance that research has identified in attending to and investing in the 0-5 year old childhood years, discussed earlier.

The MCHP report (Brownell et al., 2007) did show some promising evidence that there were positive outcomes from the initial evaluation of the Families First program. There was a lower rate of maltreatment and assault for 0-3 year old children that was marginally statistically significant, independent of the natural decline in these numbers. The report isn't suggesting that the Families First program caused this decline but rather that there is a strong association, and it is likely a combination of the programs introduced around the same time, as well as growing public awareness of the early child period, contributing to the decline (Brownell et al., 2007). The sample size involved was

still relatively small as the program had not been implemented for very long at the time of that evaluation.

In 2010 HCMO released the next stage of the evaluation of the Families First program. The evaluation reports on effect sizes or the strength of the impact of the program. It identifies that previous studies in the United States and Australia reported effect sizes of 0.10 to 0.20 from home visiting programs (Healthy Child Manitoba, 2010). The improvements that were reported in the evaluation were: increased positive parenting (Effect Size (ES) 0.80) and decreased hostile parenting (ES -0.53). There was no change in the overall score for the mother's psychological well-being but three out of six subscales showed in improvement: purpose in life (ES: 0.49), environmental mastery (ES: 0.76), self acceptance (ES: 0.79). Two other areas showing significant effect sizes were increased social support (ES: 0.65) and increased neighbourhood cohesion connected with neighbourhood (ES: 0.42). There were no differences between the program group and comparison group for neighbourhood safety, maternal depression, use of community services, family's participation in voluntary organizations, delayed child development and reading sessions with children (Healthy Child Manitoba, 2010). Considering the goal of decreasing child maltreatment and therefore outcomes associated with maltreatment, it is considered positive to see the strong indication of increased positive parenting and decreased hostile parenting. It is noted that school readiness as an indicator of healthy development was not assessed as part of this report.

School Readiness, Child Health and Social Outcomes

Definition. The definition of school readiness has evolved beyond being a set of individual child academic competencies at school entry. School readiness has been described as a meaningful approach to describe a suite of cognitive and social skills, knowledge and dispositions, and personal experiences that children bring when they enter grade one, which can be a reasonable proxy for measuring early brain development (McCain, Mustard, & Shanker, 2007). It is maintained that a broad range of skills and behaviours enable a child to learn in school, and that early intervention programs which enhance social and emotional development are just as important as the components that enhance linguistic and cognitive competence (Duncan, et al., 2007). While Duncan et al. (2007) do support that math and reading skills at school entry are strong predictors of success, they also identify that there is a link to social emotional behaviour because these behaviours are the foundation for positive classroom adaptation. A child's ability to interact with peers and teachers in a positive manner is seen as important to their being able to participate effectively in school and benefit from the learning experience offered. These concepts are combined in the definition of school readiness as not just child-focused competencies but the function of an organized system of interactions between people (parents, teachers, peers), settings (home, school, child care), and institutions (community, neighbourhood, government) (Mashburn & Pianta, 2006).

Predictors. The system of interactions mentioned above encompass many areas that affect children's school readiness. The American Pediatric Academy identifies that

child health and development depends on a family providing a nurturing and safe environment but many families do not possess the skills to do so (Council on Community Pediatrics, 2009). It is noted that cognitive stimulation, a supportive home and parental sensitivity lead to school readiness, where sustained attachment predicts academic achievement (Oxford & Lee, 2011). Mistry, Benner, Biesanz, Clark, & Howes (2010) go a step further by acknowledging that parent practices are robust predictors of child wellness across developmental domains and warm, responsive and consistent disciplinary practices have been shown to be important predictors of children's school readiness (Mistry et al., 2010). Parenting influence is again shown to be a factor where excessive control strategies of parents lead to increased aggression and decreased school readiness but the promotion of autonomy leads to increased mastery, motivation and improved reading scores (Maier, Vitiello, & Greenfield, 2011).

It is acknowledged that most children show antisocial behaviour at age two that comes under control before school age, but children brought up in neglectful, abusive conditions continue to show significant antisocial behaviour and only 30 percent of those entering school with high or chronic antisocial behaviour will receive a high school diploma (McCain et al., 2007). The relationship of school readiness to the home environment continues with a strong connection between income and school readiness. Many researchers have noted that children living in lower income families are more likely to not be school ready. Decreased income at school entry is associated with decreased academic skill and the gap widens during the ongoing school years (Snow, 2006). Lesaux, Vukovic, Hertzman, and Siegal (2007) make the connection that not only are low income groups over represented but so are minority populations when it

comes to lack of school readiness and literacy. It is proposed that increased financial strain causes increased stress and decreased available time, which decreases parental capacity to invest in child development outcomes or respond sensitively (Oxford et al., 2011). While this is concerning, we know that there are children from low SES families who are doing well, and others from high SES families who are struggling, which supports the conclusion that SES is not the only influence and some children possess a resilience in the face of challenging odds (Lesaux, 2007; McCain et al., 2007; Maier et al., 2011). Janus and Duku (2010) identify that children are more likely to be school ready in a two-parent, intact family, with an income above the low income cut-off (LICO), where the parents do not smoke, and the family reads books daily. Looking at specific individual characteristics we know that children who have the ability to control and sustain attention predict positive test scores regardless of prior reading and vocabulary (Duncan et al., 2007). Conversely, children with decreased interpersonal skills tend to experience increased teacher conflict, social exclusion, decreased participation and collaboration with a resulting decreased achievement (Duncan, et al., 2007). In general the literature continues to reinforce that school readiness is related to the combination of physical, social, emotional, and community demographics (Lesaux et al., 2007).

Significance. School readiness is now known to be not only a key determinant of children's successful transition to school but importantly, it is also predictive of long term academic achievement (Walker & MacPhee, 2011). One quarter of Canadian children between birth and six years of age are experiencing some learning or behaviour problems and this has been shown to correlate with later difficulties in school

performance, social adjustment, and health (McCain et al., 2007). In a longitudinal study by Lloyd and Hertzman (2009) which followed a group of children from kindergarten to grade seven in British Columbia, Canada, a durable negative effect of cognitive and language outcomes was predictable based on poor school readiness. Based on research results such as these the National Institute of Child Health and Human Development has stated that cognitive function starts early and may well stabilize before kindergarten (McCain et al., 2007). Skills at school entry are correlated with later skills, therefore to improve education outcomes preparation in the early years must be enhanced, rather than only focusing on the actual school years (Snow, 2006). The value of this work is that it identifies where challenges are and directs interventions to time periods where they can be most effective in order to improve long term outcomes (McCain, et al., 2007; Snow, 2006).

Impact of home visiting and school readiness. Research findings regarding school readiness is important information that needs to influence policy work on early child development in guiding strategic interventions (Mashburn, et al., 2006; Sices, & High, 2009). While the evidence continues to grow that the greatest public benefit can be actualized from early childhood development (ECD) and early years schooling, the majority of funding tends to go towards later years. This leaves ECD to families, which is considered an economically inefficient approach (McCain et al., 2007). The American Academy of Pediatrics supports that home visiting is an effective approach and works especially well in linking families with services to enhance health care, development, safety and education (Council on Community Pediatrics, 2009). The potential for this type of intervention is especially significant when it is taken into

consideration that Canada's early child education program has been criticized compared to other Organisation for Economic Co-operation and Development (OECD) countries for being patchwork and poorly resourced with stand alone service providers who are vulnerable to changing politics (McCain et al., 2007). It is believed that the highest returns on human capital occur when investment is made early, driving the formation of basic skill sets and considering the family as an agent of change--as in the case of home visiting--to promote school readiness (Snow, 2006).

Indications

The results of the Families First evaluations have shown evidence of affecting positive parenting and abusive parenting but did not explore the effects on education or indicators of these effects. With the use of the school readiness measurement tool known as the EDI and the ability to connect that data to the Families First data that is now available, it allows the exploration of whether there is evidence that Families First improves school readiness. This is the type of evidence that can support the continuation of an effective program in a political environment where all initiatives are at risk, but especially if they lack evidence of their value. Given what is known from the literature, any relationship established between Families First and school readiness has to be considered in the context of this particular model as it is clear from the research reviewed that the details of how a specific program is implemented may have a greater influence than is immediately obvious.

Theoretical Framework

In identifying a model that would help to guide this research the Neuman Systems Model (Neuman & Fawcett, 2011) was selected as a model whose style and content fits well with the structure of the Families First program. The Neuman model provides a wholistic perspective on the care of clients who may be individuals, families, groups and communities, which is a cornerstone of practice in Families First. The model describes variables to be considered as physiological, psychological, sociocultural, and spiritual. Families First considers physical, psychological, social and cultural factors for individuals and families in the implementation of the program. The model considers that the work with clients is a partnership. Families First considers the client's beliefs and values and is intended to be family-centered.

The Neuman model stipulates that research is used to predict the effectiveness of primary, secondary or tertiary prevention interventions to retain, attain or maintain client system stability. This fits with home visiting and whether the intervention predicts the attainment of improved school readiness (client system stability) in terms of the child as an individual. The research must encompass the concepts of the model including physiological, psychological, sociocultural, and spiritual variables. These are all concepts that are part of the consideration in what affects a child's school readiness and what home visiting attempts to affect. The model stipulates that instruments used for quantitative research designs should yield numerical data that are reliable and valid. The EDI and FSC have both been used extensively, with evidence available on their reliability and validity. Another direction is that researchers should consider how stressors

encountered by a person can be used to examine the effect of stressors on the individual's lines of defence. There are two levels of these lines. The flexible line of defence is a protective accordion-like mechanism that surrounds and protects the normal lines of defence or health of an individual, with the greater the expansiveness the greater the protectiveness (Neuman et al., 2011). An example would be the stressor of altered sleep patterns that lessen the individual's stability and therefore their optimal wellness. The normal line of defence is the adaptational level of health developed over time and considered normal for an individual, which becomes the standard for wellness deviance determination (Neuman et al., 2011). The current study includes individuals that have been offered a program based on identifying significant stressors in their environment and the ability of Families First to influence the effect on their lines of defence, compared to those who have similar stressors but are not in the program. Data analysis techniques must consider the lines of defence and if these affect the outcomes on the central core of the client. This was considered in methodology that explores, by using multiple regression analysis, if other variables are affecting the outcomes for the individual. Finally the research must advance understanding of the effects of prevention and must be linked to practice by using findings to direct practice. The implications of the research findings for the Families First program, and for nursing practice in particular, will be discussed. Thus, the Neuman model fits the Families First practice and guides the research to ensure it is being structured from a nursing perspective and contributes to nursing knowledge. It provides structure to ensure all areas have been considered.

Chapter 3: Methodology

The hypothesis for this study is that there is a relationship between a family's participation in the Families First program in Manitoba and an increased school readiness score for their children, as measured by the EDI. The study involved a quantitative research design, based on a secondary analysis of data contained in the HCMO data base. Analysis of these data had not been completed on this population in relation to school readiness to date. The following section outlines the methods that were used to test this hypothesis.

Description of Study Sample

Families included in the sample for this study were identified by a universal screening process implemented by PHNs across Manitoba in their community postpartum follow-up practice. The families would have scored positive using the Families First screening tool and then have a positive FSC. PHNs complete the screening forms for all families they see in the postpartum period and complete separate data collection teleforms for the families who score positive on the screen and/or FSC. The screen and teleform are faxed to HCMO. This Families First information is entered into a data base by the HCMO, and it is this data that was accessed through the data base for the study families. Families in the study would have had infants who were born in 2003 and would have a positive FSC score. The program group would have entered the Families First program during 2003/2004. The comparison group would have a positive FSC score during the same time period but did not enter the program. The comparison group may not have been in the program because there were not enough resources to offer them a space or because it

is a voluntary program and they chose not to participate. To be included in the sample the children must have been assessed using the EDI in the 2008/2009 catchment in Manitoba. Kindergarten teachers in Manitoba complete the EDI on children in their classroom and the data are entered into the data base at HCMO. Families cannot be identified by name in the data base and are linked between data bases by the number on the Families First screen, their Family Health Registration Number and Personal Health Insurance Number (PHIN). The sample included participants from those who accepted the program but never ended up having a home visitor, to those who received the complete program over three years. In the data base, 565 families were available for the program group and 292 were available for the comparison group. The program variables include FSC score and total number of home visits.

Measurement Tools Used in Data Collection

The data used were compiled from the HCMO data bases, which contain information collected using three separate tools: the Families First screening tool, the FSC and the Early Development Instrument.

The screening tool. The Families First screening tool is the first instrument of measurement in this study. This is a useful tool because it has been shown to identify families at greater risk for child maltreatment based on a number of factors. There are 39 items with public health nurses entering the information based on their discussion with the family and observation during postpartum visits. It includes biological and social risk factors such as high or low birth weight, prematurity, mother's highest level of education, family on social assistance, mental illness of mother or father, current violence between

partners, existing file with child protection, parents own history of child abuse or neglect. Variables that are more sensitive and therefore more difficult to discuss such as a history of child abuse or violence between partners may be missing more data. Only those families receiving a score of three or more move on to a more in-depth assessment to determine if they will be offered the Families First program. The tool was assessed as part of the program evaluation completed by the MCHP (2007). The sensitivity and specificity of the tool was assessed and indicated that the tool is capable of identifying groups with similar risk factors in relation to child maltreatment. Its ability to predict maltreatment was assessed as moderate according to the American Academy of Pediatrics scale (Brownell et al., 2007; Brownell, Santos, Chartier, Girard, & Roos, 2011)

Family Stress Checklist. The second measurement tool in the study is the FSC, also known as the Parent Survey or Kempe Family Stress Inventory (KFSI). Its original purpose was outlined by Carroll (1978) as a checklist to ensure completeness of an interview and to assess the safety of a home after a diagnosis of abuse had been confirmed. It was not until later that the tool was used to predict risk of maltreatment, and in the late 1980s the Hawaii Healthy Start program began to use it to identify families for referral to a para-professional home visiting program (Breakey, Uohara-Pratt, Morrel-Samuels, & Kolb-Latu, 1991). There is limited research on the reliability and validity of the tool. Three separate studies looked at the validity of the tool, i.e. whether parents with high scores are actually at high risk for maltreating their children. Murphy's (1985) study showed a sensitivity of 80 percent (mothers who maltreated and had scored high) and specificity of 89.4 percent (mothers who did not maltreat and were scored low). The percentage of moms scoring high who later maltreated their children was 52.5 (positive

predictive value) while 96.8 percent of mothers who scored low and did not maltreat (negative predictive value) (Murphy, 1985). Korfmacher (2000) describes these as acceptable numbers though there is some concern that a fairly large percentage of mothers scoring high did not maltreat in the follow-up period, which was only one to two years later.

The Hawaii Department of Health performed a validity study on their program and found a sensitivity of 89 percent, specificity of only 28 percent, and positive predictive value of 37 percent and negative predictive value of 85 percent (Korfmacher, 2000). Korfmacher concluded that the KFSI was a reasonably valid tool to identify mothers at high risk for abusing their children; however, with further analysis, it was found that there was an equal number of false negatives and false positives. The final study cited in Korfmacher (2000) was done by the Oregon Healthy families program where the sensitivity was 97 percent and specificity was only 21 percent. As Korfmacher (2000) states, higher scores on the KFSI were related to increased rates of abuse, potential abuse and increased parenting difficulties; however they should not be used in isolation or as a diagnosis of abuse but rather as an indication of being at risk (as the original authors identified). The general consensus in the research is that the tool is clinically useful. In the Families First program it is used to identify families that could benefit the most from the program but is not used as a diagnostic tool. Kormacher's (2000) work supports that it does a reasonable job of identifying higher risk families, which allows us to identify groups with similar characteristics as the experimental and comparison groups for the current study.

The early development instrument (EDI). The third measurement tool used in this study is the EDI, which was developed in Canada (Janus et al., 2007). The EDI is a tool administered by school teachers with their students in mid-kindergarten to determine students' readiness to enter grade one. It looks at indicators of school readiness in five domains: *physical health and well-being; social competence; emotional maturity; language development and cognitive development; and communication skills and general knowledge*. The best possible score in any one domain is ten with the average score ranging from six to eight.

One recent article looks specifically at the psychometric properties of the EDI. Janus et al. (2007) derived the items for the EDI from existing instruments, key informant interviews, and focus groups, with some items chosen to fit specific areas from teacher and parent completed tools, and some from the Canadian National Longitudinal Study of Children and Youth. Other questions were constructed to fit missing areas and field tested with teachers and researchers as well as reviewed at four focus groups with kindergarten teachers. The EDI was implemented in six sites for 16,583 students. The data were analyzed to confirm the *a priori* domain/factor structure using confirmatory factor analysis, which revealed fourteen factors which accounted for 63.1 percent of the variance. This led the researchers to believe they had in fact included appropriate items for analysis of school readiness. There was concern regarding the consistency and objectivity of the tool in relation to the potential for teacher bias. The researchers looked at intra-class correlations and found low levels of variability between classroom teachers. This led to the conclusion that variance in the item scores was due to variability of the children within the classroom rather than between classrooms. The consistency of the

specified domains was evaluated and all five domains showed a satisfactory internal consistency. Domains for girls and boys were compared and showed girls rated on average higher than boys in all domains. Correlation of the domains with age was also statistically significant (Janus et al., 2007). This study led to the conclusion that the EDI has an expected sensitivity to age and gender and this same sensitivity held true with ESL students. Convergent validity was assessed as acceptable but needing further investigation. Interrater reliability was also assessed by comparing teachers' ratings with early childhood educators, and teachers with parents. Interrater agreements were moderate to high for teachers and early childhood educators but low to moderate for parent-teacher ratings, though there was a high rate of agreement between parents. It is believed that this is due to school eliciting different behaviour patterns and some behaviour have low frequency or visibility. Another part of this study used the Peabody Picture Vocabulary test (PPVT), which has been assessed to have adequate psychometric properties for screening as cited in Janus et al., 2007. PPVT scores are often taken as a proxy of a child's intelligence and significant correlations with the appropriate domains on the EDI indicate good criterion validity on these domains (Janus et al., 2007)

A study by Forget-Dubois et al. (2007), using data from the Quebec longitudinal study of Child Development found that the EDI explained 34 percent of the variance in first grade school achievement. The authors of these studies concluded that the EDI's psychometric properties are at similar levels as those of other teacher questionnaires used for assessment of preschool and early school years, as did Janus et al. (2007). It is seen as a useful addition to the many measures available as a comprehensive instrument that

does not require additional training of teachers, and an acceptable compromise over much more costly rating scales.

Data Analysis

HCMO data bases were accessed through a data sharing agreement with the Manitoba government. This was a somewhat complicated process as it had not been done before. The process began with lawyers for the Manitoba Government and the University of Manitoba working on this approximately two years before the proposal for this study was approved. The proposal was successfully defended in early May, 2012, but the agreement was not completed and signed off until December, 2012. There was some difficulty linking the data of the three databases so the two Families First databases were linked and provided in late December, 2012, which allowed for some initial review of the available data. By the beginning of March, 2013, the EDI database was linked and provided, but it was discovered that a large amount of the data were missing due to many missing personal health insurance numbers (PHINs), the variable used to link the databases. The EDI was then sent to Manitoba Health to identify as many of the missing PHINs as possible. It was returned to HCMO, re-linked and supplied as a complete set of the three linked data bases in mid-May, 2013, so that analysis could begin.

The resulting data were analyzed to assess homogeneity between the control and the program group at a statistically significant level. This indicates whether the control group and program group are similar on important characteristics, other than whether they received the program or not. The program and control families were first tested to assess if they were truly similar on important characteristics. The ‘independent means

one-tailed t-test' was used. T-tests were performed on the program versus the control group variables to assess the homogeneity between the two groups, including the variables of parent survey score, age of mother at birth of the child and child's month of birth, at time of the EDI test. Chi-square was used to assess homogeneity related to the variables of education level of mother, mother's history of depression, history of child abuse for mother or father of baby, no prenatal care before 6 months, if the family was screened by the PHN prenatally, lone parent family, teen parent, alcohol or drug use of mom during pregnancy, current substance use by mom, and violence between parents. SPSS data analysis software was used for all statistical analysis. Alpha was set at .05.

There are many independent variables that may affect the child's outcome on the EDI, with involvement in the program being only one. The following variables were evaluated for their impact: maternal age; violence between parents; no prenatal care before the 6 month of pregnancy; mother's or father's history of child abuse; depression of mother; alcohol use by mother during pregnancy; family on social assistance; family identified as socially isolated or lacking social support; low education of mother; drug use by mom during pregnancy; current substance abuse of mom; teen parent; lone parent; age of child in months and gender. Variables were selected for the analysis partly based on availability, as the instruments used pre-determined which data had been collected. There is a strong focus on maternal factors as these variables tended to be more complete in the data collected through Families First, since the mother was more likely to be present or involved in the data collection. There is also a strong focus on socially related variables due to the support in recent literature and Manitoba studies showing the importance of social factors in predicting outcomes compared to physical factors.

Multiple linear regressions were used to evaluate complex statistical variable relationships. Models were created, which included each of the above independent variables, with one model for each of the five EDI domains, (the dependent variable). The null hypothesis would be rejected if the independent variable of participation in the Families First program is statistically significant in its ability to predict higher EDI scores in any or all of the five domains, given the other independent variables.

Imputation of Missing Values

The study was completed using secondary analysis of three Manitoba government data bases. There is value in the ability to look at this real world data, analyze what is happening when real people implement an intervention with a real population and all the challenges this entails. The main focus, however, of the people who collected the Families First data is not data collection for research purposes, and so there is the potential that they do not prioritize for this task as a research assistant or survey expert hired specifically for that purpose might. Two databases that were accessed for this study include data that are collected by PHNs in their community practice and there are often gaps in what they are able to collect. This can be due to parents not wanting to discuss certain areas, nurses feeling they may compromise their relationship with the families if they discuss some areas of the screen, or human error in completing forms. EDI data are collected by teachers and school administrators. The teacher's purpose is specifically collecting data, but it occurs in very large systems which are fallible in the consistent following of process. Some EDI data are also incomplete due to errors in completing the forms or because school administrators failed to add in data required by the forms. With

three different data bases involved and a wide range of people and systems collecting the data it is expected that variables do not contain complete information for each case. Confounding this is that one case can be missing data for different variables than another case. If cases with missing data were simply eliminated from the study, not only would it significantly compromise the size of the sample, it would also bias the sample as we would not know who we are eliminating from the sample and whether it affected the outcome.

He (2010) identifies that missing data can be a serious impediment for data analysis where simply removing missing cases from the analysis raises serious concerns about the validity of the results. Imputation techniques are based on the assumption that any subject in a study sample can be replaced by a new randomly chosen subject from the same source population, so that imputing missing data for a variable is replacing the missing data with a value that is drawn from an estimate of the distribution of the variable (Donders, Van Der Heijden, Stijnen, & Moons, 2006). Graham (2009) suggests that creating and imputing a scale score is appropriate when at least half of the items have been observed, which is true for this study. In multiple imputation various estimates are used, reflecting the uncertainty in the estimation of the distribution, which results in unbiased estimates of study associations (Donders et al., 2006). Data for the study were imputed for variables with missing data to compile the most complete and unbiased sample possible.

When imputing data there are a variety of methods to choose from and it is necessary to identify the most appropriate method for the analysis involved. This is partly

dependant on why the data are missing. He (2010) describes three types of missing data mechanisms: missing completely at random; missing at random; and not missing at random. A variable's data is missing completely at random if the probability of the data missing is independent of any characteristics of the subjects. Missing at random assumes that the probability of missing variable data depends only on observed variables. Data is not missing at random if its probability depends on variables that are incomplete. The present study fits the missing at random criteria as the missing data depends on observed variables. This means that once you control for all the data available any remaining missing data does not depend on an unobserved variable (Graham, 2009). The assumption is that using many predictor variables makes it more plausible that the missing data is dependent on observed characteristics and therefore we can use the variables available to predict the missing values (He & Zaslavsky, 2010).

There are several possible methods of imputation. One is the method of complete case analysis where only cases with complete data are analyzed, which can lead to over fitted models and biased estimates if data is not completely missing at random and the reduction of statistical power by discarding cases is a major drawback (He, 2010; Ambler, Omar & Royston, 2007; Azur, Stuart, Frangakis, & Leaf, 2011). The latter traits are true for this study, so complete cases analysis was not considered an appropriate imputing method. Other methods are the single imputation strategies, such as mean imputation or treating missing data as a separate category, which are based on implausible assumptions (He, 2010). These impute only once, generally underestimating the standard errors of estimates because it pretends the unobserved value is known with certainty, when actually it is unknown but estimated by the imputation method (He,

2010). Non-response weighting is another approach that can work for a survey's missing data but does not work well for multiple missing variables when there is no regular pattern for missing data and weights are estimated, so this extra level of prediction introduces more uncertainty to the inference (He, 2010). Likelihood-based models use a process of summation or integration to complete missing values but usually special software has to be developed and so it is often impractical (He, 2010). Finally, multiple imputation retains some advantages of likelihood-based models estimates, while allowing for uncertainty created by imputation, and involves creating more than one set of replacements for missing values (He, 2010). Plausible imputation should give reasonable predictions for the missing data and the variability should reflect appropriate uncertainty (He, 2010). This assumes a prior distribution for the unknown model parameters, simulates multiple independent draws from distribution of missing values given observed data (He, 2010).

One form of this is sequential regression multiple imputation (SRMI). SRMI involves multivariate data which are characterized by separate conditional models for each incomplete variable and other variables are used as predictors (He, 2010). Algorithm imputations are generated for missing values of one variable, and then these imputed values impute the next variable which continues till convergence is reached. (He, 2010). SRMI is also known in some literature as multiple imputation by chained equation (MICE) and was found to produce the best quality predictions with the least biased estimates with health care data including missing completely at random and missing at random data in a study by Ambler et al. (2007). This is probably related to using outcome variables in the imputation models to retain the association between the outcome

and predictors, because if outcomes are not used it is expected that it will shrink predictions toward the average (Ambler et al., 2007; Azur et al., 2011; He, 2010). Creating multiple imputations, as opposed to single imputations, accounts for the statistical uncertainty in the imputations and the chained equations approach is very flexible and can handle variables of varying types (e.g. continuous or binary) (He, 2010). MICE approaches have been used in datasets with thousands of observations and hundreds of variables (Azur et al., 2010; He, Zaslavsky, Harrington, Catalano & Landrum, 2010).

With this background, MICE was chosen as the method for imputing data in the present study. SPSS software was used to impute the data and ten cycles were performed to complete the imputation. The number of cycles to be performed can be specified by the researcher and at the end of these cycles the final imputations are retained, resulting in one imputed dataset (Azur et al., 2010). Generally 10 cycles are performed with this type of imputation (Azur et al., 2010). Imputed data sets can be assessed for accuracy using histograms, which provide visual representations of the extent that imputed values differ from observed values to identify model defects (Azur et al., 2011). Close association between data sets indicates reasonable imputation of the variable values in this study. A complete list of the independent variables used in imputation is listed in table 4.1 A and 4.1 B. Dependant variables used in the imputation include the EDI domain scores for physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication and general knowledge.

Limitations

There is the potential for volunteer bias where certain characteristics lead families to volunteer to participate in the Families First program compared to the group that does not volunteer. These variables may contribute to the resulting outcomes on the EDI domains as opposed to the variables that have been identified. The majority of the variables strongly focus on the influence of the mother rather than the father in the variables analyzed. The intent of the data collection was that information would be collected on both parents for the Families First screen. In practice, the variables were much more complete for the mother's information. Frequently the father was not present to complete the data, or the mothers were more likely to be involved in the program and were not always able to complete all information on the father. Many of the variables available on fathers were not used due to the high level of missing data.

The databases accessed allow the analysis to control for the variables identified through the use of multiple regression analysis statistical techniques, but this does not guarantee that all the significant variables have been included or are even available through the data collection undertaken such as child protection involvement or number of months in the program (dosage). There are statistical differences between the groups on a variety of included variables, which the multiple regression technique is intended to help compensate for in analysis; however this does not account for the potential bias of those who volunteered in the first place. It only allows us to say that the sample is representative of those in the program, whomever they may be, but decreases the ability to generalise to the overall population. In some areas the sample is somewhat more

conservative in that the mean indicates a higher level of challenge or risk in the program group versus the control group, including a slightly higher family stress checklist score for the program group. In some areas however, the control group has a greater level of risk than the program group.

Missing data is another limitation of the study that led to the use of imputation, a statistically defensible method of dealing with missing values. Looking at the imputation approach used, while the MICE approach is a principled method of addressing missing data, it is important to acknowledge certain complexities and limitations. MICE offers great advantage over other missing data techniques in terms of its flexibility, but a disadvantage is that MICE does not have the same theoretical justification as other imputation approaches (Azur et al., 2011). In particular, fitting a series of conditional distributions, as is done using the series of regression models, may not be consistent with a proper joint distribution (Azur et al., 2011). Initial research suggests that this may not be a large issue in applied settings, however further research is needed into the implications for practice (Azur et al., 2011).

There are strengths that this study does benefit from. The data available from the HCMO database is rare, in that it is frequently difficult to compile or access information from a vulnerable population. This data is obtained by the public health program in real life interactions, which can increase access to the general population rather than obtaining information from those who agree to participate in a survey and the bias involved in that circumstance. It allows for the collection of a wide variety of variable information that are known to influence outcomes for children so that they can be controlled for in data

analysis. While it is important to recognize the limitations that exist, the strengths are also compelling.

Ethical Considerations

Data in the form of computerized files that had been compiled from the Government of Manitoba master files were accessed through a Memorandum of Understanding. It did not include identifying information or potential identifying information. The data files were provided for the project with an encrypted data stick containing the Research Project Data set. It was downloaded onto a desktop computer terminal at the University of Manitoba, Faculty of Nursing, in a secure locked area that can only be accessed by approved individuals. The data set was protected by password to prevent unauthorized access and the password was only accessible to the student researcher. The data were analyzed and manipulated for the purpose of carrying out the research project and only aggregate level data was printed or placed on a data stick or transmitted outside the organization in compliance with Manitoba's Public Health Information Act (PHIA). The data set was kept secure and in strict confidence. The data were only used and accessed by the student researcher and the research team (including the thesis committee and University of Manitoba statistics consultant) for the described research project, after signing the Pledge of Confidentiality required by PHIA. No personally identifiable information or potentially personally identifiable information was used, disclosed, published or made available in any manner, form or medium. Copies of the data set were made for purposes of standard computer back-up procedures and were stored in a secure area when not in use. The data will be retained in a de-identified form, as required by university ethics policy, for seven years after completion of the project. When the data

set is no longer required it will be destroyed by the student and/or committee chair or, where it is foreseen that the data set may be needed for future research plans, the research team can request in writing to return the data set to the HCMO to be held until the planned research is approved or not approved.

Chapter 4: Findings

The findings of the data analysis previously described will be reviewed in this chapter. A description of the variables as they pertain to the program group versus the control group will follow, including sample size, mean, standard deviation, and range as applicable. Data analysis completed will be reported.

Sample Description

As discussed in the previous chapter, the data were obtained from databases available through the Healthy Child Manitoba Office. For reasons previously outlined, there were data missing. Imputation methods previously described were implemented. Table 4.1A contains a description of the frequencies for each variable, including the amount of data missing for each variable, prior to imputation. Following imputation the sample included 857 cases which will be the sample referred to for the remainder of the chapter. A breakdown of the variables is included in table 4.1-1, 4.1-2 and 4.2.

As outlined in table 4.1-1, the average age of mothers in the sample was 23.85. The average number of visits a family received by a home visitor was 22.08. While it helps to understand the composition of the sample, the variable of ‘total number of home visits’ was excluded from the final analysis because the ‘In Families First program’ variable had a relatively high co-linearity with total number of home visits variable. All the zero values of the ‘total number of home visits’ variable are zero for the ‘In Families First’ variable. All the higher values of the ‘total number of home visits’ correspond to being ‘In Families First’. It was possible that by removing the total number of home visits

variable we might see an effect on the 'In Families First' variable significance, but in fact this did not change the significance. The average score on the FSC tool was 38.45.

Table 4.2 shows there were 857 families available for the sample after identifying the number of families where the children completed the EDI in 2003 and the family scored over 25 on the FSC. Of this sample of 857, 66 percent were in the Families First program, leaving 34 percent of the sample as the control group who did not receive any program. Only 21 percent of the sample were screened prenatally which means they would not have had the opportunity to enter the program before their baby was born. Thirteen percent did not receive prenatal care before six months so they did not have a health care provider monitoring them during their pregnancy until that time. Eleven percent of the families identified had teen mothers, which is higher than the national average of 4.98 percent and the Manitoba provincial average of 4.56 percent (Bronwell, et al., 2008). Fifty-two percent of the families were headed by lone parents compared to the 8 to 28 percent of families in the province, depending on community area (Bronwell, et al., 2008). In Manitoba in 2003 when the sample children were born, there was a 74 percent grade 12 graduation rate (Manitoba Education, 2012). Only 32 percent of the sample mothers were grade twelve graduates. In the study sample for this project 70 percent of the families were receiving social assistance. The number of Manitoba children living in families that were receiving social assistance, as reported in the Manitoba Child Health Atlas (2008) was 13.3 percent. Thirty-one percent of the study sample was assessed as experiencing depression, while the Manitoba Health Indicators Atlas (2009) identified the Manitoba rate of depression as 19 percent. Other characteristics of the sample are that 40 percent of the mothers drank alcohol and 20

percent used drugs during their pregnancy. While this is used in the screen as an indicator of risk, the variable is not broken down into the type, amount or during which part of pregnancy. Only five percent of the sample indicated that they were currently using substances. Thirty-three percent of the mothers and 22 percent of the fathers were identified as having a history of child abuse in their own childhood. Fifteen percent of the families indicated there was violence between the partners.

Generally the sample contains a greater number of risk factors than the general population, which would be expected considering all families in the sample had a positive score of 25 on the FSC. The FSC is intended to assess the family's risk of neglecting or abusing their children.

Variable Description for the Program Group Versus Control Group

The variables were assessed to compare the 'in program' group to the control group using independent 2-tailed t-tests and Chi-Square as appropriate (see table 4.3). There was a statistically significant difference between the groups on the FSC score, however the difference between the means was only five points out of a possible score of 100, so the clinical significance would be small with the program families assessed as being more at risk. There was a significant difference between the ages of mothers for the groups, but again the mean difference was .8 of a year so the clinical significance is limited. The Chi-square test showed that there is a significant difference between the groups on whether they were screened prenatally, with nine percent more of those in the program being screened prenatally compared with the control group. This is important because connecting early may help build stronger relationships with the family and potentially

improve birth outcomes. A statistically significant difference was also shown between the groups in relation to alcohol and drug use by mothers during pregnancy as well as mother's and father's history of child abuse. As noted earlier, this is a limitation of the study because it shows that there is a possible bias of who volunteers to participate in the program. Mothers using drugs and alcohol during pregnancy and mothers with a history of child abuse were present in higher numbers in the control group than those who accepted the program. This indicates there is a greater degree of risk in these areas for the control group than the program group. This description indicates the importance of statistically controlling for these variables as they are also associated with child outcomes.

The Families First Sample and EDI Domains

Table 4.4 separates the results to show the program group and no control group sample size, mean score on each of the five EDI domains, and the standard deviation or standard error both before and after imputation. The mean score in each domain is slightly higher in the program group versus the no program group.

T-tests Comparing EDI Scores of Program Group Versus Control Group

Table 4.5 shows the results of t-tests to assess if there is a difference in the outcomes on the EDI domains for families who were in the program versus those who were not in the program. In the domain of 'physical health & well being' there is a p value of .021 and for 'social competence' a p value of .038. This indicates a statistically significant difference between the groups who participated in the Families First program versus those who did not for those two domains, before controlling for the influence of other

designated variables. No statistically significant difference is shown for the EDI domains of 'emotional maturity', 'language & cognitive development' or 'communication & general knowledge'.

Multiple Regression Analysis of the Variables and EDI Domains

Table 4.6 through 4.10 include the results when multiple regression is used to analyze the EDI outcomes based on all variables listed in 4.1-1 and 4.1-2. It should be noted here that there is a statistically significant difference in all domains for the variables of gender and child's month of birth so these variables will not be reviewed for each table. This reinforces the findings of Janus et al. (2007) who noted girls rated on average higher than boys in all domains and correlation of the domains with age was also statistically significant.

Table 4.6 shows the relationship between the selected variables and the EDI domain of 'physical health and well-being'. There is a significant relationship between the 'low education of mother' ($p=.005$) and 'alcohol use by mother during pregnancy' ($p=.044$) and the 'physical health and well-being' domain. There is also an association of borderline significance between the 'In Families First' program variable and 'physical health and well-being', with a p value of $.057$. It is interesting to note that the 'In Families First' variable also had a statistically significant relationship with the 'physical health and well-being' domain using t -tests, before controlling for the other variables using multiple regression analysis.

Table 4.7 reviews the relationship between the selected variables and the EDI domain of 'social competence'. Statistically significant relationships are identified for

the variables of 'low education of mom' ($p=.002$), 'social isolation' ($p=.027$) and 'mother's history of child abuse' ($p=.007$). No significant relationship was identified between the variable of 'In Families First program' and the 'social competence' domain of the EDI.

Table 4.8 reviews the relationship between the variables and the EDI domain of 'emotional maturity'. Statistically significant relationships were identified between 'low education of mom' ($p=.003$), 'social isolation' (.012), and 'mother having a history of child abuse' ($p=.028$). No significant relationship was identified between the variable 'In Families First program' and the EDI domain of 'emotional maturity'.

Table 4.9 reviews the relationship between the selected variables and the EDI domain of 'language & cognitive development'. Statistically significant relationships were identified between 'low education of mother' ($p=.002$), 'on social assistance' (.004), and a 'history of violence between parents' ($p=.042$). No significant relationship was identified between the variable 'In Families First program' and the EDI domain of 'language and cognitive development'.

Table 4.10 reviews the relationship between the selected variables and the EDI domain of 'communication & general knowledge'. Statistically significant relationships were identified between 'low education of mother' ($p=.003$), 'social isolation' (.001), and a 'history of violence between parents' ($p=.006$). No significant relationship was identified between the variable 'In Families First program' and the EDI domain of 'communication & general knowledge'.

Tables 4.11- 4.15 include all the same variables as above but the variable of 'Family Stress Checklist' (FSC) score has been added. Tables 4.6-4.10 did not include this variable. The score of the FSC was used to identify the sample to show all families included in the sample had a score between 25 and 100, but the score itself was not included as a variable. The intent of the checklist score is to indicate that a family is at a higher risk to abuse or neglect their children. Including this in the following analysis was done to assess if its inclusion changed the significance of the variables being analyzed and if the FSC score is significant.

As shown in table 4.11, adding the variable FSC, which is the parent survey score, did not affect the significance of 'In Families First' variable which stayed the same ($p=.057$) in relation to the 'physical health and well-being' domain. The variable of 'FSC' was not significant while 'low education of mother' ($p=.005$) and 'alcohol use by mother during pregnancy' ($p=.044$) continued to be statistically significant.

As outlined in table 4.12, adding the variable of FSC did not change the significance of the variables in their relationship to the EDI domain of 'social competence'. 'Low education of mother' ($p=.002$), 'social isolation' ($p=.030$), and 'mother history of child abuse' ($p=.009$) remained statistically significant while 'FSC' was not significant.

In table 4.13, adding the variable of FSC did not change the significance of the variables in their relationship to the EDI domain of 'emotional maturity'. 'Low education of mother' ($p=.003$), 'social isolation' ($p=.013$), and 'mother's history of child abuse' ($p=.09$) remained statistically significant while 'FSC' was not significant.

In table 4.14, adding the variable of 'FSC' did not change the significance of the variables in their relationship to the EDI domain of 'language and cognitive development'. 'Low education of mother' ($p=.002$), 'on social assistance' ($p=.004$), and 'violence between parents' ($p=.052$) remained statistically significant while 'FSC' was not significant.

In table 4.15, adding the variable of 'FSC' did not change the significance of the variables in their relationship to the EDI domain of 'communication & general knowledge'. 'Low education of mother' ($p=.003$), 'social isolation' ($p=.002$), and 'violence between parents' ($p=.007$) remained statistically significant while 'FSC' was not significant.

Summary

The study sample reflects the families who have a high enough score on the FSC to be offered the Families First program. Using the FSC score identifies a sample of parents who have a greater degree of risk factors than the general population. A limitation is that the 'program group' versus the 'no program group' are not the same in their level of risk in all variables, which may be due to a bias in who actually participates in the program. The control group may be affecting the comparison if they are at a higher risk than those who participated in the program, so this must be considered in the results of the analysis. It would be expected, however, that the 'in program group' would show a greater degree of success in being more school ready than the 'no program group' who showed greater risk in some variables. The results are very modest in their indication of any difference between the groups on school readiness.

With regard to the differences between the groups on EDI outcomes, the ‘in program group’ had a slightly higher mean score than the ‘no program group’ in all domains of the EDI. T-tests showed that the differences were statistically different between the ‘in program group’ versus the ‘no program’ group in the EDI domains of ‘physical health & well-being’ and ‘social competence’ before controlling for other variables.

When multiple regression was applied, controlling for the identified variables, there were some significant results. The only area where there was any indication of the ‘program group’ being statistically significantly different compared to the ‘no program group’ was in the domain of ‘physical health & well-being’, but this was marginal with a $p=.057$. This was true whether the ‘FSC’ was included as a variable or not. This relationship was also true prior to controlling for the other variables.

Variables were identified as being statistically significant in their relationship to school readiness. ‘Gender’ and ‘month of child’s birth’ were significant in all domains which was a factor already established in previous research by Janus et al. (2007). ‘Low education of mother’ was a significant variable in the prediction of school readiness in all five domains. While this is possibly not intuitively surprising, it is strong reinforcement of the impact of this variable. ‘Alcohol use during pregnancy’ was identified as a significant variable but only in the domain of ‘physical health & well-being’. ‘Social isolation’ was a significant variable in the areas of ‘social competence’, ‘emotional maturity’, and ‘communication & general knowledge’. ‘Mother’s own history of child abuse’ showed up as significant in the domains of ‘social competence’ and ‘emotional maturity’. Being ‘on social assistance’ only showed up as significant in the domain of

‘language & cognitive development’, which is somewhat surprising given that this provides an indication of income level and income is identified in the literature as a very important factor in school readiness. This of course is connected to socio economic status, which includes education status. This relationship is affected by the large number of variables included, which are interrelated so that it is difficult to disentangle their individual effects. Assessing these relationships further, when mother’s education figures so prominently in all domains as a significant variable, is still suggested. Finally, ‘violence between parents’ was identified as significant, but only in the areas of ‘language & cognitive development’ and ‘communication & general knowledge’. Further discussion will continue in chapter five.

The areas of significance are in some ways reassuring as these are all areas that we have identified to include in assessing risk and whether we offer services to one family compared to another. The relationships are important but of course they only indicate that an association between the variables exists. These relationships are important in giving direction to further research and investigation, which is needed to understand the relationships.

Table 4.1

Sample Size and Number of Missing Data of Study Variables Prior to Imputation

<u>Variable</u>	<u>Valid Data</u>	<u>Missing Data</u>
Gender	857	0
Age	851	6
Screened prenatally	687	170
Month of birth	843	14
Alcohol use by mother during pregnancy	775	82
Drug use by mother during pregnancy	762	95
Teen Mother	798	59
Low education of mother (under grade 12)	809	48
Lone Parent	807	50
On social assistance	817	40
No prenatal care before 6 months	773	84
Depression of mother including postpartum	762	95
Current substance abuse mother	710	147
Social isolation/lack of social support	777	80

Violence between parents	671	186
Mother has history of child abuse as a child	653	204
Father has a history of child abuse as a child	533	324
In families first program	857	0
Family Stress Checklist score	857	0
Physical health & well-being	610	247
Social competence	612	245
Emotional maturity	609	248
Language & cognitive development	610	247
Communication & general knowledge	612	245

Table 4.2-1

Variable Descriptive Data Rates of Explanatory Variables in Study Sample for
Continuous Variables

<u>Variable Name</u>	<u>Number</u>	<u>Mean</u>	<u>SD</u>	<u>Range</u>
Age of Mother	857	23.85	5.744	29
Total number home visits	857	22.08	28.305	231
Family Stress Checklist (FSC)	857	38.45	11.856	65

Table 4.2-2

Variable Descriptive Data - Rates of Explanatory Variables in Study Sample for
Dichotomous Variables

<u>Variable</u>	<u>No</u>	<u>Percent</u>	<u>Yes</u>	<u>Percent</u>
In Families First	292	34%	565	66%
Screened prenatally	678	79%	179	21%
No prenatal care before 6 months	748	87%	109	13%
Teen mother	766	89%	91	11%
Lone Parent	409	48%	448	52%
Low education of mother	278	32%	579	68%
On social assistance	256	30%	601	70%
Social isolation/lack supports	677	79%	180	21%

Depression of mother	592	69%	265	31%
Alcohol use by mother during pregnancy	512	60%	345	40%
Drug use by mother during pregnancy	688	80%	169	20%
Current substance use by mother	818	95%	39	5%
Mother has a history of child abuse	571	67%	286	33%
Father has a history of child abuse	669	78%	188	22%
Violence between parents	731	85%	126	15%

Table 4.3

Description of Variables for Program Group Versus Control

Variable Name	Not In Families First %	Mean	In Families First %	Mean	Chi 2-p	T test-p
<u>T Tests</u>						
Family Stress Checklist (FSC)	34%	35	66%	40.00		.00
Month of Child's Birth	34%	6.5	66%	6.60		.61
Total # Home Visits	34%	N/A	66%	22.08		.96
Age of Mother	34%	24.4	66%	23.60		.04
<u>Chi-square</u>	34%		66%			
<u>Gender</u>						
Screened Prenatally	15%		24%			.001
No Prenatal Care Before 6	16%		11%			.033
Teen Mother	10%		11%			.135

Lone Parent	50%	56%	.135
Low Education Mother	71%	65%	.071
On Social Assistance	68%	71%	.452
Social Isolation/Lack Supports	19%	22%	.346
Depression of Mother	29%	32%	.503
Alcohol Use By Mother During Pregnancy	48%	36%	.001
Drug Use By Mother During Pregnancy	25%	17%	.003
Current Substance Use By Mother	5%	4%	.554
Mother Has A History of Child Abuse	41%	29%	.001
Father Has A History of Child Abuse	12%	27%	.000
Violence Between Parents	14%	15%	.694

Table 4.4

Families First Program and Relationship to EDI Domains

Group Statistics

EDI Domain	In Families First Program	Number	Mean	Standard Deviation	Standard Error
<u>Original Data</u>					
Physical Health & Well-being	NO	213	7.8583	1.67892	.11505
	YES	397	8.1942	1.66268	.08345
Social Competence	NO	214	7.2066	2.06181	.14094
	YES	398	7.6969	2.07832	.10418
Emotional Maturity	NO	212	7.0573	1.62630	.11169
	YES	397	7.3776	1.71176	.08591
Language and Cognitive Development	NO	213	7.0270	2.39010	.16377
	YES	397	7.3797	2.39383	.12014
Communication and General Knowledge	NO	214	6.4190	2.88260	.19705
	YES	398	6.9378	2.80062	.14038

	In Families First Program	N	Mean	Standard Error
<u>Imputed Pooled Data</u>				
Physical Health & Well-being	NO	292	7.7127	.10071
	YES	565	7.9897	.07431
Social Competence	NO	292	7.0205	.14282
	YES	565	7.4041	.10570
Emotional Maturity	NO	292	6.9164	.11037
	YES	565	7.1724	.08770
Language and Cognitive Development	NO	292	6.8176	.16828
	YES	565	7.0322	.11582
Communication and General Knowledge	NO	292	6.2070	.17129
	YES	565	6.5709	.12939

Table 4.5

T Test for Independent Sample- In Families First Program Versus No Program

EDI Domain	In Families First Program	t	P-value	Mean Difference	95% confidence interval	
					Lower	Upper
<u>Imputed Pooled Data</u>						
Physical Health & Well-being	Equal variance assumed	2.304	.021	-.27702	-.51283	-.04121
	Equal variance not assumed	-2.299	.022	-.27702	-.51329	-.04075
Social Competence	Equal variance assumed	-2.153	.038	-.38364	-.73817	-.02911
	Equal variance not assumed	-2.157	.038	-.38364	-.73745	-.02982
Emotional Maturity	Equal variance assumed	-1.807	.078	-.25608	-.53738	-.02521

	Equal variance not assumed	-1.823	.075	-.25608	-.3494	.02277
Language and Cognitive	Equal variance assumed	-1.023	.314	-.21467	-.63311	.20377
Development	Equal variance not assumed	-1.026	.313	-.21647	-.63208	.20274
Communication and General Knowledge	Equal variance assumed	-1.768	.078	-.36397	-.76803	.04010
	Equal variance not assumed	-1.759	.079	-.36397	-.77002	.04208

Table 4.6

Multiple Regression Models for Families First Home Visiting Program as Predictors of Physical Health & Well-being Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Significa nce
Gender	-.381	-2.831	.006
Month of Childs Birth	-.042	-2.454	.014
Screened Prenatally	-.175	-.979	.331
No Prenatal Care Before 6 Months	-.250	-1.298	.197
Age of Mother	.008	.635	.526
Teen Mother	.184	.846	.398
Lone Parent	.078	.474	.637
Low Education Mother	.051	-2.957	.005
On Social Assistance	-.233	-1.506	.134
Social Isolation/Lack Supports	.085	.498	.620
Depression of Mother	-.233	-1.508	.137
Alcohol Use By Mother During Pregnancy	.256	2.020	.044
Drug Use By Mother During Pregnancy	-.090	-.493	.623
Current Substance Use By Mother	.284	.765	.448
Mother Has A History of Child Abuse	-.047	-.269	.789
Father Has A History of Child Abuse	.051	.244	.809
Violence Between Parents	-.349	-1.816	.071
In Families First Program	.238	1.904	.057

Table 4.7

Multiple Regression Models for Families First Home Visiting Program as Predictors of Social Competence Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-1.013	-6.294	.000
Month of Child's Birth	-.052	-2.270	.025
Screened Prenatally	.201	.903	.371
No Prenatal Care Before 6 Months	-.141	-.593	.555
Age of Mother	.017	1.151	.251
Teen Mother	.145	.545	.586
Lone Parent	-.055	-.308	.759
Low Education Mother	-.522	-3.095	.002
On Social Assistance	-.218	-1.102	.274
Social Isolation/Lack Supports	-.432	-2.233	.027
Depression of Mother	-.316	-1.622	.113
Alcohol Use By Mother During Pregnancy	.054	.306	.761
Drug Use By Mother During Pregnancy	-.277	-1.009	.321
Current Substance Use By Mother	.354	.811	.421
Mother Has A History of Child Abuse	-.643	-2.914	.007
Father Has A History of Child Abuse	.344	1.415	.167
Violence Between Parents	-.517	-1.522	.143
In Families First	.151	.935	.351

Table 4.8

Multiple Regression Models for Families First Home Visiting Program as Predictors of Emotional Maturity Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-.672	-5.122	.000
Month of Child's Birth	-.035	-1.899	.059
Screened Prenatally	.187	1.015	.315
No Prenatal Care Before 6 Months	-.289	-1.515	.133
Age of Mother	.005	.346	.730
Teen Mother	.063	.306	.760
Lone Parent	-.104	-.595	.556
Low Education Mother	-.415	-3.003	.003
On Social Assistance	-.030	-.190	.849
Social Isolation/Lack Supports	-.383	-2.531	.012
Depression of Mother	-.233	-1.328	.193
Alcohol Use By Mother During Pregnancy	.155	1.042	.302
Drug Use By Mother During Pregnancy	-.311	-1.427	.162
Current Substance Use By Mother	.681	1.856	.069
Mother Has A History of Child Abuse	-.368	-2.265	.028
Father Has A History of Child Abuse	.171	.676	.501
Violence Between Parents	-2.77	-1.097	.282
In Families First Program	.094	.676	.501

Table 4.9

Multiple Regression Models for Families First Home Visiting Program as Predictors of Language and Cognitive Development Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-.932	-5.470	.000
Month of Childs Birth	-.101	-3.630	.001
Screened Prenatally	.117	.447	.657
No Prenatal Care Before 6 Months	-.344	-1.363	.174
Age of Mother	-.018	-.917	.362
Teen Mother	-.058	-.198	.843
Lone Parent	.115	.535	.594
Low Education Mother	-.793	-3.259	.002
On Social Assistance	-.664	-2.973	.004
Social Isolation/Lack Supports	-.358	-1.495	.139
Depression of Mother	-.134	-.654	.515
Alcohol Use By Mother During Pregnancy	-.095	-.424	.674
Drug Use By Mother During Pregnancy	.065	.229	.820
Current Substance Use By Mother	.141	.234	.816
Mother Has A History of Child Abuse	-.186	-.666	.512
Father Has A History of Child Abuse	.175	.607	.548
Violence Between Parents	-.738	2.124	.042
In Families First	.094	.676	.501

Table 4.10

Multiple Regression Models for Families First Home Visiting Program as Predictors of Communication and General Knowledge Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-1.131	-5.095	.000
Month of Childs Birth	-.125	-4.137	.000
Screened Prenatally	.111	.394	.695
No Prenatal Care Before 6 Months	-.373	-1.145	.256
Age of Mother	-.015	-.6900	.491
Teen Mother	-.044	-.1290	.898
Lone Parent	.085	.3540	.724
Low Education Mother	-.799	-3.105	.003
On Social Assistance	-.444	-1.625	.109
Social Isolation/Lack Supports	-.791	-3.237	.001
Depression of Mother	-.014	-.059	.953
Alcohol Use By Mother During Pregnancy	-.073	-.294	.770
Drug Use By Mother During Pregnancy	.024	.080	.937
Current Substance Use By Mother	.080	.142	.887
Mother Has A History of Child Abuse	-.366	-1.361	.180
Father Has A History of Child Abuse	.054	.162	.872
Violence Between Parents	-1.02	-2.851	.006
In Families First	.165	.761	.448

Table 4.11

Multiple Regression Models for Families First Home Visiting Program as Predictors of Physical Health & Well-being Including the FSC as a Covariate Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-.384	-2.832	.006
Month of Child's Birth	-.042	-2.454	.014
Lone Parent	.079	.481	.633
Screened Prenatally	-.174	-.974	.333
No Prenatal Care Before 6 Months	-.250	-1.292	.199
Age of Mother	.008	.651	.516
Teen Mother	.186	.853	.394
Low Education Mother	-.500	-2.946	.005
On Social Assistance	-.231	-1.486	.139
Social Isolation/Lack Supports	.087	.510	.611
Depression of Mother	-.229	-1.474	.146
Alcohol Use By Mother During Pregnancy	.258	2.032	.043
Drug Use By Mom During Pregnancy	-.089	.484	.629
Current Substance Use By Mother	.288	.778	.440
Mother Has A History of Child Abuse	-.040	-.223	.825
Father Has A History of Child Abuse	.056	.271	.788
Violence Between Parents	-.340	-1.757	.081
Family Stress Checklist (FSC)	-.002	-.384	.701
In Families First	.249	1.911	.057

Table 4.12

Multiple Regression Models for Families First Home Visiting Program as Predictors of Social Competence Including the FSC as a Covariate Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-1.024	-6.368	.000
Month of Childs Birth	-.052	-2.275	.025
Lone Parent	-.050	-.280	.780
Screened Prenatally	.204	.918	.363
No Prenatal Care Before 6 Months	-.140	-.591	.556
Age of Mother	.018	.232	.232
Teen Mother	.151	.568	.571
Low Education Mother	-.517	-3.072	.002
On Social Assistance	-.209	-1.057	.294
Social Isolation/Lack Supports	-.424	-2.195	.030
Depression of Mother	-.304	-1.555	.128
Alcohol Use By Mother During Pregnancy	.062	.356	.723
Drug Use By Mother During Pregnancy	-.272	-.986	.332
Current Substance Use By Mom	.366	.838	.406
Mother Has A History of Child Abuse	-.617	-2.794	.009
Father Has A History of Child Abuse	.361	1.497	.144

Violence Between Parents	-.486	-1.437	.165
Family Stress Checklist (FSC)	-.007	-1.214	.225
In Families First	.192	1.166	.245

Table 4.13

Multiple Regression Models for Families First Home Visiting Program as Predictors of Emotional Maturity Including the FSC as a Covariate Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-.681	-5.198	.000
Month of Childs Birth	-.035	-1.903	.059
Lone Parent	-.101	-.573	.570
Screened Prenatally	.189	1.029	.308
No Prenatal Care Before 6 Months	-.288	-1.517	.132
Age of Mother	.005	.387	.700
Teen Mother	.068	.330	.741
Low Education Mother	-.411	-2.974	.003
On Social Assistance	-.023	-.145	.885
Social Isolation/Lack Supports	-.377	-2.490	.013
Depression of Mother	-.213	-1.267	.214
Alcohol Use By Mother During Pregnancy	.162	1.092	.279
Drug Use By Mom During Pregnancy	-.307	-1.403	.169
Current Substance Use By Mother	.691	1.870	.067
Mother Has A History of Child Abuse	-.347	-2.106	.041

Father Has A History of Child Abuse	.184	.972	.337
Violence Between Parents	-.251	-1.101	.325
Family Stress Checklist (FSC)	-.006	-1.081	.281
In Families First	.127	.867	.389

Table 4.14

Multiple Regression Models for Families First Home Visiting Program as Predictors of Language and Cognitive Development Including the FSC as a Covariate Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-.940	-5.492	.000
Month of Childs Birth	-.102	-3.630	.001
Lone Parent	.118	.551	.583
Screened Prenatally	.119	.454	.652
No Prenatal Care Before 6 Months	-.343	-1.360	.175
Age of Mother	-.017	-.893	.375
Teen Mother	-.054	-.185	.854
Low Education Mother	-.790	-3.243	.002
On Social Assistance	.658	-2.939	.004
Social Isolation/Lack Supports	-.352	-1.461	.148
Depression of Mother	-.126	-.610	.544
Alcohol Use By Mom During Pregnancy	-.089	-.396	.694
Drug Use By Mom During Pregnancy	.068	.240	.811

Current Substance Use By Mother	.150	.248	.806
Mother Has A History of Child Abuse	-.167	-.606	.550
Father Has A History of Child Abuse	.186	.651	.520
Violence Between Parents	-.717	-2.024	.052
Family Stress Checklist (FSC)	-.005	-.636	.526
In Families First	.062	.296	.768

Table 4.15

Multiple Regression Models for Families First Home Visiting Program as Predictors of Communication and General Knowledge Including the FSC as a Covariate Using Imputed Data

Variable Name	Unstandardized coeff Beta	T	Sig.
Gender	-1.142	-5.165	.000
Month of Childs Birth	-.125	-4.143	.000
Lone Parent	.090	.377	.707
Screened Prenatally	.114	.404	.687
No Prenatal Care Before 6 Months	-.371	-1.143	.257
Age of Mother	-.014	-.655	.514
Teen Mother	-.037	-.110	.913
Low Education Mother	-.794	-3.088	.003
On Social Assistance	-.434	-1.591	.116
Social Isolation/Lack Supports	-.782	-3.193	.002
Depression of Mother	-.001	-.003	.997

Alcohol Use By Mother During Pregnancy	-.063	-.254	.801
Drug Use By Mother During Pregnancy	.029	.095	.925
Current Substance Use By Mother	.094	.165	.869
Mother Has A History of Child Abuse	-.338	-1.243	.220
Father Has A History of Child Abuse	.070	.210	.835
Violence Between Parents	-.990	-2.775	.007
Family Stress Checklist (FSC)	-.008	-.891	.373
In Families First	.208	.941	.348

Chapter 5: Discussion

This chapter will focus on discussion of the findings from last chapter as they relate to the five EDI domains, the variable of ‘low education of mom’ in particular, and Families First home visiting. This will include a comparison of findings with related research in the literature. The application of the Neuman framework to the findings will be reviewed with implications for nursing practice. Application of the findings and recommendation for future research will be included throughout the discussion. Additional research recommendations and policy implications will conclude the paper.

EDI Domain: Physical Health and Well-being

Significant relationships between the ‘low education of mother’ ($p=.005$), ‘alcohol use by mother during pregnancy’ ($p=.044$), and the physical health & well-being domain were found. There is an association of borderline significance between the ‘In Families First program’ variable and the physical health & well-being domain, with a p value of $.057$. The ‘In Families First’ variable also had a marginally statistically significant relationship with the physical health & well-being domain using t -tests, before controlling for the other variables using multiple regression analysis. The EDI includes items such as whether or not children arrive at school tired or hungry, have good washroom habits, are coordinated, can climb stairs and are energetic. Physical health & well-being along with language and cognitive development are especially strong predictors of later achievement (Forget & Dubois, 2007; Lloyd, Li, & Hertzman, 2010) so the importance of the relationship of ‘In Families First’ to physical health & well-being domain should not be dismissed lightly. Since this research cannot explain why

this relationship exists, it will be important to explore this further. A specific area of the Families First program intervention is known as “body builders”. The intent of this section of the intervention is to increase the parent’s awareness of the importance of sleep, nutrition, health care and stimulating physical development. It is possible that this aspect of Families First is contributing to improving the physical health & well-being domain successfully. If it could be determined that this is the case and why, the program could seek to intentionally maintain and strengthen the influences responsible. The current study identifies a relationship but not cause and effect.

The association of marginal significance between the Families First program and this EDI domain lend some support to the hypothesis of a relationship between children being ready for school and participating in the program. School readiness, however, is a complex concept that is influenced by many other factors, as confirmed by this study. An association between ‘Alcohol use during pregnancy’ and this domain was found. This variable encompasses any alcohol use and doesn’t define amounts, frequency or timing during pregnancy. This is a very interesting relationship that would also require more exploration to understand. One has to consider the strong social pressure not to use alcohol during pregnancy and then wonder why forty percent of this sample did drink alcohol during their pregnancy. There is much research regarding alcohol use during pregnancy and the negative effect on academic outcomes and neurodevelopment, but it tends to use samples where the children have been identified with extreme alcohol effects such as fetal alcohol syndrome (Blair, 2001; Cole, Claire, & Kable, 2009; Henry, Stone, & Black-Pond, 2007). The statement is frequently made that there is no safe amount of alcohol during pregnancy but from our sample we see that a large portion of the mothers

continued to use some amount. While addictions in general are a potential challenge for parenting, the data accessed for this study does not differentiate between alcohol addiction and minimal use. It encourages further research to assess if a connection can be made to outcomes such as school readiness with even a small consumption of alcohol during pregnancy.

‘Low education of mother’ is also significant here but, as it is significant in all five domains, this will be discussed in relation to all the domains following the initial review of each domain individually.

EDI Domain: Social competence

Statistically significant relationships are identified with the social competence domain for the variables of ‘low education of mother’ ($p=.002$), ‘social isolation’ ($p=.027$) and ‘mother’s history of child abuse’ ($p=.007$).

The *EDI in Manitoba* report was released in May, 2012, by the Manitoba Centre for Health Policy, as the first report to use data from the province wide collection of the EDI in Manitoba (Santos, et al., 2012). The report states there was an expectation that maternal depression would have a negative effect on at least the domain of social competence, but noted that maternal depression was not a significant predictor for social competence. This reinforced earlier research, which found maternal depression did not have a direct influence on school performance (Fransoo et al., 2008). The current research conforms to these findings as maternal depression was not identified as having a significant relationship with any of the EDI domains.

The significance of the variables ‘social isolation’ and the ‘mother’s history of child abuse’ are interesting factors in relation to the findings of the Healthy Child Manitoba Office (HCMO) (2010) evaluation. A relationship between Social Competence and the Families First program was not found in the current study. The 2010 HCMO evaluation did find that the program influenced an increase in positive parenting and a decrease in hostile parenting, which are predictors of child abuse. The question that arises from this relationship is, if the program can decrease child abuse will that have an effect on children of the next generation and their school readiness?

EDI Domain: Emotional Maturity

Statistically significant relationships were identified between ‘low education of mother’ ($p=.003$), ‘social isolation’ (.012), ‘mother having a history of child abuse’ ($p=.028$) and this domain. The significant variables are identical here to those that were significant in the domain of social competence. The same questions therefore hold true here.

EDI Domain: Language & Cognitive Development

Statistically significant relationships were identified between ‘low education of mother’ ($p=.002$), ‘on social assistance’ (.004), and ‘a history of violence between parents’ ($p=.042$) with this domain.

The EDI report (Santos, 2012) makes a strong connection between being on social assistance and poor outcomes on school readiness. Language & cognitive development is the only EDI domain where the ‘on social assistance’ variable had a significant

relationship in the current research. The EDI report looked at the whole population whereas the current research sample is a group identified as high risk by the FSC. The data base used in the current study also includes financial difficulty in the “on social assistance” variable so that the variable is similar but not the same as that used in the EDI report. To be considered “not ready” according to the EDI a child has to have scored in the lowest tenth percentile for their site, in one or more of the five domains. They are then categorized as “vulnerable” in terms of school readiness. Being ‘on social assistance’ only needs to be significant in one domain for the child to be considered not school ready. The *EDI report* also states vulnerability is 43-129 percent higher across at risk groups compared to not at risk. Seventy percent of the whole sample were on social assistance in this research cohort and that alone is considered an at risk group (Brownell et al., 2010; Santos et al., 2012). Receiving social assistance is often used as an indicator of low income in the general population and low income has been associated with poor school readiness outcomes (Cushon, 2011; Janus, 2007; Lesaux, 2007; Puchala, 2010). The EDI report shows a greater concentration of children is identified as “not ready” in the lower income quintile, although in numbers there are many more children in middle income (Santos et al., 2010). Brownell (2010) found children in families receiving social assistance had a decreased cognitive achievement, which supports the finding that being on income assistance has a significant relationship with this domain. More research is needed to understand why social assistance is significant here as this could inform the need to specifically build in greater stimulation in this area for families receiving social assistance.

A history of ‘violence between parents’ is another significant variable in this domain. This is an interesting outcome as no research specific to the effect of partner violence on school readiness was found in the literature. There is more information available on the effect of violence in general, within the home and community, on school readiness. The nurse-family partnership as a home visiting program has done some work around intervening with families experiencing partner violence (Jack et al., 2012). It was found to be a very complicated process to prepare staff with skills to increase their confidence in working effectively with families experiencing intimate partner violence and ongoing research is occurring. The Families First program does not have a specific intervention to address issues around partner violence. Daniel and Milligan (2013) acknowledge that one of the challenges in this area is identifying those affected by partner violence through screening as part of an initial assessment, so that early detection and management can occur. They suggest that, because nurses are the largest class of health care providers, their ability to perform screening activities is paramount to early detection and management of intimate partner violence. Families First has incorporated a universal screening process that includes screening for partner violence. In relation to school readiness, this screening process may be the beginning of developing an intervention to reduce partner violence and its effects on school readiness, but there is work to do to better understand the relationship of partner violence and school readiness.

Peacock et al.’s (2013) systematic review of the literature on home visiting found that children under one year of age did better in maintaining gains in cognitive development after home visiting programs than children over one, but either age group was better in language development . Controlling for other variables, we did not find a significant

relationship between this domain and the Families First home visiting program; however, Peacock's work is referring to a different program and a different assessment tool

EDI Domain: Communication & General Knowledge.

Statistically significant relationships were identified between 'low education of mother' ($p=.003$), 'social isolation' (.001), and 'a history of violence between parents' ($p=.006$) with this domain. The consideration of 'social isolation' has been discussed under the domain of social competence. The same situation arises with this domain. 'In Families First' was not a significant variable. Similarly, the variable 'history of violence between partners' was reviewed under the domain of language and cognitive development, where it was also significant.

It is important to note that the *EDI in Manitoba* report (Santos et al.) found that 'single parent' (or the variable 'lone parent' as it is identified in the current study) was significant in predicting communication & general knowledge. This was not a significant variable for any of the domains in this study when controlling for the other variables identified. This discrepancy may be related to the higher rate of vulnerability in the current study population.

Low Education of Mother as an Indicator Variable

The 'low education of mother' variable had a significant relationship in every domain, which indicates a need to explore and understand this further. Intuitively this is not a surprise but it is more remarkable when the other variables included in the analysis are considered. This variable remained consistently significant, even when several variables

that have been identified in the literature as significant that were also included as independent variables in this study, were not significant throughout the domains.

Brownell et al. (2010) found poor education outcomes if a child was born to a teen mother or if the mother was a teen when they had their first child. The present study did not indicate a relationship between teen parents at birth of first child variable in any of the school readiness domains. It is likely that the large number of variables used makes it difficult to disentangle the effects of one compared to another. Brownell et al. (2010) examined high school outcomes but, as identified in the literature review, there is strong evidence connecting school readiness to later academic achievement. This is supported in the *EDI report* (Santos et al., 2010). The three risk factors Brownell et al. (2010) studied were mother being a teen parent with first child, being on income assistance, and being involved in the child welfare system. If a child has all three risk factors they are eleven times more likely to not complete high school, fourteen times more likely to be on income assistance themselves and thirteen times more likely to have a teen pregnancy, with one third of Manitoba children experiencing one of these outcomes (Brownell et al., 2010). Income assistance significance in the current results has already been discussed. Involvement in the child welfare system was not included as a variable in the current research due to an unacceptable level of missing data in the data base available. It is possible that the addition of this variable would have affected the overall results.

Machin and Vignoes' (2004) work showed that a parent not having completed high school education leads to poor employment opportunities and this tends to lead to a cycle of lower education and poverty in the next generation. This does not explain the

relationship between the mother's low education and the child's lack of school readiness in this study. Machin and Vignoes (2004) suggest it is low education of mother leading to poor employment that leads back to intergenerational poor education and poverty. It would be important for planning purposes to recognize if this is an effect that is established long before the parent is experiencing poor employment. If it is the mother's low education that is the greater influence on their child's progress in school it could potentially change the intervention focus. Where the system seeks to intervene or spend scarce resource dollars could be influenced by this insight. Brownell et al. (2010) state that they did not include all the confounding variables such as the mother having a low education or not completing grade twelve in their research. This reinforces that this area requires further investigation. They also note they did not look at what some protective factors might be. Jutte et al.'s (2010) research looked at the variable of teen mom at the time of first birth and stated there was an increased risk of poor educational and social outcomes for the children of these mothers. This returns the inquiry to the question: Is it having a teen mother at first birth that leads to poor education outcomes, including school readiness, or is it that many teen mothers have not finished grade twelve and this is where the relationship arises? Exploring this relationship and the literature specific to it is indicated.

Home visiting programs and Families First

The Families First program does not specifically target increasing school readiness, but rather decreasing child maltreatment is the overarching goal. Many of the interventions are aimed at improving children's growth and development while

strengthening the parent child relationship. Many of the activities are intended to improve development in areas similar to the developmental outcomes assessed for in the EDI. How this is reflected in home visiting outcomes has a variety of influences. Peacock et al. (2013) identified that it is hard to achieve the consistency in the models intended in home visiting programs, which affects the outcomes. An example of this is the number of home visits received by a family, as identified in the systematic review (Peacock et al., 2013). This is true for the Families First sample in the study, with a mean number of home visits at 22.08 but a wide range of 231, when the intended number is approximately 52 home visits in the first year, 26 in the second and nine in the third. According to the variable 'total number of home visits' mean, it is obvious the norm is less than intended, not more. Peacock et al., (2013) note an average of eleven home visits over three months, which is similar to the Families First program. This may explain the reduced effects Peacock et al. (2013) found in the studies involved as well as the current study. Challenges were also identified when working with disadvantaged families in the Peacock et al. review. Families may have enrolled in a program but never actually participated, or the participation was inconsistent, which could affect outcomes. This also fits with the Families First program. Peacock et al. (2013) recognize increased success if programs started prenatally. We know with the Families First program sample only 21 percent were screened prenatally, therefore the rest of the sample would not have had the opportunity to participate prenatally.

There was no evidence of an association between the Families First program and four out of five of the EDI domains of school readiness. Research to understand why the marginal relationship exists with physical health and well-being may help to provide

direction on how to increase the effects. Some of the challenges for home visiting programs mentioned above may have been present with the cohort used. A later cohort may have had an improved implementation of the intended intervention and therefore an increased effect on this domain. The importance of school readiness in relation to predicting academic success indicates the need to explore this relationship further, even though the finding was marginal.

These factors potentially influence the effects of the program. Further research could examine if factors such as social isolation, mothers level of education, being on income assistance, violence in relationships, alcohol use in pregnancy, and the mother having a history of child abuse in her own childhood, interact with the home visiting program in modifying school readiness. Also, understanding the relationship that was shown between the Families First program and the physical health and well-being domain is important, in order to maintain and possibly enhance this outcome.

Additional Research Recommendations

As identified, previous involvement with child protection has been an important predictor of outcomes. The *EDI report* (Santos et al., 2010) strongly suggests that involvement in the child protection system has a negative effect on the EDI outcomes but the variable of history of involvement with Child and Family services available from the Healthy Child Manitoba data base was missing too much information to use with this cohort. It would be advisable to include this variable in the future to assess if it affects the significance of other variables identified.

Peacock et al. (2013) saw some positive effects of home visiting programs on general outcomes, but a more significant effect if a nutrition component was added in. Healthy Child Manitoba offers a prenatal income supplement for families below an income of 32,000.00 dollars per year, which is intended to improve prenatal nutrition health. It would be interesting to examine the effect of adding in actual grocery supplies with the home visiting program. This is an intervention which has not been explored. Offering nutritious food as part of the home visits may even increase engagement and retention if families are engaged by the incentive of receiving food. This may have been a factor in the research Peacock identified.

Peacock et al. (2013) noted a high dose of home visiting over a long period of time was the most successful in creating positive outcomes. Adding in a variable that represents dose of the program may influence the research outcomes. In the present research the co-linearity between the variable of the In Families First variable and the total number of home visits led to the decision not to include the total number of home visits variable. How this variable could be represented in future research should be explored.

Peacock et al. (2013) indicated no literature was found that looked at the effect of the relationship of the home visitor with the family and how that affects outcomes. Looking at whether the relationship changes if the program group is divided by level of complexity, and if there is greater success with less complex though challenged families, would be helpful to understand. In this research the FSC score was introduced as a

variable, which is intended to quantify risk. It did not change the factors that were significant but further exploration is indicated

Policy and Program Considerations

The *EDI report* (Santos, 2013) states that identifying early life determinants of school readiness is a top priority of policy makers as one of the most important developmental tasks facing preschoolers. The report notes that it is particularly important in creating policy to understand the developmental origins of disparities in physical and mental health in early life in order to define effective population health and prevention strategies (Santos et al., 2013). It may be that a first step is to decrease child maltreatment, which shows up as very relevant in the literature, and which Families First has been shown to contribute to in the HCMO (2010) evaluation. The next step was to determine if we can influence other important determining variables, such as children`s school readiness. The results of the current study did not indicate a strong relationship between Families First and school readiness but it did pose further questions.

The ‘low education of mother’ variable did surface as having a relationship with each EDI domain. While this is not surprising as a significant factor, the fact that it is so prominent in the results is important. This reinforces the protective factor of mother’s finishing grade twelve specifically in this population. Interventions and investments such as child care centres in high schools could help to decrease barriers to mothers returning or staying in school. Increasing the work done by Families First to help parents returning to school could be considered. Investment in resources that help mothers complete grade twelve is reinforced. In home care for children; transportation to school for mothers’;

short term 1:1 tutoring such as used with the reading recovery program presently available in elementary schools to catch up those who are behind; and decreasing other barriers to parents completing high school are important to consider.

Brownell et al. (2010) point out that increasing competency leads to decreased costs to the system for income assistance and child protection along with an increased skilled labour force that pays taxes. Brownell et al. (2010) recognize that identifying youth with risk factors is easy for schools and could lead to targeting them for additional resources, including parents and their children. The current project leads to further questions about home visiting in relation school readiness as it is only suggesting a marginal relationship. Continued research is needed to improve our understanding of how to provide guidance to policy and programming.

The Neuman Framework, Research Findings and Implications for Nursing Practice

With Neuman's model as a theoretical framework, research is used to predict if primary prevention is effective in allowing the attainment of client system stability. In this case system stability would be a child being ready for school entry. This study assesses if the primary prevention intervention of the Families First program is associated with children attaining improved school readiness. The sample consists of clients or families who have many stressors as identified by the FSC. These stressors affect the individual and families line of defence as described by Neuman (2011). The goal of the research in this case was to assess if the intervention of Families First creates a better expansiveness and therefore protectiveness of the flexible line of defence as described in the framework. Neuman identifies the normal lines of defence as a client's normal

standard of wellness that develops over time. This equates to a child developing skills that create a state of readiness for school as their normal standard. The data analysis technique of multiple regression with SPSS software explored if a relationship existed between children involved in Families First and an improvement in their normal standard or normal lines of defence as assessed using the EDI. This meets the requirement of the framework to use validated measurement tools with appropriate software applications.

The model is helpful in understanding the results related to the relationship found between the physical health & well-being domain of school readiness and the Families First program. Neuman guides us to consider physiological, psychological, sociocultural, and spiritual variables simultaneously as part of the client system. The domains of the EDI cover most of these concepts in the different domains. The research did identify a relationship of borderline significance between physical health and well-being and Families First, which relates to the physiological variable referred to in the framework. Neuman does not identify that an intervention must affect all of these variable areas but only that they must all be considered. This reinforces that from this nursing model's perspective, if we have the potential to affect the client's (child's) physiological health and well-being, there is a benefit to nursing practice continuing to support the Families First program. The model instructs us that the nurse's role is to accurately assess environmental stressors, which the validated FSC tool does, and then assist the client as a partner to adjust to achieve optimal wellness or best possible health (Neuman, 2011). This requirement is met by nurses completing the FSC with families that they work with and offering the Families First program as a possible voluntary, family centered, intervention.

An assumption of the Neuman model is that nursing goals are more effective when they are established with the client, respecting the client's perspectives and rights (Neuman, 2011). The results indicate that involvement in the voluntary program does have a positive relationship with school readiness or best possible health. Nurses have an ongoing role in the Families First program where they continue to connect with the family, but also in their role as supervisors of the home visitors who are paraprofessionals. The results indicate that this practice should not be abandoned as they are consistent with reaching desired outcomes of nursing practice in effecting the clients state of wellness. The results also indicate the need for further research to explore the mechanism underlying the relationship, and potentially how it can be strengthened as well as sustained, considering the effect on the clients' system state of wellness. Further research to understand what caused other variables to be significant and how nursing practice can help families to achieve optimal wellness based on the significant influence of these other variables is indicated.

Conclusion

The results of this research project demonstrate weak support for the hypothesis that the Families First program is related to school readiness for children whose families are enrolled. The significance was marginal and only shown in the domain of physical health and well being, though this domain is a very relevant predictor of future achievement. Significant relationships with the variables of low education of mother, alcohol use during pregnancy, social isolation, mother's history of child abuse in her own childhood, on social assistance, and history of violence between partners were identified in the other

four domains of the EDI as discussed. This is not surprising as these are known risk factors that affect outcomes for children's development and why they were included as control variables. A direct relationship with the Families First program is not shown with the four remaining domains of the EDI. Further investigation would be necessary to assess if the program can affect the significant variables identified, which in turn are related to school readiness. These relationships indicate the need for further research to understand why they exist, which can help to guide future planning and programming. The variable of low education of mom is particularly significant in that it consistently showed a relationship to all five domains when controlling for the other variables. This makes the further exploration of this variable especially important to investigate, regarding why it is featured so significantly in all the domains of school readiness.

The results of this research in combination with general home visiting research raise further questions for investigation including: how does the consistency of how home visiting models are implemented affect outcomes; could success in enrolling and retaining families change the affects; can timing of enrolment and the dosage of program actually received improve the results? Some challenges experienced with Families First are true in a variety of home visiting programs delivered. These include some other confounding variables that affect outcomes and require investigation beyond the present research. It is important to keep in mind that there is more to consider than the direct effects of a home visiting program on the EDI, including if the programs affect may be on the variables that were identified as significant, which in turn affect school readiness.

The relationships found in this study stimulate further research questions. When a relationship is established although marginal, it tells us further investigation is required to understand why. Changes to the program have already been incorporated which may affect future results such as additional material to increase parents awareness of the importance of socio-emotional development, which could potentially affect the social competence and emotional maturity outcomes of the EDI. The results generated and future research are intended to inform research, policy, and programming. Knowing that school readiness can open doors as a child enters the world of independence tells us continued research to determine the keys that open these doors is not only compelling but crucial. The answers hold a piece of the puzzle that can give rise to the equity of future generations. It is only through solving this puzzle that we can achieve the ultimate state of health and well-being, where we provide resources to those with the greatest need, closing the gap in health that exists throughout our society. It is only then that we will be able to lay claim to the true achievement of population health.

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