Early Childhood Development and Children of Immigrant Families

by

Ameneh Toosi

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Abstract

Mounting evidence indicates that early childhood experiences have lifetime consequences for adult functioning and therefore the wellbeing of societies. Early childhood life is also considered the most effective and cost-efficient time for preventing inequalities in human life. Despite the large numbers of international migrants and their children worldwide, as well as the growing interest in understanding and supporting optimal child development, there is little understanding about the early development of children in international migrant families and the factors that influence their development. The majority of research on children in international migrant families focused on risk behaviours in adolescence and outcomes related to the neonatal period with substantially less focus on early childhood development. As such, we do not understand if development of children in international migrant families is different and, if so, in what ways it differs from children from native-born families or factors that influence their development. Knowledge of international migrant children's patterns of development and factors that influence their early life is necessary to inform policies and practices in order to ensure that this group of children has appropriate services and opportunities to support their early development and future opportunities.

The aim of this thesis was two-fold. The first aim was to compare indices of early childhood development across key developmental domains (fine and gross motor, communication, problem solving, personal-social, social-emotional and behavioural problems and competencies) between children at two years of age who were born to foreign-born parents and their counterparts who were born to Canadian-born parents. The second aim of this thesis was to identify and compare factors associated with communication and social-emotional behavioural problems and

competencies of early childhood development at two years of age for children who were born to foreign-born parents and their counterparts who were born to Canadian-born parents.

Methods: This study used data from a prospective longitudinal pregnancy cohort study, the All Our Babies (AOB) study (n=3223; 2008-2011) in Alberta, to answer the research questions. We classified the eligible mother-child dyads who participated in the two year follow-up (n=1581) into two groups based on the parents' country of birth: 1) children who were born to Canadian-born parents (n=1129, 73%) and 2) children who were born to families with at least one foreign-born parent (at least one of the parents had to have been born outside of Canada) (n=452, 27%).

Analysis: The demographics of the children and their parents were described as frequencies and precentages for categorical variables and means (SD) for continuous variables. Bivariate analysis was used to assess differences in developmental score means and categories using independent sample T-tests and Chi Square tests, respectively, between children two years of age who were born to foreign-born parents and those born to Canadian-born parents. Unadjusted odds ratios were generated for each independent variable and outcome. Multivariable logistic regression analysis was performed to examine risk and protective factors of child development in each group.

Results and conclusion: Children with foreign-born parents were more likely to need further assessment in communication (17%) with compared to those with Canadian-born parents (12.4%). They were also more likely to be at risk for social-emotional and behavioural problems (20.9%) and delay in social-emotional and behavioural competencies (18.9%) with compared to those with Canadian-born parents (12.6% and 11.1% respectively).

Our findings suggest that the quality of stimulating activities in families with foreign-born parents differs from that of families with Canadian-born parents, which can influence the

communication and emotional-social development of these children. Foreign-born parents may benefit from parenting supports to improve the quality of parenting practices. History of mental health issues was a universal risk factor for social-emotional delays in both groups. Addressing maternal mental health as a modifiable risk factor is warranted.

Preface

The Child Health Research Office and the Conjoint Health Research Ethics Board of the Faculties of Medicine, Nursing, and Kinesiology, University of Calgary and the Affiliated Teaching Institutions approved the All Our Babies (AOB) study. This research project received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Migrant Children and Early Childhood Development: A Cohort Study", No. Pro00048228, April 28, 2015. The three manuscripts contained herein were prepared by Ameneh Toosi and at this time are in various stages of peer review for publication, with the supervisory committee as co-authors.

Dedications

To my anchor who kept me grounded, to my porter who made it possible to ride this elevator, the elevator of knowledge, to my husband Boris.

To my son, Daniel for putting up with my deadlines, busy schedule, fatigue and constant debates at the dinner table.

Acknowledgments

I would like to thank the AOB cohort participants and the study support team who made it possible to access the data. I would also like to thank my supervisors and committee members for helping me through this journey.

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Table Of Contents

List of Tables and Figures

Chapter 1: Introduction

Mounting evidence indicates that early childhood experiences have lifetime consequences for adult functioning and therefore the wellbeing of societies (Britto, Engle, & Super, 2013; Walker et al., 2011). Early childhood life is also considered the most effective and cost-efficient time for preventing inequalities in human life (Boivin & Hertzman, 2012; Hertzman, 2013; Walker et al., 2011). Despite the large numbers of international migrants and their children worldwide, as well as the growing interest in understanding and supporting optimal child development, there is little understanding as to whether or not migration and the process of adjustment to a new country influence children's development. While a substantial amount of research has been conducted on the patterns and determinants of children's development, very little research has been focused on children from foreign-born families. As such, we do not understand the trajectories of development across these children's lives, how these trajectories compare to children from native-born families, or factors that influence development of children from foreign-born families. This knowledge is necessary to understand any risks specific to children, and to support their optimal development.

Knowledge of international migrant children's patterns of development and factors that influence their early life is necessary to inform policies and practices in order to ensure that this group of children has appropriate services and opportunities to support their early development and future opportunities. The results of this study will generate knowledge to set priorities for early childhood development programs and policies and future studies that target international migrant children. The first paper (Chapter 2) of this thesis outlines this gap in greater detail.

The aim of this thesis was two-fold. The first aim was to compare indices of early childhood development across key developmental domains (fine and gross motor,

communication, problem solving, personal-social, social-emotional and behavioural problems and competencies) between children at two years of age who were born to foreign-born parents and their counterparts who were born to Canadian-born parents. This objective guides the second paper (Chapter 3) of this thesis. The second aim of this thesis was to identify factors associated with communication and social-emotional behavioural problems and competencies of early childhood development at two years of age for children who were born to foreign-born parents and their counterparts who were born to Canadian-born parents. This objective guides the final paper (Chapter 4) of this thesis. The aim of the final chapter of this thesis (Chapter 5) was to provide recommendations and implications for nursing practice and policy development.

The primary research question was: What are the differences in early childhood development indices (fine and gross motor, communication, problem solving, personal-social, social-emotional behavioural problems and competencies) between children at two years of age who were born to foreign-born parents and their counterparts who were born to Canadian-born parents? The secondary research question was: What are the factors that influence the development (communication and social-emotional behavioural problems and competencies) of children at 2 years of age who were born to foreign-born parents and their counterparts who were born to Canadian-born parents?

Methods

This study used data from a prospective longitudinal pregnancy cohort study, the All Our Babies (AOB) study (n=3223; 2008-2011) in Alberta, to answer the research questions. In the present study, mother-child dyads were eligible if the place of birth for both parents was reported. Among those who participated in the two-year follow up (n=1595), 14 parents did not report their place of birth. We classified the eligible mother-child dyads (n=1581) into two

groups based on the parents' country of birth: 1) children who were born to Canadian-born parents (n=1129, 73%) and 2) children who were born to families with at least one foreign-born parent (at least one of the parents had to have been born outside of Canada) (n=452, 27%).

Analysis

The demographics of the children and their parents were described as frequencies and precentages for categorical variables and means (SD) for continuous variables. Bivariate analysis was used to assess differences in developmental score means and categories using independent sample T-tests and Chi Square tests, respectively, between children two years of age who were born to foreign-born parents and those born to Canadian-born parents. Unadjusted odds ratios were generated for each independent variable and outcome. To assess multicollinearity, correlations among independent variables were estimated for each group in order to assess their eligibility for entry into the multivariable logistic regression models. Independent variables significant at a level of $p \leq 0.20$ were included in the final multivariable models (Field, 2011).

Multivariable logistic regression analysis was performed to examine risk and protective factors of child development in each group. Given evidence that factors associated with development could differ by developmental domain (e.g., those that influenced socio-emotional development differed from language development) (Kingston, Tough, & Whitfield, 2012; Kingston & Though, 2014; Kingston, McDonald, Austin, & Tough, 2015), separate models were built for each developmental domain and for each group of children. The potential factors were chosen based on empirically identified factors from current literature. In addition, factors that could contribute to health disparities for international migrant populations were included in the models associated with the children who were born to foreign-born parents. Those factors included the migration experience (refugee, immigrant), social adjustment (less than 5 or more

than 5 years in Canada), social economical status (i.e. income), social supports, mothers' health status (i.e. physical and mental health), access to care (prenatal care), and utilizing services (formal and informal community resources). The latter factors were chosen based on the Assessing Health Disparity Trajectories in Immigrant/Refugee Communities Model (Edberg, Cleary, & Vyas, 2011), which proposes a comprehensive approach for assessment of contributing factors to health disparities among immigrant and refugee populations. This model identifies nine domains of factors (migration experience, social adjustment, social economical status, social supports, neighbourhood charactoristics health status, health knowledge and practices, access to care, and perceived discrimination) to establish the scope of data collection and analysis (Edberg et al., 2011).

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Chapter 2

An Overview of Research on Children From Immigrant Families: Challenges and Trends

Author Note

Amy Toosi, RN, PhD Candidate, University of Alberta

Solina Richter, RN, DCur, University of Alberta

Dawn Kingston, RN, PhD, University of Calgary

Sheila McDonald, PhD, University of Calgary

Manuscript submitted to the Child Development (Journal)

Abstract

Children in immigrant families represent the fastest growing segment of the child population in high-income countries. Despite the large numbers of children in immigrant families little research is focused on the early development of these children. The purpose of this review is to explore the major gaps in knowledge related to the early development of children in immigrant families and to provide a direction for future research. The findings suggest that the majority of research on children in immigrant families focused on risk behaviours in adolescence and outcomes related to the neonatal period with substantially less focus on early childhood development. There is little understanding about the early development of children in immigrant families and the factors that influence their development.

Migration across international borders has increased at a significant rate over the past several decades and continues to increase. International migrants include immigrants, refugees, asylum-seekers, or temporary workers who migrate for a variety of reasons (Toosi, Richter, & Woytowich, 2016). According to the United Nations (UN, 2013), the number of international migrants almost tripled globally from 1960 to 2006. The most current estimates suggest that there are 232 million international migrants worldwide and this number is expected to rise to 280 million by the year 2050 (UN, 2013). On average, 3.3 million people migrate annually worldwide with 16% of them being children aged 0 to 9 years old (UN, 2013). The rate of migration by global refugees also increased by 45% in 2015, exceeding all previous records for the past 20 years, largely due to conflict in the Syrian Arab Republic (United Nations High Commissioners for Refugee, 2015). The number of displaced people increased to 65.3 million by the end of 2015 with 51% being children (UNHCR, 2016). The World Health Organization and their World Health Assembly Resolution (2008), "Health of Migrants," has made monitoring, promoting, and maintaining the health of immigrants a major public health concern (WHO, 2008).

Given the increasing rates of international migrants, and considering the higher birth rates among this group (mean=1.03) compared to the native-born group (mean=0.77), children born to international migrants represent the fastest growing segment of the child population in high-income countries (Adsera & Ferrer, 2011; Bradley, 2011; Statistics Canada, 2011; United Nations Children's Fund UNICEF, 2009). Despite the large numbers of children in international migrant families worldwide as well as the growing interest in understanding and supporting optimal child development, little research has been done to study early development among international migrant children. There is also little understanding as to whether or not the

immigration of parents and factors associated with the process of adjustment to a new country influence children's health and development (Bornstein & Bohr, 2011; Cote, 2011; Georgiades, Boyle, Kimber, & Rana, 2011; Health Canada, 1999; Pottie, Hatcher, Torres, & DesMeules, 2011).

Increasing evidence in neuroscience, epigenetics, and epidemiology suggests that the quality of the early childhood experiences affect brain development and become embedded within the human body (Boivin & Hertzman, 2012; Hertzman, 2013; Monk, Spicer, & Champagne, 2010; Shonkoff, Richter, Van der Gaag, & Bhutta, 2012). This effect on the brain and the Central Nervous System can alter cognitive, social, emotional, and behavioural development of children (Heymann, Hertzman, Barer, & Evans, 2006). There is also a strong relation between cognitive, social, emotional, behavioural, and physical aspects of early development and adult health (Boivin & Hertzman, 2012; Hertzman, 2013; Heymann et al., 2006). As a result, childhood experiences can affect long-term health and development through adulthood.

The quality of childhood experiences may also have an effect on a variety of body defense systems such as immune, hormone, and clotting systems and the biological maturation of these pathways (Heymann et al., 2006). The systematic differences of these factors over the life course may lead to systematic differences in the functioning of organ systems and observed differences in morbidity and mortality (Heymann et al., 2006). As a result, childhood development can be one of the best indicators for health trajectories over the life course (Shonkoff et al., 2012).

Mounting evidence indicates that early childhood experiences have lifetime consequences for adult functioning and therefore the wellbeing of societies (Britto, Engle, &

Super, 2013; Walker et al., 2011). Early childhood is also the time that is considered the most effective and cost-efficient for preventing inequalities in human life (Boivin & Hertzman, 2012; Hertzman, 2013; Walker et al., 2011). Yet, we do not understand if the childhood development of children in immigrant families is different from children in native-born families and if so what factors influence their optimal or sub-optimal development. The purpose of this article is to explore the major gaps in knowledge related to early childhood development for children from immigrant families living in high-income countries and also to provide a direction for future research in this area. Children in immigrant families is defined as children who live in families with at least one international migrant parent who was born outside of the country of settlement (Hernandez & Charney, 1998; UNICEF, 2009). Children in native-born families is defined as children who were born in the country of settlement and live in families in which both parents were born in the country of settlement (Hernandez & Charney, 1998; UNICEF, 2009).

Are Children in Immigrant Families at Risk?

Socioeconomic, psychosocial, and developmental environments influence biological processes, which consequently generate systematic differences in health status and functioning over the life course (Boivin & Hertzman, 2012; Hertzman, 2013). Growing evidence suggests that social and economic disparities between international migrants and native-born individuals exist and that the gap is widening, which further suggests that children in immigrant families are more likely to experience these disparities (Bornstein & Bohr, 2011; Cote, 2011; De Maio, 2010; Georgiades et al., 2011). Thus, we anticipate that the early life experiences of these children and their development may be different from children in native-born families.

International Migrants' Experiences

Migration (physical relocation) and acculturation (social and psychological adjustment to a new location) (Caplan, 2007), can affect adult health in significant ways in the form of resettlement stress, poverty, family separation, and social isolation (De Maio, 2010; Gushulak, Pottie, Hatcher, Torres, & DesMeules, 2011). Factors such as unemployment, poverty, and lack of social support can have adverse effects on anyone's health and since international migrants are more prone to such factors there is greater risk of negative effects and consequences to their health (De Maio, 2010).

Furthermore, the stress of migration and social isolation on international migrant mothers increases their risk for depression, which may adversely affect childhood development (Bornstein & Bohr, 2011; Cote, 2011; De Maio, 2010; Van Hulst, Séguin, Zunzunegui, Vélez, & Nikiéma, 2011). Research shows that international migrant mothers have lower social support when compared to native-born counterparts. For example, 12% of international migrant mothers have lower social support compared to 3.8% of their Canadian counterparts (Van Hulst et al., 2011). They also have less support during pregnancy and the postpartum period (Kingston et al., 2011; Toosi, McDonald, Kingston, & Richter, 2016). Kingston et al. (2011) reports that recent immigrant women (those that migrated in the past 5 years) have less support during pregnancy (74%) and the postpartum period (68%) compared to Canadian women (90% and 87% respectively). Toosi, McDonald et al. (2016) also reports that 41.7% of international migrant mothers have lower social support compared to 22.8% of native-born mothers at 12 or 24 months postpartum.

This lack of support may have a negative impact on their physical, mental, and emotional health (Bornstein & Bohr, 2011; Cote, 2011; De Maio, 2010; Reblin & Uchino, 2008). For

example, only 56% of migrant mothers report good maternal health compared to 70% of Canadian mothers at 5 and 17 months postpartum (Van Hulst et al., 2011). Toosi, McDonald et al. (2016) also indicates that 84.7% of international migrant mothers report good to excellent physical health compared to 89.7% of native-born mothers at 12 or 24 months postpartum.

Research shows that international migrant women report more depression during pregnancy (21.9%) and postpartum (24%) compared to native-born women (12.8% and 18.4% respectively) (Toosi, McDonald et al., 2016). Kingston et al. (2011) also indicates that 13% of recent immigrant women have experienced postpartum depression compared to 6% of Canadian mothers. However, the impact of immigration and the process of acculturation on children development are unclear.

Poverty

International migrants migrate for a variety of reasons such as to escape conflict, political instability, environmental disaster, or to find better living conditions, higher wages, or better access to education and health care (Cymbal & Bujnowski, 2010). Unfortunately, not all immigrants realize their dreams of a better life and, instead, find themselves in poor living conditions and with less satisfaction with their health and wellbeing (Correa-Velez, Gifford, & Barneet, 2010; Meleis, 2010). Research indicates that international migrants are more likely to live in poverty than their native-born counterparts (Ministry of Finance, 2012; UNICEF, 2009). For example, 34% of recent immigrants were considered low income in 2006; this was more than three times higher than their Canadian-born counterparts (9.7%) (Statistics Canada, 2011). As a consequence, poverty rates are higher among children in immigrant families compared to children in native-born families in high-income countries (UNICEF, 2009). For example, immigrants who have children are three times more likely to live in poverty than their native-

born counterparts (Beiser & Hou, 2002). Poverty increases the risk of disease and also decreases the likelihood of accessing treatment and can also adversely affect child development (Beiser, 2005). In general, poverty affects the overall health of immigrants twice as much as their native-born counterparts (Newbold & Danforth, 2003).

Research indicates that biological and psychosocial risk factors associated with poverty such as lack of stimulation or excessive stress can affect brain development and increase the likelihood of behavioural and educational problems in childhood (Engle & Black, 2008) and can result in poor mental and physical health for adults, consequently resulting in living in poverty in adulthood (Belsky, 2008; Mustard, 2006; Walker et al., 2011). Evidence from the National Institute of Child Health and Human Development (NICHD) (2005) reveals that poverty has a negative effect on cognitive and behavioural development. For example, children who were identified as being poor at 6 months of age had lower cognitive skills (score of 85) than children who were not poor (score of above 95) while the magnitude of the differences between the groups remained the same through the first 9 years of their lives (NICHD, 2005). The consequences of poverty can lead to inequalities in early childhood development, educational achievement, and as a result adult health and productivity, and can lead to perpetuation of the poverty cycle (Belsky, 2008; Walker et al., 2011). The adults that grow up in low-income families are at higher risk of having tobacco, alcohol, or drug dependency and unfavorable cardiovascular risks. These adults are more than two times more likely to be tobacco, alcohol, or drug-dependent than those from high-income families. They are also two and half times more likely to have cardiovascular risk factors than those from higher income families (Melchior, Moffitt, Milne, Poulton, & Caspi, 2007).

Accumulating evidence suggests that there is a relation between socioeconomic status

and early childhood brain development, and also health and wellbeing in adulthood. Research conducted using a British birth cohort indicates that the developmental score of an infant at age 22 months can forecast educational qualifications at age 26 (Mustard, 2006). These findings suggest that the more developed brain has better functioning in areas such as language, cognitive behaviour, and emotional development, which are important factors for determining an individual's social status later on in life (Mustard, 2006).

The Social and Economic Resources

The social and economic resources of families are the main sources of early childhood development inequalities (Boivin & Hertzman, 2012). Social resources refer to parenting skills and education, the health status of family members, and cultural practices and approaches. Economic resources refer to finances and material goods, which help to reduce stress for parents thereby helping to provide opportunities for family members and children to develop nurturing relationships (Boivin & Hertzman, 2012). These modifiable resources are directly related to childhood developmental outcomes; the more the resources, the better the outcomes (Boivin & Hertzman, 2012). Bernard et al. found in their study that high risk (for maltreating) children aged 11.7 to 31.9 months that participated in a program that enhanced sensitive and nurturing care among parents developed disorganised attachments with their primary caregiver at lower rates (32%) than children not receiving the program (57%) (2012). These same children also had higher rates of developing a secure attachment (52%) compared to children who did not receive the program (33%) (Bernard et al., 2012).

Evidence from a longitudinal study involving 7-year-old disruptive boys from low socioeconomic backgrounds revealed similar results for the children in that study in their adulthood. The children who received a 2-year preventive intervention (multi-modal involving

social skills training, parent training, and teacher support) at 7 years of age were two times more likely to acquire a high school diploma than control groups at 24 years of age (Boisjoli, Vitaro, Lacourse, Barker, & Tremblay, 2007). On the other hand, those who did not receive the supportive intervention were two times more likely to have a criminal record than the intervention group at age 24 (Boisjoli et al., 2007).

International migrant families, especially those with fewer economic resources and with language barriers, tend to use less non-parental care for their children in the early childhood years (Bradley, 2011; Toosi, McDonald et al. 2016). This lack of exposure to non-parental care may predispose this group of children to less contact to mainstream culture and consequently less integration into society (Bradley, 2011). This acculturation gap is likely to increase tension and conflict between immigrant children and mainstream society (Cote, 2011). Consequently, immigrant children may have less of a chance to have an optimal early education and therefore less school engagement and academic success (Bradley, 2011).

After a 3-year investigation into the influence of the social environment on health, the World Health Organization's (WHO) Commission on Social Determinants of Health concluded that inequalities were killing people on a grand scale (2008). The WHO commission also indicated that children were the ones most affected by inequalities related to social and financial difficulties during early childhood, reportedly the most critical period of their development (2008). Children in immigrant families can be considered one of the groups of children who are affected by inequalities, as their experiences can be far different from children in native-born families.

Mounting evidence indicates that social and economic disparities between international migrants and native-born counterparts exist and the gap is widening (Bornstein & Bohr, 2011;

Cote, 2011; De Maio, 2010; Georgiades et al., 2011; UNICEF, 2009). Higher parental stress; emotional, mental, and physical health problems; insufficient parenting skills and education; poor living conditions and poverty; family separation and social isolation, and lack of use of non-parental care for immigrant children can have lasting negative effects on these children over time (Bradley, 2011; Correa-Velez et al., 2010; De Maio, 2010; Gushulak et al., 2011; Kingston et al., 2011; Ministry of Finance, 2012; Statistics Canada, 2008; Toosi, McDonald et al., 2016; Walker et al., 2011). One consequence may be that children in immigrant families are more likely to experience developmental and health disparities. Consequently, children in immigrant families may have less of a chance to have an optimal early education, which can therefore lead to less school engagement and less chance for academic success (Bradley, 2011). As a result, any negative effects from the process of migration and integration into new environments may also have lasting effects on children in immigrant families and their development (Cote, 2011). In spite of knowing that developmental disparities may exist between children in immigrant families and those in native-born families in the early childhood period, research has not focused on this area. Research has focused mainly on the prenatal, early infancy, or adolescent periods.

Lack of Evidence on the Development of Children in Immigrant Families

Health disparities between international migrants and native-born counterparts in high-income countries are well documented including perinatal health outcomes such as pregnancy, birth, the maternity experience, as well as related health care service use (Gagnon, Merry, & Haase, 2013; Gagnon, Tuck, & Barkun, 2004; Gushulak et al., 2011; Kingston et al., 2011; Newbold & Danforth, 2003; Singh & Miller, 2004; Wiking, Johansson, & Sundquist, 2004). Studies about health disparities indicate that infants born to international migrant mothers have birth weight and mortality advantages but have lower cognitive development compared to infants

born to native-born mothers (Fuller et al., 2010). However, not many studies focus on development for children in immigrant families. Studies that explore development for this group of children emphasize that disparities exist between children in immigrant families and those in native-born families, but the results are inconsistent (De Feyter & Winsler, 2009; Foss, Chantal, Hendrickson, 2004; Puder et al., 2013; Toosi, Kingston, McDonald, & Richter, 2016; Washbrook, Waldfogel, Bradbury, Corak, & Ghanghro, 2012).

A study in the United States of America (U.S.A.) that focused on the relation between the developmental level of children 0-25 months of age and the degree of depression and anxiety of their mothers indicated that children of native-born mothers performed better on the Denver II (personal social, fine and gross motor, and language development) than the foreign-born group (Foss et al., 2004). A study that compared the development of 2 year old children in immigrant families and those in Canadian-born families reported that children in immigrant families had higher rates of possible communication delay (17% vs. 12.4%), possible delay in social-emotional behavioural competencies (18.9% vs. 11.1%), and possible social-emotional behavioural problems (22.9% vs.12.6%) compared to children in Canadian-born families (Toosi, Kingston et al., 2016). However, there were no notable differences in the proportion of children with fine and gross motor, problem solving, and personal-social developmental delays between the two groups (Toosi, Kingston et al., 2016).

A study that focused on the development of 4 year old children in the U.S.A. also indicated that children in immigrant families had lower cognitive and language skills compared to children in native-born families, but had fewer behaviour problems compared to the non-migrant children (De Feyter & Winsler, 2009).

Puder et al. (2013) reported that children in immigrant families between 4 to 6 years of age had lower levels of Health Related Quality of Life (HRQoL) compared to those from native-born families (both parents were born in Switzerland). For children, HRQoL is an important indicator of everyday functioning and includes multi-dimensional concepts such as physical health, emotional, social, and school functioning (Coker et al., 2011). For example, in one study, children in immigrant families scored lower in their overall HRQoL (81.7) compared to those from native-born families (84.2), which was similar to the differences between healthy children (83.84) and those with chronic illnesses such as diabetes (81.64) (Puder et al., 2013; Varni, Limbers, & Burwinkle, 2007). In this study, the magnitude of the differences between children in native-born families and those in immigrant families for physical health (2.04), emotional functioning (1.75), social functioning (2.53), and school functioning (1.54) were also similar to differences between healthy children and those with diabetes (Puder et al., 2013; Varni et al., 2007). These results suggest that the impact of being in immigrant families on child development may be similar to having a chronic disease.

The results from a multi-country study that included Australia, Canada, the United Kingdom (U.K.), and the U.S.A. suggested that children in immigrant families between 4 to 5 years of age had lower scores in vocabulary tests compared to children in native-born families with no differences between their behavioural development (Washbrook et al., 2012). In contrast, results of a study by Ma (2002) indicated that children between 4 to 11 years of age in immigrant families had fewer emotional and behavioural problems than children in Canadian-born families. In the aforementioned study, analyses showed that immigration negatively affected conduct disorder, property offences, hyperactive behaviour, and emotional disorder by 7%, 5%, 6%, and 9% of a standard deviation in effect size respectively (Ma, 2002).

Although evidence demonstrates that differences vary between children in immigrant families and children in native-born families depending on the developmental period being studied (Georgiades et al., 2011), developmental disparities among immigrant children in their early childhood period are nevertheless poorly understood and therefore less conclusive (Cote, 2011; Mendoza, 2009; Washbrook et al., 2012).

Why Do Gaps Exist?

Limited Data

One of the reasons for the lack of understanding regarding disparities in early development is that documented data on children from immigrant families beyond infancy is limited (Cote, 2011). This is due, in part, to challenges in identifying and recruiting immigrant families to be followed as cohorts over time for longitudinal studies because they are highly mobile and also because at times they hesitate to participate in such research studies (Edberg, Cleary, & Vyas, 2011; Ogilvie, Burgess-Pinto, & Caufield, 2008). By contrast, research on school age or adolescent children has been found to be more feasible because high-quality, comparable data is usually collected by different organizations. For example, test score outcomes for 15-year-old adolescents are collected from many schools within Organization for Economic Co-operation and Development (OECD) countries such as Canada, Australia, the U.K., and the U.S.A. (Washbrook et al., 2012).

Limited Screening Tools

Another reason for this gap in research is related to the limited number of developmental screening tools that have been tested on children from immigrant families and/or the limited number that have been found to have good psychometric properties. Even though some childhood developmental screening tools have been tested with individuals from various ethnic

and socioeconomic backgrounds (Newborg, 2004; Squires, Twombly, Bricker & Potter, 2009), not all have been validated for use with children in immigrant families that speak different languages at home other than English and that have different cultural backgrounds (Edberg et al., 2011).

In most research studies, one of the inclusion criteria is the ability to read and/or write in English, which is often the dominant language of settlement countries. This criterion eliminates many immigrant families and children, ironically those often identified in research studies as being most at risk of disparites. This elimination increases the risk for sample selection biases and may lead to insufficient sample sizes of immigrants, which are needed for statistical analyses, and as a result underestimates levels of potential disparities (Georgiades et al., 2011; Mendoza, 2009; Ogilvie et al., 2008). It appears that research in immigrant populations can be thought of as having a "double edged sword;" on one side, researchers are either not able or willing to include immigrant populations in their studies because of different issues such as budget constraints, recruitment difficulties, or lack of confidence with screening instruments and on the other side there are few studies and small sample sizes, which makes it difficult to test and develop quality instruments that can be used to measure and predict health outcomes. This issue has led to a vicious cycle that generates limited data and limits to quality instruments for this vulnerable population.

Focus on Deficiency

Another reason for the lack of understanding of disparities in development is that the majority of the research on children in immigrant families has been founded on the deficit model and has focused on the deficits rather than the strengths of these children. The majority of the research on immigrant and minority group adolescent children has focused on risk behaviours

such as drug use, teen pregnancy, school performance, and failure rather than their normative development and strengths (Cote, 2011; Crosnoe & Turley, 2011; Puder et al., 2013; Washbrook et al., 2012). In those studies, adolescents from immigrant families have been found to have more school difficulties, higher dropout rates, and higher rates of teenage pregnancy and drug use (Cote, 2011; Crosnoe & Turley, 2011; Puder et al., 2013).

Unfortunately, research related to development for children in immigrant families has focused mainly on both ends of the child development continuum, the infancy and adolescent periods, and paid little attention to the most vital period of life, early childhood. Since, the mortality and serious illness rates in the early childhood period have reportedly dropped significantly in high-income countries researchers have lost interest in focusing on this period of life. Another outcome of focusing on the deficit model is that research in this area does not take into account the importance of the strengths that this group of children may have in spite of adversity. Cultural elements that these children have, which may foster resilience, have been overlooked (Gunnestad, 2006).

Continuous Gap in Immigrant Children Research

After conducting an extensive review on Canadian research that focused on immigration health in 1999, Health Canada reported that, "compared to available research on Canadian children in general, surprisingly little research was found that directly addressed the topic of immigrant children" (p. 47). This gap in early childhood development research still continues to be an issue 25 years later. Even though one of the findings of the Health Canada Report (1999) is that research on immigrant health is predominantly about determinants of health, researchers continue to disregard childhood development as one of the important determinants of health. The direction researchers should take is clear. Health and the early development of children in

immigrant families need to be the focus of research and the risk and protective factors of their development should be identified in order to develop much needed interventions.

Direction for Future Research

The increasing numbers of children in immigrant families requires focused efforts to address their health and developmental needs. Even though mortality and serious illness rates are the health outcome measures in the early childhood period that garner the most attention, researchers should consider using alternative health measures such as physical growth and cognitive and behavioural development as more useful measures, because they can also predict adulthood health status (Boivin & Hertzman, 2012; Hertzman, 2013).

Researchers need to pay particular attention to identifying disparities in health and development for this group of children, specifically during the early childhood period along with identifying the predictors of such disparities. There is also a need to understand what the barriers to and facilitators of are for health equity in this population by exploring the perceptions of different groups who interact with children in immigrant families such as their parents, health care providers, community workers, and their teachers. Along with that, there is also the dire need to develop and test instruments for this population and in this field of study.

Researchers understand the potential risks to validity for their studies when they consider using tools that have not been validated in their population of interest. It is therefore understandable that researchers might be concerned about validity and reliability in their research and that alone can keep them from performing research in this area. How does this influence research related to immigrant families and their children? As DeVellis (1996) states, it is not always possible to find evidence of reliability and validity in a tool for some populations of interest. DeVellis (1996) suggests that researchers question to what extent the construct of

interest or the response that participants might give to items in a test is likely to differ across populations. If the differences are not large enough to invalidate a tool then researchers need only justify their conclusions to their broader scientific communities. Not having tested instruments that can be used in immigrant populations might end up being a limitation to a study but it will also lead to more studies and other opportunities to validate instruments for use in studies with immigrant populations.

In order to develop quality instruments that can be used specifically for immigrant children populations, it is important to understand and incorporate family culture into those instruments. Most instruments that are used currently have been developed based on Western culture. For example, Western culture considers independent conception of the self as normal development while non-Western cultures consider the interdependent conception of the self as normal development (Van de Vijver, 2011). Therefore, when immigrant children are assessed for behavioural development, they may score as having a problem on a test but when their assessment is based on their family values they may score as having normal development.

Researchers need to also increase their effort to overcome difficulties in recruiting immigrant families due to issues such as lack of trust, language barriers, and/or cultural differences (Ogilvie et al., 2008). They need to use effective strategies to ensure the inclusion of this population. For example, the use of ethnocultural community gatekeepers, settlement workers or cultural brokers, and bilingual and bicultural research team members are a few strategies that can be used to ensure successful recruitment (Ogilvie et al., 2008). Researchers also need to allocate some funding from their budgets to honoraria, as well as translation, interpretation, and face-to-face interviews rather than mailed questionnaires (Ogilvie et al., 2008).

Future efforts need to be focused on creating similar high-quality data gathering systems for the early childhood period just as there presently is for the school age period. By linking anonymized government administrative data, researchers can access multiple sources of data in order to better understand the life trajectories of children in immigrant families. In addition, creating database management systems or research platforms through data sharing can be a viable solution to addressing the lack of data for children in immigrant families, especially in early childhood period.

In order to eliminate the risk factors that influence child development, it is important to first identify them. Understanding and identifying protective factors is an important step in helping children in immigrant families to overcome their adversities and reach their optimal health and development, especially where the risk factors cannot be eliminated. It is also important for researchers to acknowledge, when working with immigrant families, that not all have negative outcomes; indeed, some have optimal outcomes despite adversities (Masten, 2011). Many children from immigrant families face multiple risks (e.g., resettlement stress, mental health vulnerabilities, poverty, family separation, and social isolation) (Beiser, 2005; Bornstein, & Bohr, 2011; Cote, 2011; De Maio, 2010; Gushulak et al., 2011; Kingston et al., 2011; Newbold & Danforth, 2003). In order to assist these children to achieve their optimal potentials, multiple efforts and protective interventions are required. In order to maximize their strengths, it is important to identify the protective pathways for those who do well in spite of adversity and to better understand the pathways to coping with adversity. Understanding these protective pathways can be an important step in a needs assessment as well as in the allocation of resources for this group of children to support optimal development.

Conclusion

An important factor related to health and wellbeing is a solid foundation in early childhood development. Despite the large numbers of children in immigrant families worldwide, there is little understanding about whether or not the parents' migration experience and the process of adjustment to a new country influence the health and development of these children.

The majority of the research on immigrant and minority children groups has focused on risk behaviours in adolescence such as drug use, teenage pregnancy, and school failure rather than on how children from immigrant families achieve developmental milestones (Cote, 2011; Puder et al., 2013). Few studies have examined outcomes in children from immigrant families beyond the early postnatal period. Therefore, we do not understand the trajectories of health and development across these children's lives or how these trajectories compare to children from non-immigrant families (Cote, 2011). As a result, we know little about the early childhood development period of immigrant children, which is the time when interventions can be the most effective and cost-efficient.

The current body of evidence does not answer the question of whether migration and the acculturation process for immigrant parents affects their children's health and development, specifically during the early childhood period. It therefore remains an important area to be considered for future research. In order to close this knowledge gap, we first need to know more about the development of young children from immigrant families, about how these children achieve developmental milestones, and whether their developmental trajectories differ from those of their counterparts who were born to native-born families.

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Chapter 3

Comparing Early Development Between Children with Foreign-Born and Canadian-Born Parents: A Cohort Study

Author Note

Amy Toosi, RN, PhD Candidate, University of Alberta

Dawn Kingston, RN, PhD, University of Calgary

Sheila McDonald, PhD, University of Calgary

Solina Richter, RN, DCur, University of Alberta

Manuscript submitted to the Child Development (Journal)

Abstract

Early childhood development is essential for ensuring a solid foundation for children's health and wellbeing. The purpose of this study was to compare the childhood development (communication, fine, gross motor, personal social, problem solving, social-emotional behavioural problems and competencies) between children with foreign-born (n=452) and those with Canadian-born parents (n=1129) at two years of age by utilizing the data from a prospective cohort study (n=1581). Children with foreign-born parents were more likely to need further assessment in communication (17%) with compared to those with Canadian-born parents (12.4%). They were also more likely to be at risk for social-emotional and behavioural problems (20.9%) and delay in social-emotional and behavioural competencies (18.9%) with compared to those with Canadian-born parents (12.6% and 11.1% respectively).

Mounting evidence indicates that early childhood experiences have lifetime consequences for adult health and functioning and therefore the wellbeing of societies (Belsky & Pluess, 2013; Mustard, 2006; Britto, Engle, & Super, 2013; Walker et al., 2011). Furthermore, early childhood is considered the most efficient and cost-effective time for preventing inequalities in human life (Boivin, & Hertzman, 2012; Hertzman, 2013; Walker et al., 2011). Similarly, the World Health Organization (WHO, 2016) recognizes early childhood development as an essential part of building healthy and productive societies. Childhood development is also considered by the United Nation Secretary-General to be a central development goal in the global strategy for women's, children's, and adolescent's health (2016-2030) (United Nations UN, 2016).

Childhood development is determined by the interaction between genes, biology, and the social and physical environment (Shonkoff & Garner, 2012). The social and economic resources of families are the main sources of early childhood development inequalities (Boivin & Hertzman, 2012). Those living in poverty or under adverse conditions such as toxic stress, poor health and nutrition, or lack of an enriching environment (i.e. inadequate stimulation and learning) have a higher chance of impaired cognitive, emotional, social, and behavioural development (Engle & Black, 2008; Heymann, Hertzman, Barer, & Evans, 2006; Kingston & Tough, 2013; Kingston, Tough, & Whitfield, 2012; National Institute of Child Health and Human Development NICHD, 2005).

Growing evidence suggests that social and economic disparities between international migrant and native-born individuals exist (Bornstein & Bohr, 2011; Cote, 2011; De Maio, 2010; Georgiades et al., 2011; Kingston et al, 2011). These disparities may have lasting effects on international migrant children. Higher parental stress, emotional, mental, and physical health

problems, insufficient parenting skills and education, poor living conditions and poverty, family separation and social isolation, and lack of use of non-parental care for international migrant children can have lasting negative effects on these children over time (Beiser, 2005; Beiser & Hou, 2002; Bradley, 2011; Correa-Velez, Gifford, & Barneet, 2010; De Maio, 2010; Gushulak, Pottie, Hatcher, Torres, & DesMeules, 2011; Kingston et al, 2011; Meleis, 2010; Ministry of Finance, 2012; Monk, Spicer, & Champagne, 2012; Newbold & Danforth, 2003; Statistics Canada, 2013, 2010, 2008; Walker et al., 2011). Consequently, international migrant children have less of a chance to have an optimal early education, which can therefore lead to less school engagement and less chance for academic success (Bradley, 2011). Further, the process of migration and integration into new environments can also have lasting negative effects on international migrant children and their development (Cote, 2011).

On average, 3.3 million people migrate annually worldwide while 16% of them are children aged 0 to 9 years old (United Nations UN, 2013). Current estimates suggest that there are 232 million international migrants worldwide and this is expected to rise to 280 million by the year 2050 (UN, 2013). Rapid migration has become even more alarming with the sudden increase of global refugees, which increased by 45 percent in 2015 exceeding all previous records for the past 20 years (United Nations High Commissioners for Refugee UNHCR, 2015). The number of displaced people by the end of 2015 increased to 65.3 million, with 51% being children (UNHCR, 2016). Given the increases in international migrant populations and considering the higher birth rates among this group (mean=1.03) as compared to the native-born group (mean=0.77), children born to international migrants represent the fastest growing segment of the child population in high-income countries (Adsera & Ferrer, 2011; Bradley, 2011; Ma, 2002; Statistics Canada, 2011). Increasing the number of international migrants

requires focused efforts to address their health and developmental needs. Despite the large numbers of international migrant children worldwide as well as the growing interest in understanding and supporting optimal child development, little research has been done to study early development among international migrant children. There is little understanding as to whether or not the migration of parents and factors associated with the process of adjustment to a new country influence their children's health and development (Bornstein & Bohr, 2011; Cote, 2011; Georgiades, Boyle, Kimber, & Rana, 2011; Pottie, Hatcher, Torres, & DesMeules 2011).

The current research related to international migrant child health and development has focused mainly on the prenatal, early infancy, school-aged or adolescent periods (Cote, 2011; Glick, Hanish, Yabiku, & Bradely, 2012; Palacios, Guttmannova, & Chase-Lansdale, 2008; Puder et al., 2013). As a result, we do not fully understand if international migrant children's development is different and, if so, in what ways it differs from native-born children. Understanding whether child development for children born to international migrant parents differs from children born to native-born parents and identifying risks and protective factors contributing to their development are necessary in order to create strategies that will help to support their optimal development. This understanding is also essential to inform policy and practice across health, education, and social sectors to ensure that this group of children has appropriate services and opportunities to support their early development and future opportunities.

The aim of this study was to compare indices of early childhood development between children at two years of age who were born to foreign-born parents and their counterparts who were born to Canadian-born parents across key developmental domains.

Methods

Study Design

This study used data from a prospective longitudinal pregnancy cohort study, the All Our Babies (AOB) study (n=3223; 2008-2011) in Alberta, Canada. The AOB study was designed to examine maternal and infant outcomes during the perinatal period and to identify barriers and facilitators for accessing health care services and trajectories for child development.

Observational data along with biological data was collected during the perinatal period and early childhood. Eligible participants completed questionnaires at five time points: twice during pregnancy, and at 4, 12, and 24 months postpartum. Information related to recruitment and data collection is described in detail elsewhere (Gracie et al., 2010; McDonald et al., 2013). In brief, women were eligible if they were less than 24 weeks and 6 days gestation age at the time of recruitment, at least 18 years of age, and receiving prenatal care in Calgary. They were recruited through community posters and word of mouth as well as from primary health care offices and a citywide single provider public health laboratory service (Gracie et al., 2010; McDonald et al., 2013). A comparison performed between the AOB participants and both national and provincial statistics, showed that the AOB cohort is, in general, representative of pregnant and parenting populations at local and provincial levels within Canadian urban settings. The perinatal indicators used in the study are also comparable to perinatal surveillance data in Canada. The proportion of children who were born to foreign-born parents (27%) in AOB is similar to the proportion of children born to foreign-born parents in Canada (22%) as well as in Alberta (22.5%) (Statistics Canada, 2013).

Study Sample

Due to delays in securing funding and ethics approval processes, not all children (3223)

were at the appropriate age range for the follow up at 24 months. Therefore not all children were eligible to continue with the study at 24 months (Tough et al., 2016). In the present study, mother-child dyads were eligible if the place of birth for both parents was reported. Among those who participated in the two-year follow up (n=1595), 14 parents did not report their place of birth. We classified the eligible mother-child dyads (n=1581) into two groups based on the parents' country of birth: 1) children who were born to Canadian-born parents (n=1129, 73%) and 2) children who were born to families with at least one foreign-born parent (at least one of the parents had to have been born outside of Canada) (n=452, 27%). The flow of participants is shown in figure 3.1.

Primary Outcomes

The primary outcomes of this study were indices of child development –communication, fine and gross motor, problem solving, personal-social, and social-emotional, behavioural problems, and competencies.

Measurements

Foreign-born parents. At least one of the parents was born outside of Canada and may have different statuses such as immigrant, refugee, international student, or temporary worker.

Ages and Stages Questionnaire (ASQ). The ASQ is the most suitable measurement tool as a population measure of development for 2-2 ½ year old children (Bedford, Walton, & Ahn, 2013). The ASQ is a multi-domain, first level screening tool that may be completed by families or other caregivers of children between 1 and 66 months. (Hornman, Derstjens, de Winter, Bos, & Reijneveld 2013; Squires, Twombly, Bricker, & Potter, 2009). The ASQ is organized into five 6-item subscales (communication, fine motor, gross motor, problem-solving, and personal social), for a total of 30 items. The respondent rates each item on a 3 point scale. For each item,

the parents indicate “yes” (10 points), “sometimes” (5 points) or “not yet” (0 point) to represent their child's ability to perform a task (Kerstjens et al. 2011; Limbos & Joyce, 2011).

The ASQ was normed with 15,138 children and families (53% male and 47% female) in the U.S.A in 2008. (Bedford et al., 2013; Ringwalt, 2008). As part of validity testing, the content was reviewed by experts while parents, practitioners and experts were consulted during the development of the items. (Caselman & Self, 2008; Bedford et al., 2013; Hornman et al., 2013; Kerstjens et al., 2011; Limbos & Joyce, 2011).

The ASQ has excellent reliability with test-retest reliability (2 weeks) of 0.92 (excellent) and with Intraclass Correlation Coefficient (ICC) (best and the most conservative) of 0.75-0.82 (excellent), inter-rater reliability (between parents and trained examiners) of 0.93 (excellent) and internal consistency with Cronbach's alpha for each developmental area among children 2 to 36 months and 42 to 60 months, respectively: Communication (0.57 to 0.80 and 0.66 to 0.83); Gross Motor (0.57 to 0.87 and 0.68 to 0.73); Fine Motor (0.51 to 0.77 and 0.76 to 0.83); Problem Solving (0.53 to 0.78 and 0.70 to 0.78); and Personal-Social (0.51 to 0.67 and 0.66 to 0.71). The internal consistency is acceptable for 42-60 months of age (mostly above 0.70) but is lower for 2-36 months of age as compared to 42-60 months of age (Hornman et al., 2013; Kerstjens et al., 2011; Limbos & Joyce, 2011; Squires et al., 2009).

The ASQ also has high validity/accuracy when compared with the Batelle Developmental Inventory (BDI) across all age groups with a sensitivity of 86% (range: 85-89%), and specificity between ASQ and BDI across all age group 86% (range 78–92%). The ASQ also has been validated against the Bayley Scales of Infant Development II (BSID-II) and has a sensitivity of 100% and specificity of 87% at 24 months for severely delayed status (Bedford et al., 2013).

Optimal (normal) and suboptimal (showing difficulties) development. The level of child developmental in each domain was chosen based on the scoring algorithm of the ASQ. Children who scored above the monitoring zone (score 1 SD above the mean) were considered to have optimal development (Kerstjens et al. 2011; Limbos & Joyce, 2011). Children scoring below the monitoring zone (score 1SD below the mean) were considered to have sub-optimal development (Kerstjens et al. 2011; Limbos & Joyce, 2011). The comparisons of five domains of child development (communication, fine and gross motor, problem solving, and personal-social) were done separately between the two groups.

Brief Infant-Toddler Social and Emotional Assessment (BITSEA). The BITSEA has been used as a first level-screening tool for identifying social-emotional and behavioural problems (aggression, defiance, over-activity, negative emotionality, anxiety, and withdrawal), and social-emotional behavioural competencies (empathy, pro-social behaviours, and compliance) in children between 12 to 36 months. In general it addresses the internalizing, externalizing and dysregulation domains. It is intended to identify children who may need further and more comprehensive evaluation (Bedford et al., 2013; Briggs-Gowan et al., 2013; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti 2006; Caselman & Self, 2008; Eliason et al., 2011). The BITSEA has 42 items as 31items assess social-emotional and behavioral *problems* and 11-item assess *competence* in social-emotional abilities. The respondent rates each item on a 3 point scale. For each item, the parents indicate “very true/always” (2 points), “somewhat true/sometimes” (1 point) or “not true/rarely” (0 point) to represent their child's ability to perform a task. Lower scores indicate lesser competence. (Briggs-Gowan et al., 2006).

The BITSEA was originally tested with 600 children (12-36 months old) in the U.S.A. in educationally, economically, and ethnically diverse groups such as Caucasian, African

American, Hispanic, and Asian families (Bedford et al., 2013; Briggs-Gowan et al., 2013; Briggs-Gowan et al., 2006; Caselman & Self, 2008; Eliason et al., 2011). A number of studies also examined and supported the validity and reliability of the BITSEA in different countries and in different languages such as Turkish, Dutch, Spanish, and French (Hungerford, Garcia, & Banger, 2015; Karabekiroglu, Briggs-Gowan, Carter, Rodopman-Arman, & Akbas 2010; Kruizinga et al., 2012; Wendland et al., 2014).

The BITSEA has excellent reliability with excellent test-retest reliability of 0.85–0.87 (10-14 days), excellent inter-rater reliability (parent to parent) with ICC (for problem domain) of 0.74 and (for competence score) of 0.63, and excellent internal consistency of 0.83-0.89 for the problem scale and adequate (0.66-0.75) for the competence scale, and item reliability of 0.65-0.79. The BITSEA also has excellent sensitivity of 0.78-0.95 and specificity of 0.80-0.90 (Briggs-Gowan et al., 2013; Briggs-Gowan et al., 2006; Caselman & Self, 2008; Bedford et al., 2013; Eliason et al., 2011; Karabekiroglu et al., 2010). The BITSEA has been tested against other tools and its total problem score is correlated (moderately) with the ASQ-SE at 0.55, and CBCL at 0.6 (Briggs-Gowan et al., 2013; Briggs-Gowan et al., 2006; Caselman & Self, 2008; Bedford et al., 2013; Eliason et al., 2011).

Optimal (normal) and suboptimal (showing difficulties) development. The optimal level of child development was chosen based on established cut-offs according to the examiner's manual. For the social-emotional behavioural problem scale, children who ranked at the 25th percentile or higher were considered suboptimal (possible problem/delay) and for the behavioural competence scale, those that ranked at the 15th percentile or lower were considered suboptimal (possible problem/delay) (Briggs-Gowan et al., 2013).

Sample Size Calculation

The sample size estimation for this study was based on the objective as well as the following research hypothesis: There is a difference in early childhood development among children two years of age who were born to foreign-born parents compared to those who were born to Canadian-born parents. We estimate that in order to detect a 20% mean difference (small effect size of 0.2) (Washbrook, Waldfogel, Bradbury, Corak, & Ghanghro, 2012) for each domain of early childhood development (fine and gross motor, communication, problem solving, personal-social, emotional, and behaviour) with a 80% (0.80) power and an alpha of 0.05 using a two-tailed independent-t-test, a minimum of 394 children is required in each group. The number of children in each group (Canadian-born parents, n = 1129; migrant parents, n = 452) exceeds the minimum requirement for this research hypothesis.

Analysis

The demographics of the children and their parents were described as frequencies and precentages for categorical variables and means (SD) for continuous variables. Bivariate analysis was used to assess differences in developmental score means and categories using independent sample t-tests and Chi Square tests, respectively, between children two years of age who were born to foreign-born parents and those born to Canadian-born parents. For all analyses, the statistical tests were two-tailed, and a ρ value of ≤ 0.05 was considered statistically significant. All statistical analyses were performed with IBM SPSS Statistics, Version 23. A description of study variables and measurement tools are reported in Table 3.1.

Results

Of the 1595 children in the cohort, 1129 were born to Canadian-born parents and 452 were born to foreign-born parents while 14 were missing parents' place of birth. Overall, 91.7%

of the sample had partially or fully completed post-secondary education, 72% had incomes over $80,000, and 95.6% were partnered. Children with foreign-born parents were significantly more likely to live in a lower income household, have older parents, and were more likely to speak a language other than English at home compared to Canadian-born children. The characteristics of the children and their families are shown in Table 3.2.

Outcomes: Domains of Early Childhood Development

A. Communication (subscale of the ASQ). The overall sample mean for the communication subscale of the ASQ was 51.39 (SD=12.38). Children with foreign-born parents (M=50.02, SD=13.48) had significantly lower mean scores than children with Canadian-born parents (M=51.92, SD= 11.91); t(1542)= -2.721, p= 0.007.

Overall 13.7% (213 of 1557) of children in the cohort scored below the cut-off score for the monitoring zone on communication development. A total of 17% (75 of 441) of children with foreign-born parents were identified as having possible delay and in need of further assessment in communication compared with 12.4% (137 of 1101) of children with Canadian-born parents. There was a significant association between communication development and the status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1542) = 5.530, ρ =0.019. Children with foreign-born parents were 1.44 [1.06-1.96] times more likely to need further assessment as compared to children with Canadian-born parents. A summary of the results is shown in Table 3.3.

B. Fine motor (subscale of ASQ). The overall sample mean for the fine motor subscale of the ASQ was 50.98 (SD=7.25). Children with foreign-born parents (M=49.83, SD=7.39) had significantly lower mean scores than children with Canadian-born parents (M=51.43, SD= 7.15); t(1536)= -3.94, ρ < 0.001.

Overall 11.4% (177 of 1553) of children in the cohort scored below the cut-off score for the monitoring zone on fine motor development. A total of 13.8% (61 of 443) of children with foreign-born parents were identified as having possible delay and in need of further assessment in fine motor development compared with 10.4% (114 of 1095) of children with Canadian-born parents. However, there was no significant association between the fine motor development and status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1538)= 3.529, ρ =0.060. A summary of the results is shown in Table 3.3.

C. Gross motor (subscale of ASQ). The overall sample mean for the gross motor subscale of the ASQ was 54.94 (SD=8.13). There was no significant difference in mean scores between children with foreign-born parents (M=54.79, SD=8.05) and children with Canadian-born parents (M=54.97, SD= 8.19); t(1545)= -0.40, ρ = 0.69.

Overall 13.3% (207 of 1562) of children in the cohort scored below the cut-off score for the monitoring zone on gross motor development. A total of 14.9% (66 of 442) of children with foreign-born parents were identified as having possible delay and in need of further assessment in gross motor development compared with 12.8% (141 of 1105) of children with Canadian-born parents. However, there was no significant association between the gross motor development and status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1547)= 1.285, ρ =0.257. A summary of the results is shown in Table 3.3.

D. Problem solving (subscale of ASQ). The overall sample mean for the problem solving subscale of the ASQ was 47.71 (SD=9.74). There was no significant difference in scores between children with foreign-born parents (M=47.19, SD=9.95) and children with Canadian-born parents (M=47.90, SD= 9.68); t(1536)= -1.30, p=0.19.

Overall 14% (218 of 1553) of children in the cohort scored below the cut-off score for the monitoring zone on problem solving development. A total of 14.6% (64 of 437) of children with foreign-born parents were identified as having possible delay and in need of further assessment in problem solving development compared with 13.8% (152 of 1101) of children with Canadian-born parents. However, there was no significant association between the problem solving development and status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1538)= 0.183, ρ =0.669. A summary of the results is shown in Table 3.3.

E. Personal-social (subscale of ASQ). The overall sample mean for the personal-social subscale of the ASQ was 51.19 (SD=8.85). Children with foreign-born parents (M=50.28, SD=9.67) had significantly lower mean scores than children with Canadian-born parents (M=51.56, SD= 8.47); t(1544)= -2.57, p=0.01.

Overall 15.8% (246 of 1561) of children in the cohort scored below the cut-off score for the monitoring zone on personal-social development. A total of 17.9% (79 of 442) of children with foreign-born parents were identified as having possible delay and in need of further assessment in personal-social development compared with 14.9% (164 of 1104) of children with Canadian-born parents. However, there was no significant association between the personal-social development and status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1546)= 2.17, ρ =0.141. A summary of the results is shown in Table 3.3.

Social-emotional and behaviour.

F. Problems (subscale of BITSEA). The overall sample mean for the social-emotional and behavioural problems subscale of BITSEA was 8.84 (SD=5.12). Children with foreign-born

parents (M=9.87, SD=5.86) had significantly higher mean scores than children with Canadian-born parents (M=8.42, SD= 4.74); t(1577)= 5.10, p<0.001.

Overall 14.9% (236 of 1580) of children in the cohort scored below the cut-off score on social-emotional behavioural problems. A total of 20.9% (93 of 444) of children with foreign-born parents were identified as having possible behavioural problems and in need of further assessment compared with 12.6% (141 of 1123) of children with Canadian-born parents. There was a significant association between social-emotional and behavioural problems and the status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1567)= 17.634, ρ <0.001. Children with foreign-born parents were 1.85 [1.38-2.46] times more likely to need further assessment compared with children with Canadian-born parents. A summary of the results is shown in Table 3.3.

G. Competencies (sub-scale of BITSEA). The overall sample mean for the social-emotional and behavioural competencies subscale of BITSEA was 17.76 (SD=2.53). Children with foreign-born parents (M=17.46, SD=2.80) had significantly lower mean scores than children with Canadian-born parents (M=17.88, SD= 2.40); t(1576)= -3.01, p=0.003.

Overall 13.3% (210 of 1579) of children in the cohort scored below the cut-off score on the social-emotional, behavioural competencies. A total of 18.9% (84 of 444) of children with foreign-born parents were identified as having possible delay in social-emotional and behavioural competencies and in need of further assessment compared with 11.1% (124 of 1122) of children with Canadian-born parents. There was a significant association between social-emotional and behavioural competencies and the status of the children (whether they were born to foreign-born or Canadian-born parents), X^2 (df=1, n=1566)= 17.094, ρ <0.001. Children with foreign-born parents were 1.88 [1.39 to 2.54] times more likely to need further assessment

compared with children with Canadian-born parents. A summary of the results is shown in Table 3.3.

Discussion

This study compared the early childhood development in children who were born to foreign-born parents and their counterparts who were born to Canadian-born parents at two years of age. We found that there were differences in the mean score and proportion of children with communication development, social-emotional, behavioural problems and competencies in children two years of age who were born to foreign-born parents compared with their counterparts who were born to Canadian-born parents.

Children with foreign-born parents had significantly lower mean scores in communication (50.02 vs. 51.92), fine motor (49.83 vs. 51.43), personal-social (50.28 vs. 51.56), social-emotional, behavioural competencies (17.46 vs. 17.88) and higher mean scores in social-emotional behavioural problems (9.87 vs. 8.42) compared with children with Canadian-born parents. However, we did not find any significant differences in the mean scores of gross motor and problem solving development between the two groups.

Children with foreign-born parents had significantly higher rates of possible communication delay (17% vs. 12.4%), possible delay in social-emotional behavioural competencies (18.9% vs. 11.1%), and possible social-emotional behavioural problems (22.9% vs.12.6%) compared with children with Canadian-born parents. However, we did not find any significant differences in the proportion of children with fine and gross motor, problem solving, and personal-social developmental delays between the two groups. We did not find that the status of the childen (whether they were born to foreign or Canadian-born parents) was

associated with fine (ρ=0.060) and gross motor (ρ=0.257), problem solving (ρ=0.669) and personal-social (ρ=0.140) development at two years of age.

Evidence reveals that differences in developmental domains vary between children of international migrants and native-born children depending on the developmental period being studied (Georgiades et al., 2011). However, the developmental disparities among international migrant children in the early childhood period are nevertheless poorly understood and therefore less conclusive. For example, one study that focused on children between 2 and 6 years of age in Switzerland indicated that children of foreign-born parents had a lower level of social functioning compared with native-born parents and that parental education levels and lifestyle behaviours such as screen time only partly mediated the differences (Puder et al., 2013). The result related to the social functioning correlates with our findings related to the social-emotional, behaviour development in both problems and competencies at 2 years of age. It should be noted here that different measurement tools were used in measuring social functioning, and social-emotional behavioural development.

In a multi-country study (Australia, Canada, the United Kingdom, and the United States of America U.S.A.) researchers also found that international migrant children (age 4-5) had lower scores in vocabulary tests, and no differences between behavioural outcomes (Washbrook et al., 2012). Considering the differences in the age groups being studied (4-5 years old) the results correlated with our findings that further assessment was needed for communication development. However their results in relation to behavioural outcomes differ from the results of our study.

A study in the U.S.A. that focused on the relation between the developmental level of children (0-25 months of age) and the degree of depression and anxiety of their mothers

indicated that children of native-born mothers performed better on the Denver II (personal social, fine and gross motor, and language development) than the foreign-born group (Foss, Chantal, & Hendrickson, 2004). The results of this study correlated with our findings in relation to communication development, but not with personal social and fine and gross motor development.

A study that focused on the development of 4 year old children in the U.S.A. indicated that children in non-migrant families had higher cognitive and language skills than first-generation migrant children (De Feyter & Winsler, 2009). Interestingly, the children who were born to foreign-born parents were reported as having fewer behaviour problems compared with the non-migrant children in that study (De Feyter & Winsler, 2009). Although this was a different age group it was nevertheless another example of a study that found a lower level of language skill development for migrant children but not for behaviour and cognitive development.

The most consistent finding that is notable between these studies and our study is that children with foreign-born parents have less communication development than children with native-born parents. However, this delay in communication development may be related to the fact that these children tend to speak different languages other than English at home as well as the fact that the tools used to assess communication development may not be suitable for non-English speakers.

Clinical Significance and Magnitude of the Differences

In this study, we found inconsistencies between the levels of significant differences of means and proportions for fine motor and personal-social development in these groups. For example, when comparing fine motor mean scores, we found that children with foreign-born

parents had significantly lower mean scores (-1.60) compared to children with Canadian-born parents ($\rho < 0.001$) while there was no significant difference in the proportion of children having a possible delay between the two groups ($\rho = 0.060$). Since the standard cutoff score (1 SD below the mean= monitoring zone) for each domain was based on the significance of clinical differences, we concluded that the mean differences may not be clinically meaningful.

With respect to personal-social development, children with foreign-born parents had lower mean scores (-1.28) compared to children with Canadian-born parents ($\rho = 0.01$) while there was no significant difference in the proportion of children having a possible delay between the two groups ($\rho = 0.141$) therefore suggesting that the mean differences may not be clinically meaningful.

Chen, Cohen, and Chen (2010) proposed a method for interpreting the size of the OR as such that OR=1.68, 3.47, and 6.71 are equivalent to Cohen's d=0.2 (small), 0.5 (medium), and 0.8 (large), respectively. Children with foreign-born parents were more likely to have possible delays in their communication development (OR=1.44), social-emotional behavioural competencies (1.88) and possible social-emotional problems (OR=1.85) compared with children with Canadian-born parents. However, based on the method for interpreting the OR proposed by Chen et al. (2010), the magnitude of the difference was small for social-emotional behavioural competencies and possible social-emotional problems and for communication development may not be clinically significant.

Evidence suggests that there is a strong link between early childhood development and adult health (Heymann, Hertzman, Barer, & Evans, 2006). Therefore, early identification and intervention of developmental delay in migrant children is fundamental to ensuring lifelong success. Research on the early childhood period for this group of children is however poorly

understood and therefore less conclusive. Given that the international migrant population is growing at a rapid rate for many developed countries including Canada, research needs to increase in size and scale along with this rapid growth. Future studies should focus on identifying possible disparities between the early childhood development of international migrant children, specifically refugees, and native-born children as well as on understanding the factors that influence these differences.

It is also important to recognize that statistical testing and epidemiological approaches to research have their own limitations such as the fact that participant perception may not be included in research findings. Therefore, it is also important to supplement research inquiry in this area with a qualitative approach by exploring the perceptions of different groups such as the migrant family, health care providers, community workers, and teachers. This approach will strengthen any interventional studies performed in the future with the ultimate goal of improving the health and developments of children from migrant parents.

Limitations

Among those eligible, the AOB cohort demonstrated a retention rate of 81% for the 12 month data collection, and 76% for the 24 month data collection periods (Tough et al., 2016). The decreased rate of participation across time is a common limitation in longitudinal studies, which can be a potential source of selection bias and limits generalizability of the findings. Women who continued participating at least one follow-up time point were more likely to be older, be in a stable relationship, have higher educational attainment and higher family incomes, be born in Canada, and primarily speak English in their home (McDonald et al., 2013; Tough et al., 2016). Although recall bias was minimal due to the prospective nature of data collection other forms of information bias such as reporting and misclassification may be potential sources

of bias due to the self-reporting nature of the data collection and coding of the variables.

In comparison to national ($68,410) and provincial ($83,560) averages for income at the time of data collection (Statistics Canada, 2015), our sample had a fairly high income. In comparison to the national (Canada) average income, 80.7 % of the total sample, 71.4% of the migrant and 84.6% of the Canadian group were above average. In comparison to the provincial (Alberta) average income, 72.6 % of the total sample, 63.4% of the migrant, and 76.4% of the Canadian group were above average. Therefore, the results of this study may not be generalizable to lower income families. Alternatively, the differences between childhood development for migrant and Canadian children may be at a greater magnitude due to the fact that income can have a negative effect on childhood development.

The majority of the foreign-born parents reported being immigrant or Canadian citizens when they arrived in Canada (76%) and only 3% reported being refugees. The remaining 21% reported another status such as international student, temporary worker, or visitor. Therefore, the results of this study may not be applicable to children born to refugee parents.

The use of measurements in English might be a barrier for those participants who have limited English language skills. Nevertheless, only 1% of the participants were ineligible due to difficulty in completing the English language questionnaire (McDonald et al., 2013). Even though the developmental screening tools used in this study have been tested with individuals from various ethnic and socioeconomic backgrounds, they lack validity on international migrant children or children with foreign-born parents who may speak different languages other than English at home.

Conclusion

We found that there were differences in the communication, social-emotional and behavioural domains of early childhood development between children two years of age who were born to foreign-born parents and their counterparts who were born to Canadian-born parents; however, the manitude of these differences were small and may not translate into clinical significance. Future studies should focus on identifying possible disparities between the early childhood development of migrant children and native-born children as well as on understanding the factors that influence these differences. By understanding the influencing factors interventional programs can be created to optimize early childhood development for migrant children.

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Ethical Approval

The Child Health Research Office and the Conjoint Health Research Ethics Board of the Faculties of Medicine, Nursing, and Kinesiology, University of Calgary, and the Affiliated Teaching Institutions approved the AOB study (McDonald, et.al, 2013). The Health Research Ethics Board of the University of Alberta approved this study.

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Tables

Table 3.1: Measurement, Outcome Measures

Measurement Tools	Outcome Measures (Domains of Early Childhood Development)
Ages and Stages Questionnaire (ASQ)	1) Mean scores of developmental domains: A. Communication B. Fine motor C. Gross motor D. Personal social skills E. Problem solving 2) Proportion of optimal and suboptimal in each category
Brief Infant-Toddler Social and Emotional Assessment (BITSEA)	1) Mean score: Social emotional and behavioural development F. Problems G. Competencies 2) Proportion of optimal and suboptimal in both problem and competence category

Table 3.2. Characteristics of AOB Children at 24 months (n=1595)

Characteristics	Total sample (n=1595) n (%)	Migrant (n=452) n (%)*	Canadian (n=1129) n (%)*	ρ value
Gender	(n=1551)	(n=436)	(n=1104)	
Boy	805(51.9)	221(50.7)	576(52.2)	0.60
Girl	746(48.1)	215(49.3)	528(47.8)	
Child birth order	(n=1578)	(N=450)	(N=1122)	
First child	786(49.8)	231(51.3)	551(49.1)	0.43
Not the first child	792(50.2)	219(48.7)	571(50.9)	
Gestational age at birth	(n=1541)	(N=431)	(N=1099)	
37 or higher	1437(93.3)	395(91.6)	1032(93.9)	0.11
36 or lower	104(6.7)	36(8.4)	67(6.1)	
Weight at birth	(n=1469)	(N=408)	(N=1050)	
2500 or higher	1383(94.1)	379(92.9)	993(94.6)	0.22
Low birth weight (less than 2500g)	86(5.9)	29(7.1)	57(5.4)	
Primary language at home	(n=1587)	(N=452)	(n=1129)	

English	1425(89.8)	304(67.3)	1116(98.8)	<0.0001
Other	162(10.2)	148(32.7)	13(1.2)	
Initiated Breastfeeding	(n=1319)	(n=267)	(n=943)	
Yes	1274(96.6)	260(97.4)	907(96.2)	0.35
No	45(3.4)	7(2.6)	36(3.8)	
Maternal Marital Status	(n=1587)	(n=452)	(n=1129)	
Married/Common Law	1517(95.6)	430(95.1)	1083(95.9)	0.48
Other (Single, separated, divorced)	70(4.4)	22(4.9)	46(4.1)	
Total Annual Household Income (before taxes and deductions)	(n=1527)	(n=434)	(n=1088)	
$39,999 or less	90 (5.9)	45(10.4)	44(4)	
$40,000- $79,999	328 (21.5)	114(26.3)	213(19.6)	<0.0001
$80,000 or more	1109 (72.6)	275(63.4)	831(76.4)	
Maternal education level	(n=1586)	(n=450)	(n=1129)	
High school or less	132(8.3)	30(6.7)	100(8.9)	0.153
Some or completed post secondary	1454(91.7)	420(93.3)	1029(91.1)	
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	
Maternal age at delivery	31.40 (4.39) (n=1525)	32.14 (4.36) (n=428)	31.10 (4.37) (n=1092)	<0.0001
Father's age at delivery	33.47 (5.12) (n=1494)	34.98 (5.40) (n=419)	32.89 (4.90) (n=1071)	<0.0001

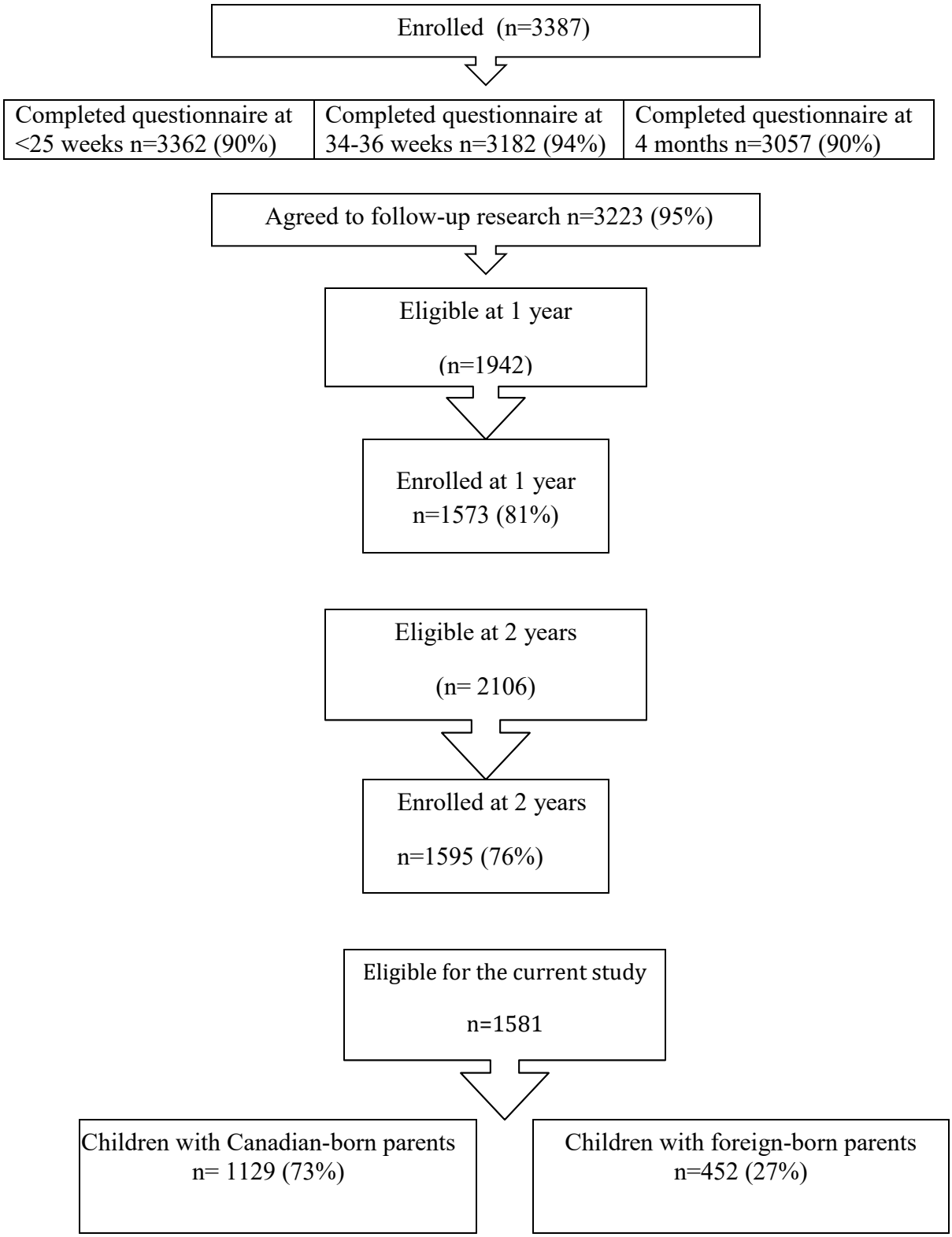
For categorical variables Chi-Square test and for continues variables independent t-test was used to assess the differences between children with foreign-born and those with Canadian-born parents.

*Denominator varies due to missing values for some variables.

Table 3.3. Comparison of domains of early childhood development between children with foreign-born parents and Canadian-born parents at 2 years of age

Independent Variable	**Whether they had developmental delay or not**		
	Possible delay n (%)	On schedule n (%)	ρ value OR [95% CI]
A. Communication			
Migrant	75 (17%)	366 (83%)	0.019
Canadian	137 (12.4%)	964 (87.6%)	1.44 [1.06-1.96]
B. Fine Motor			
Migrant	61 (13.8%)	382 (86.2%)	0.060
Canadian	114 (10.4%)	981 (89.6%)	1.37 [0.99-1.92]
C. Gross Motor			
Migrant	66 (14.9%)	376 (85.1%)	0.257
Canadian	141 (12.8%)	964 (87.2%)	1.2 [0.88-1.65]
D. Problem Solving			
Migrant	64 (14.6%)	373 (85.4%)	0.669
Canadian	152 (13.8%)	949 (86.2%)	1.07[0.78-1.47]
E. Personal Social			
Migrant	79 (17.9%)	363 (82.1%)	0.14
Canadian	164 (14.9%)	940 (85.1%)	1.25 [0.93-1.67]
F. Social-Emotional & Behavioural Problems			
Migrant	93 (20.9%)	351 (79.1%)	<0.001
Canadian	141 (12.6%)	982 (87.4%)	1.85[1.38-2.46]
G. Social-Emotional & Behavioural Competencies			
Migrant	84 (18.9%)	360 (81.1%)	<0.001
Canadian	124 (11.1%)	998 (88.9%)	1.88 [1.39-2.54]

Figure 3.1. Flow of participants



Chapter 4

Factors Associated With Early Development of Children with Foreign-Born Versus Canadian-Born Parents: A Cohort Study

Author Note

Amy Toosi, RN, PhD Candidate, University of Alberta

Sheila McDonald, PhD, University of Calgary

Dawn Kingston, RN, PhD, University of Calgary

Solina Richter, RN, DCur, University of Alberta

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Abstract

Early childhood development is essential for ensuring a solid foundation for children's health and wellbeing. Data from a prospective cohort study (n=1581) was utilized to identify the factors influencing the early development of children with foreign-born (n=452) and those with Canadian-born parents (n=1129) at two years of age. Our findings suggest that the quality of stimulating activities in families with foreign-born parents differs from that of families with Canadian-born parents, which can influence the communication and emotional-social development of these children. Foreign-born parents may benefit from parenting supports to improve the quality of parenting practices. History of mental health issues was a universal risk factor for social-emotional delays in both groups. The need for assuring maternal mental health is warranted.

The first three years of a child's life is the most crucial time for human development because the brain, which controls emotion, attention, self-control and stress, rapidly develops during this time period (Boivin & Hertzman, 2012; Hertzman, 2013). It is important to recognize that the child's brain is shaped by interactions between genes and life experiences (Monk, Spicer, & Champagne, 2012; Shonkoff & Garner, 2012). A new and emerging science of human development integrates genetics, epigenetics, neuroscience, life course epidemiology, and developmental psychology, which suggests that early childhood experiences become biologically embedded within the human body (Boivin & Hertzman, 2012; Hertzman, 2013; McEwen, 2000; Mustard, 2006; Shonkoff, 2012; Shonkoff, Boyce & McEwen, 2009; Shonkoff & Garner, 2012). As a consequence, childhood experiences affect long-term health and development through adulthood.

The quality of early life experiences has an effect on the brain and the central nervous system therefore affecting cognitive, social, emotional, and behavioural development of children (Heymann, Hertzman, Barer, & Evans, 2006). It also has an effect on a variety of body defense systems such as immune, hormone, and clotting systems and the maturation of these pathways (Heymann et al., 2006). The systematic differences of these factors over the life course lead to systematic differences in the functioning of organ systems and observed differences in morbidity and mortality (Heymann et al., 2006).

The social and economic resources of families are the main sources of early childhood development inequalities (Boivin & Hertzman, 2012; Stein et al., 2012; Melhuish et al. 2008; National Institute of Child Health and Human Development Early Child Care Research Network, NICHD ECCRN, 2005). Children living in poverty or under adverse conditions such as toxic stress, poor health and nutrition, or lack of an enriched environment (i.e. inadequate stimulation

and learning) have a higher chance of impaired cognitive, emotional, social, and behavioural development (Engle & Black, 2008; Heymann et al., 2006; Kingston, McDonald, Austin, & Tough, 2015; Kingston & Tough, 2014; Kingston, Tough, & Whitfield, 2012; NICHD, 2005).

Accumulating evidence suggests that social and economic disparities between international migrant and native-born individuals exist (Beiser, 2005; Beiser & Hou, 2002; Bornstein & Bohr, 2011; Bradley, 2011; Correa-Velez, Gifford, & Barneet, 2010; De Maio, 2010; Foss, Chantal, & Hendrickson, 2004; Georgiades, Boyle, Kimber, & Rana, 2011; Gushulak, Pottie, Hatcher, Torres, & DesMeules, 2011; Kingston et al, 2011; Mendoza, 2009; Ministry of Finance, 2012; Newbold & Danforth, 2003; Pottie, Hatcher, Torres, & DesMeules, 2011; Statistics Canada, 2010; Van Hulst, Séguin, Zunzunegui, Vélez, & Nikiéma, 2011; Walker et al., 2011). These disparities may have lasting effects on international migrant children with consequences for development. In our previous study, we found that children born to foreign-born parents had lower communication and social-emotional development (lower social-emotional competencies and higher social-emotional behaviour problem scores) compared to children born to Canadian-born parents at two years of age (Toosi, Kingston, McDonald, & Richter, 2016).

On average, 3.3 million people cross international borders annually worldwide with 16% of them being children aged 0 to 9 years old (United Nations UN, 2013). Given the increases in international migration and considering the higher birth rates in this population, foreign-born children or children who were born to foreign-born parents represent the fastest growing segment of the child population in high-income countries (Adsera & Ferrer, 2011; Bradley, 2011; Ma, 2002; Statistics Canada, 2010). The increasing number of international migrants requires focused efforts to address their health and developmental needs. Despite the large numbers of

international migrant children worldwide, as well as the growing interest in understanding and supporting optimal child development, little research has been done to study early development among international migrant children. Identifying the factors influencing the early development of international migrant children is necessary to inform strategies that support optimal development. The aim of this study was to identify factors associated with communication and social-emotional domains of early childhood development at two years of age for children who were born to foreign-born parents and their counterparts who were born to Canadian-born parents.

Methods

Study Design

This study used data from a prospective longitudinal pregnancy cohort study, the All Our Babies (AOB) study (n=3223; 2008-2011) in Alberta, Canada. Women were eligible if they were less than 24 weeks and 6 days gestation age at the time of recruitment, at least 18 years of age, and receiving prenatal care in Calgary. They were recruited through community posters and word of mouth as well as from primary health care offices and a citywide single provider public health laboratory service (Gracie et al., 2010; McDonald et al., 2013).

The AOB study was designed to examine maternal and infant outcomes during the perinatal period and to identify barriers and facilitators for accessing health care services and trajectories for child development. Observational data along with biological data was collected during the perinatal and the early childhood periods. Eligible participants completed five questionnaires: twice during pregnancy, and at 4, 12, and 24 months postpartum. Information related to recruitment and data collection is described in detail elsewhere (Gracie et al., 2010; McDonald et al., 2013).

Study Sample

Due to delays in securing funding and ethics approval processes, not all children (3223) were at the appropriate age range for the follow up at 24 months. Therefore not all children were eligible to continue with the study at 24 months (Tough et al., 2016). In the present study, mother-child dyads were eligible if the place of birth for both parents was reported. Among those who participated in the two-year follow up (n=1595), 14 parents did not report their place of birth. We classified the eligible mother-child dyads (n=1581) into two groups based on the parents' country of birth: 1) children who were born to Canadian-born parents (n=1129, 73%) and 2) children who were born to families with at least one foreign-born parent (at least one of the parents had to have been born outside of Canada) (n=452, 27%). The status reported by foreign-born parents that were born outside of Canada included immigrant, refugee, international student, or temporary worker.

Outcome Measures

Communication development. Communication development was assessed with the communication sub-scale of the Age and Stages Questionnaire (ASQ). The optimal level of child development was chosen based on the scoring algorithm of the ASQ. Children who scored above the monitoring zone (score 1 SD above the mean) were considered optimal (Kerstjens et al. 2011; Limbos & Joyce, 2011; Potter & Bricker, 2009).

Social-emotional development. Social-emotional development was assessed using the Brief Infant-Toddler Social and Emotional Assessment **(**BITSEA). The BITSEA is used for identifying social-emotional and behavioural problems or deficits in social-emotional behavioural competencies (Briggs-Gowan et al., 2013; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2006). For the social-emotional behavioural problem scale, children who ranked at the

25th percentile or higher were considered suboptimal (i.e. possible problem/delay) and for the behavioural competence scale those who ranked at the 15th percentile or lower were considered suboptimal (i.e. possible problem/delay) (Briggs-Gowan et al., 2013; Briggs-Gowan et al., 2006).

Risk and Protective Factors

The potential factors were chosen based on empirically identified factors from current literature. In addition, the factors that could contribute to disparities for children with foreign-born parents were chosen based on the Assessing Health Disparity Trajectories in Immigrant/Refugee Communities Model (Edberg, Cleary, & Vyas, 2011). Those factors included the migration experience (refugee, immigrant), social adjustment (less than 5 or more than 5 years in Canada), social economical status (i.e. income), social supports, mothers' health status (i.e. physical and mental health), access to care (prenatal care), and utilizing services (formal and informal community resources).

Maternal factors. Maternal depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS) with a cutoff score of >=10 indicating a risk of depression for the antenatal (24 weeks) and the postnatal (4 and 12 months postpartum) periods (Allbaugh, Marcus, Ford, & Flynn, 2015; Cox, Holden, & Sagovsky, 1987; Earls, 2010; Lagerberg, Magnusson, & Sundelin, 2011). Maternal anxiety was assessed using the Spielberger State Anxiety Scale (SAI) with a cutoff score of >=40 indicating the presence of anxiety (4 and 12 months postpartum) (Spielberger, Gorsuch, & Lushene, 1970). Self-reported history of mental health issues was assessed at 24 weeks of pregnancy based on answering yes to either of the following questions: "Have you ever experienced feeling sad, blue, depressed or down for most of the time for at least 2 weeks?" or "Have you ever experienced other mental disorders such as

generalized anxiety disorder, bipolar disorder, schizophrenia, or obsessive compulsive disorder?" Maternal postpartum physical health was assessed at 12 and 24 months postpartum using one item from the Short Form Health Survey (SF-12): "In general, how would you rate your physical health?"

Family factors. Social support was assessed at 12 and 24 months postpartum by using the Social Support Scale from the National Longitudinal Survey of Children and Youth (NLSCY) and less than one SD to indicate low social support (Statistics Canada, 2007). Formal community resources include recreation centres for moms, recreation centres for moms and babies, parenting resources, library story time, drop-in childcare centres, or learning resources such as drop-in programs or classes (e.g. parent link centres), and organized parenting groups, (e.g. Parents and Children Together (PACT), Families Matter, etc.). Informal community resources include informal mom and tots groups, internet parenting groups, informal play groups, spiritual institutions, parenting books, magazines, or TV shows.

Parent child interaction was assessed by parenting practices such as whether parents or adults read to the child at 12 months, played games such as pretend or imitation games or used educational toys to promote learning the alphabet or drawing with the child at 24 months. Pretend games are defined as plays, games, and activities that inspire a child's imagination and involves pretending an object or an action is something other than what it really is such as putting a teddy bear in a bed or feeding a doll (Porter, Hernandez-Reif, & Jessee, 2009). Educational toys are defined as toys that foster learning the alphabet such as alphabet fridge magnets, or toys that sing or say letters, or make sounds. Screen time included the amount of time that a child spent on watching television programs, and movies, or stories on a DVD, or VCR in a typical weekday.

Child factors. The type of childcare was categorized as 1) primarily cared for at home by parents, relatives, nanny or family day home, and 2) primarily cared for outside of the home in places such as childcare centres.

Analysis

The demographics of the children and their parents were described as frequencies and percentages for categorical variables and means (SD) for continuous variables. Unadjusted odds ratios were generated for each independent variable and outcome. To assess multicollinearity, correlations among independent variables were estimated for each group in order to assess their eligibility for entry into the final multivariable logistic regression models. Independent variables significant at a level of $p \leq 0.20$ were considered for inclusion in the final multivariable models (Field, 2011). All statistical analyses were performed with IBM SPSS Statistics, Version 23.

To identify the risk and protective factors associated with development for children from foreign-born and Canadian-born parents, we developed separate models for each group. Given evidence that factors associated with development could differ by developmental domain (e.g., those that influence socio-emotional development differ from language development) (Kingston et al., 2012, 2014, 2015), separate models were built for each developmental domain. In addition, factors that could contribute to health disparities for international migrant populations were included in the models associated with the children who were born to foreign-born parents. Those factors include the migration experience (refugee, immigrant), social adjustment (less than 5 or more than 5 years in Canada), social economical status (i.e. income), social supports, mothers' health status (i.e. physical and mental health), access to care (prenatal care), and utilizing services (formal and informal community resources). The latter factors were chosen

based on the Assessing Health Disparity Trajectories in Immigrant/Refugee Communities Model (Edberg et al., 2011).

Results

Of the 1595 children in the cohort, 1129 were born to Canadian-born parents and 452 were born to foreign-born parents (at least one of the parents having been born outside of Canada) while 14 were missing parents' place of birth. Overall, 91.7% of the sample had some or completed post-secondary education, 72% had incomes over $80,000, and 95.6% were partnered. Children with foreign-born parents were significantly more likely to live in a lower income household, have older parents and more likely to speak a language other than English at home compared to children who had Canadian-born parents. The characteristics of the children and their families are shown in Table 4.1.

Table 4.2 shows comparisons between migrant and Canadian children on maternal, family, and child risk factors. Compared to Canadian-born mothers, foreign-born mothers were significantly more likely to have depression during pregnancy (21.9% vs. 12.8%; $\rho<0.0001$), postnatal depression at 4 or 12 months (24.8% vs. 18.4%; $\rho<0.006$), postpartum anxiety at 4 or 12 months (43.1% vs. 31%; $\rho<0.0001$), fair-poor physical health at 12 or 24 months postpartum (15.3% vs. 11%; $\rho<0.020$), low social support at 12 or 24 months postpartum (41.7% vs. 22.8%; $\rho<0.0001$), and not use informal community resources at 12 or 24 months postpartum (28.5% vs. 17.2; $\rho<0.0001$). Compared to children born to Canadian-born parents, children born to foreign-born parents were significantly more likely to use more than 1 hour of screen time per day at 24 months (36% vs. 30%; $\rho<0.021$), to be living in a household with more than 2 adults (15.9% vs. 7.7%; $\rho<0.0001$), and to have less interactions with their parents or adults in their household (parents or adults didn't read to them at 12 months) (4.4% vs. 0.7%; $\rho<0.0001$), didn't play

imitation games with them at 24 months (2.7% vs. 0.9%; ρ<0.007), didn't play using educational toys with them at 24 months (1.6% vs. 3%; ρ<0.003), and didn't draw with them at 24 months (2% vs. 0.6%; ρ<0.014)

In the final multivariable models, we aimed to identify the most important predictors of child development delay in each domain for both migrant and Canadian children. We performed separate multivariable logistic regression analyses using separate models for each domain of early development for both children with foreign-born parents and Canadian-born parents. Multicollinearity was assessed by estimating the correlations amongst independent variables in each group. We did not find any strong relationship between the independent variables for both children with foreign-born and Canadian-born parents. The correlations between the variables are shown for children with foreign-born parents (see Table 4.3) and for children with Canadian-born parents (see Table 4.4).

Communication Development (Sub-scale of ASQ)

Children with foreign-born parents. In the final multivariable model, we found that gender and type of childcare at 12 and 24 months were significantly associated with possible communication delay at 24 months. Among this group of children, being a boy (OR=2.73 [1.04 to 7.07]) and being cared for primarily by parents rather than in childcare centres at 12 months (OR=5.04 [1.79 to 14.21]) and 24 months (OR=2.73 [1.04 to7.07]) were the most important predictors of possible communication delay (Table 4.5).

Children with Canadian-born parents. In the final multivariable model, we found that gender, gestational age at the delivery of the infant and whether adults play pretend games at 24 months with children were significantly associated with possible communication delay at 24 months. Among this group of children, being a boy (OR=1.89 [1.22 to 2.91]), being born preterm

(OR=2.35 [1.16 to 4.78]), and not playing pretend games with adults (OR=3.56 [1.12 to11.37]) were the most important predictors of possible communication delay (Table 4.6).

Social-Emotional Development (BITSEA)

Children with foreign-born parents.

Competency skills (Competence score subscale). In the final multivariable model, we found that maternal mental health history and utilizing informal community resources were significantly associated with social-emotional competencies at 24 months. Among this group of children, having a mother with a history of mental health issues (OR=4.61[1.18 to18]) and parents not utilizing informal community resources at 12 or 24 months (OR=3.72 [1.26 to 10.97]) were the most important predictors of possible delay in social-emotional competencies (Table 4.7).

Behaviour problems (Problem scores subscale). In the final multivariable model, we found that maternal physical health at 12 or 24 months, the type of childcare at 12 months, and the primarily language spoken at home were significantly associated with social-emotional behaviour problems at 24 months. Among this group of children, having a mother with reportedly fair to poor health at 12 or 24 months (OR=5.08 [1.06 to 26.17]), being cared primarily by parents at 12 months (OR=4.65 [1.14 to19.03]) and speaking a language other than English at home (OR=4.83 [1.15 to 20.31]) were the most important predictors of possible social-emotional behaviour problems (Table 4.7).

Children with Canadian-born parents.

Competency skills (Competence score subscale). In the final multivariable model, we found that adults playing pretend games with children was significantly associated with social-behaviour competencies at 24 months. Among this group of children, not playing pretend games

with adults at 24 months (OR=3.26 [1.03 to10.38]) was the most important predictor of possible delay in social-emotional competencies (Table 4.8).

Behaviour problems (Problem scores subscale). In the final multivariable model, we found that maternal mental health history; maternal physical health at 12 or 24 months, and number of children in the household were significantly associated with social-emotional behaviour problems at 24 months. Among this group of children, being an only child (OR=2.98 [1.01 to 8.80]), having a mother with a history of mental health issues (OR=3.26 [1.19 to 8.98]), and having a mother with reportedly fair to poor health at 12 or 24 months (OR=9.9 [2.70 to 36.84]) were the most important predictors of possible social-emotional behaviour problems (Table 4.8).

Discussion

This study identified the most important predictors of possible delay in the communication and social-emotional domains of child development for both children with foreign-born and Canadian-born parents at two years of age. We found that factors that predict the possible delay in each domain of development differed between children who were born to foreign-born parents and those who were born to Canadian-born parents.

Communication Development

Among children with foreign-born parents boys were 2.73 times more likely to have a communication delay compared with girls. In addition, children who were cared primarily by parents at 12 months were 5.04 times more likely to have a possible communication delay compared with those who spent time at a childcare centre and children who were cared primarily by parents at 24 months were 2.73 times more likely to have a communication delay compared with those who spent time at a childcare centre. Among children with Canadian-born parents,

boys were 1.89 times more likely to have a possible communication delay compared with girls. In addition, children who were born preterm were 2.35 times more likely to have a possible communication delay compared with those who were not. We also found that those children with adults that did not play pretend games with them at 24 months were 3.56 times more likely to have a possible communication delay compared with those who did.

Consistent with other studies (Collisson et al., 2016; Reilly et al., 2010; Zubrick, Taylor, Rice, & Slegers, 2007), this study identified the male gender for both groups of children and prematurity (Reilly et al., 2010; Zubrick et al., 2007) for children born to Canadian-born parents as significant risk factors for a possible communication delay.

Collisson et al. (2016) also identified reading to infants daily, providing informal play opportunities, and being cared for primarily in childcare centres as protective factors in relation to late talking in toddlers. Their results confirm the risk factors that we found to be associated with possible communication delay in children with foreign-born parents (being primarily cared for at home) and children with Canadian-born parents (not playing pretend games with adults).

Chen, Cohen, and Chen (2010) proposed a method for interpreting the size of the OR as such that OR=1.68, 3.47, and 6.71 are equivalent to Cohen's d=0.2 (small), 0.5 (medium), and 0.8 (large), respectively. Gender was a predictor of a possible communication delay for both groups, however the magnitude of the effect was small to medium for children with foreign-born parents (OR=2.73) and small for children with Canadian-born parents (OR=1.89) based on the method for interpreting the OR provided by Chen et al. (2010). Using their method also indicates that type of childcare (primarily outside of home care) at 12 months (OR=5.04) had a medium to large effect at 24 months (OR=2.73) and had a small to medium effect on a possible communication delay for children with foreign-born parents. On the other hand, being born

prematurely (OR=2.35) had a small to medium effect while not playing pretend games with adults (OR=3.56) had a medium effect on a possible communication delay in children with Canadian-born parents.

Social-Emotional Development

Competency skills. Among children with foreign-born parents, those who had a mother with a history of mental health issues were 4.61times more likely to have a delay in social-emotional competencies compared with those who did not. In addition, children whose parents did not utilize informal community resources at 12 or 24 months were 3.72 times more likely to have a delay in social-emotional competencies compared with those who did. Among children with Canadian-born parents, those children with adults that did not play pretend games with them at 24 months were 3.26 times more likely to have a delay in social-emotional competencies compared with those who did.

Based on the method for interpreting the OR provided by Chen et al. (2010) having a mother with a history of mental health issues (OR=4.61) had a medium to large effect and not utilizing informal community resources at 12 or 24 months (OR=3.72) had a medium effect on a possible social-emotional competencies delay for children with foreign-born parents. On the other hand, not playing pretend games (OR=3.26) with adults had a medium effect on a possible social-emotional competencies delay in children with Canadian-born parents.

Behaviour problems. Among children with foreign-born parents, those who had a mother with reportedly fair to poor health at 12 or 24 months were 5.08 times more likely to have a social-emotional behaviour problems compared with those who had mothers with excellent to good health. In addition, children who were cared primarily by parents at 12 months were 4.65 times more likely to have social-emotional behaviour problems compared with those

who spent time at a childcare centre. Furthermore, children who spoke a language other than English at home were 4.83 times more likely to have social-emotional behaviour problems compared with those who spoke English.

Among children with Canadian-born parents, those who had a mother with a history of mental health issues were 3.26 times more likely to have social-emotional behaviour problems compared with those who did not. In addition, children who had a mother with reportedly fair to poor health at 12 or 24 months were 9.9 times more likely to have social-emotional behaviour problems compared with those who had mothers with excellent to good health. Furthermore, children who were an only child were 2.98 times more likely to have social-emotional behaviour problems compared with those who were in a household with more than 1 child.

Having a mother with reportedly fair to poor health at 12 or 24 months was a predictor of a possible social-emotional behaviour problem for both groups, however the magnitude of the effect was medium to large for children with foreign-born parents (OR=5.08) and large for children with Canadian-born parents (OR=9.9) based on the method for interpreting the OR provided by Chen et al. (2010). Using their method also indicates that type of childcare (primarily outside of home care) at 12 months (OR=4.65) and speaking a language other than English at home (OR=4.83) had a medium to large effect for possible social-emotional problems for children with foreign-born parents. On the other hand, being an only child (OR=2.98) and having a mother with a history of mental health issues (OR=3.26) had a small to medium effect on possible social-emotional problems for children with Canadian-born parents.

Although evidence shows that childhood development is determined by the interaction between genes, biology, and the social and physical environment (Shonkoff & Garner, 2011) it is the social and economic resources of families that are the main sources of early childhood

development inequalities (Boivin & Hertzman, 2012). There are well-documented studies that support the notion that environmental, parental, and family factors can affect child development. Those include factors such as parents' education, maternal mental or physical health, family income, household employment, parenting skills, parenting style, stimulation for healthy brain development, family functioning, and cultural practices and approaches (Belsky & Pluess 2013; Boivin & Hertzman, 2012; Bradley, 2002; Diamond, 2011; Feinstein, 2003; Heymann et al., 2006; Kieran & Mensah, 2011; Masten, 2007; Masten & Osofsky, 2010; Melhuish, 2016).

Protective factors such as attachment with competent and loving caregivers, stimulation for healthy brain development, opportunities to learn new skills, and desirable settings to develop self-control are particularly important during the early childhood period for children to achieve their full potentials (Masten & Osofsky, 2010). Children need to be nourished, stimulated, and protected as well as to be able to establish interpersonal relationships in order to achieve optimal development and also have the foundations for effective cognitive and neurobiological adaptation to adversities throughout the life span (Luthar, 2013; Masten & Osofsky, 2010; Naudeau, 2009; Ungar, 2012).

The quality of early life stimulation has a profound effect on children's cognitive, social, emotional, and behavioural development (Belsky & Pluess 2009; Heymann et al., 2006). Lack of adult attention and stimulation in the early years can lead to poor socio-emotional and cognitive development (Naudeau, 2009). Positive caring practices by caregivers and interactions with peers in structured group settings promote healthy emotional and positive social development (Naudeau, Kataoka, Valerio, Neuman, & Elder, 2010). The most consistent finding regarding emotional and behavioural development is that social demographic factors and parental behaviours and practices, particularly the quality of maternal care and stimulation in the

home environment, are the most influential factors (Melhuish et al. 2008; NICHD ECCRN, 2005 Stein et al., 2012). However, in our study we did not find that social demographic factors were significant for child development at 2 years of age and perhaps this is due to the fact that our parent samples were mostly educated (had some or completed a post-secondary education), had a fairly high income, and were partnered. Alternatively, the types of childcare and community resources that families utilized were found to be significant factors for social-emotional development for children with foreign-born parents. For children with Canadian-born parents, whether or not adults played pretend games with them was the significant factor. This suggests that the quality of maternal care in the home including parenting practices and stimulating activities is the most significant factor for emotional and behavioural development.

The findings in our study suggest that outside of home resources provide developmental stimulation to the children with foreign-born parents rather than their parents and/or adults in their household. These children appear to get the stimulation they need for developing their communication and social-emotional behaviour from exposure to non-parental care and their social-emotional competencies from informal community resources such as informal moms and tots groups, internet parenting groups, informal play groups, spiritual institutions, parenting books, magazines, or television shows. As well, children with Canadian-born parents appear to get the stimulation they need from pretend play, games, and activities that inspire child imagination with their parents or adults in their household.

The effect of non-parental care on childhood development is not fully understood as evidenced by contradictions between studies. The findings from one study in the United States of America (U.S.A.) indicates that young children who utilized non-parental care are more at risk of developing externalizing behaviour problems (Melhuish et al., 2008) while the findings from

some European studies find no negative effects (Borge, Rutter, Côté, & Tremblay 2004; Mathers & Sylva, 2007). Similar to our results, a study by Stein et al. (2012) indicates that a home environment with low quality maternal caregiving, maternal stress and maternal mental health issues are the strongest and most consistent influences on child behavioural development while childcare and gender have a small effect.

Limitations

A comparison performed between the AOB participants and both national and provincial statistics, showed that the AOB cohort is, in general, representative of pregnant and parenting populations at local and provincial levels within Canadian urban settings (McDonald et al., 2013). The proportion of children who were born to migrant parents (27%) in the AOB cohort is very similar to the actual proportion of children born to migrant parents in Canada (22%) as well as in Alberta (22.5%) (Statistics Canada, 2013). However, as compared to national ($68,410) and provincial ($83,560) averages for income at the time of data collection (Statistics Canada, 2015), our sample had a fairly high income. As compared to the national (Canada) average income, 80.7 % of the total sample, 71.4% of the migrant and 84.6% of the Canadian group were above average. As compared to the provincial (Alberta) average income, 72.6 % of the total sample, 63.4% of the migrant and 76.4% of the Canadian group were above average. Therefore, the results in this study may not be generalizable to lower income families. The majority of the foreign-born parents reported being immigrant or Canadian citizens when they arrived in Canada (76%) and only 3% reported being refugees. The remaining 21% reported another status such as international student, temporary worker, or visitor. Therefore, the results of this study may not be generalizable to children born to refugee.

Among those eligible, the AOB cohort demonstrated a retention rate of 81% for the 12 month data collection, and 76% for the 24 month data collection periods (Tough et al., 2016). The decreased rate of participation across time is a common limitation in longitudinal studies, which can be a potential source of selection bias and limits generalizability of the findings. Women who continued participating to at least one follow-up time point were more likely to be older, and in a stable relationship, to have higher educational attainment and higher family incomes, and to be born in Canada, and primarily speaking English in their home (McDonald et al., 2013; Tough et al., 2016).

Although recall bias was minimal due to the prospective nature of data collection, other forms of information bias such as reporting and misclassification are potential sources of bias due to the self-reporting nature of the data collection, and coding of the variables. In addition, both outcomes and predictors measurements were self-reported using standardized tools, however some predictors were measured differently with single item questions (e.g. measuring parent child interactions or parenting practices and stimulation activities). The reported information in relation to the quality and quantity of stimulation and support available to the children (e.g. the quality of caregiver-child interactions) might have been different if it was measured using other available tools. Using tools such as the Home Observation for Measurement of the Environment (HOME) (Bradley & Caldwell, 1988), and the Caregiver Interaction Scale (CIS) (Arnett, 1989) might have been a better choice of measurement to minimize the risk of misclassification bias.

The use of measurements in English might be a barrier for some participants who might have limited English language skills. Nevertheless, only 1% of the participants were ineligible due to difficulty in completing the English language questionnaire (McDonald et al., 2013). Even

though the developmental screening tools used in this study have been tested with individuals from various ethnic and socioeconomic backgrounds, they lack validity on immigrant children who may speak different languages other than English at home and have different cultural backgrounds.

Conclusions

There are inequalities in health, education, and social adjustment across high-income countries (Willms, 2006). The roots of these inequalities often start in early childhood (Oberklaid, Baird, Blair, Melhuish, & Hall, 2013). Developmental and behavioural problems can effect the educational achievement and social interaction for children, which can have enduring consequences in both childhood and adulthood.

Many studies suggest that the quality of the home environment is the most significant factor for emotional and behavioural development for children (Melhuish et al. 2008; NICHD ECCRN, 2005; Stein et al., 2012). Home environmental factors include the quality of maternal care and stimulation, parenting practices, maternal stress, and mental health problems (Bradley, 2002; Melhuish et al. 2008; NICHD ECCRN, 2005; Stein et al., 2012). Our findings suggest that the parenting practices and stimulating activities provided by foreign-born parents may differ from Canadian-born parents, which can negatively influence the communication and emotional-social development of their children. As a result, children with foreign-born parents may also have less of a chance to have an optimal early education and subsequently less school engagement and academic success in the future (Bradley, 2011).

Foreign-born parents may benefit from parenting support to improve the quality of the home environment. Promoting parent-child interactions and stimulating activities to improve responsiveness, increase attachment, encourage learning, book reading, play activities, positive

discipline, and problem-solving related to children's development are some examples of items that could be part of parenting support (Engle et al., 2011).

There is evidence to suggest that there is an association between prenatal and postnatal maternal mental health and infant, toddler, and school-age child development (Kingston et al., 2012, 2014, 2015; Stein et al., 2012). We also found that history of mental health issues was a risk factor for a possible social-emotional competencies delay for children with foreign-born parents and also a risk factor for possible social-emotional problems in children with Canadian-born parents. The need for assuring maternal mental health is warranted. The early identification and treatment of perinatal mental health problems could be an effective strategy for optimizing child development (Kingston et al., 2012, 2014, 2015).

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Ethical Approval

The Child Health Research Office and the Conjoint Health Research Ethics Board of the Faculties of Medicine, Nursing, and Kinesiology, University of Calgary and the Affiliated Teaching Institutions approved the AOB study (Gracie et al., 2010; McDonald, et.al, 2013). This study was approved by the Health Research Ethics Board of the University of Alberta.

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Table 4.1. Characteristics of AOB Children at 24 months (n=1595)

Characteristics	Total sample (n=1595) n (%)	Migrant (n=452) n (%)*	Canadian (n=1129) n (%)*	ρ value
Gender	(n=1551)	(n=436)	(n=1104)	
Boy	805(51.9)	221(50.7)	576(52.2)	0.60
Girl	746(48.1)	215(49.3)	528(47.8)	
Child birth order	(n=1578)	(n=450)	(n=1122)	
First child	786(49.8)	231(51.3)	551(49.1)	0.43
Not the first child	792(50.2)	219(48.7)	571(50.9)	
Gestational age at birth	(n=1541)	(n=431)	(n=1099)	
37 or higher	1437(93.3)	395(91.6)	1032(93.9)	0.11
36 or lower	104(6.7)	36(8.4)	67(6.1)	
Weight at birth	(n=1469)	(n=408)	(n=1050)	0.22
2500 or higher	1383(94.1)	379(92.9)	993(94.6)	
Low birth weight (less than 2500g)	86(5.9)	29(7.1)	57(5.4)	
Primary language at home	(n=1587)	(n=452)	(n=1129)	
English	1425(89.8)	304(67.3)	1116(98.8)	<0.0001
Other	162(10.2)	148(32.7)	13(1.2)	
Initiated breastfeeding	(n=1319)	(n=267)	(n=943)	
Yes	1274(96.6)	260(97.4)	907(96.2)	0.35
No	45(3.4)	7(2.6)	36(3.8)	
Maternal marital status	(n=1587)	(n=452)	(n=1129)	
Married/Common law	1517(95.6)	430(95.1)	1083(95.9)	0.48
Other (Single, separated, divorced)	70(4.4)	22(4.9)	46(4.1)	
Total annual household income (before taxes and deductions)	(n=1527)	(n=434)	(n=1088)	
$39,999 or less	90 (5.9)	45(10.4)	44(4)	<0.0001
$40,000- $79,999	328 (21.5)	114(26.3)	213(19.6)	
$80,000 or more	1109 (72.6)	275(63.4)	831(76.4)	
Maternal education level	(n=1586)	(n=450)	(n=1129)	
High school or less	132(8.3)	30(6.7)	100(8.9)	0.153
Some or completed post secondary	1454(91.7)	420(93.3)	1029(91.1)	
Maternal age at delivery	**Mean (SD)** (n=1525) 31.40 (4.39)	**Mean (SD)** (n=428) 32.14 (4.36)	**Mean (SD)** 31.10 (4.37) (n=1092)	<0.0001

Father's age at delivery	(n=1494) 33.47 (5.12)	(n=419) 34.98 (5.40)	(n=1071) 32.89 (4.90)	<0.0001

For categorical variables Chi-Square test and for continues variables independent t-test was used to assess the differences between children with foreign-born and Canadian-born parents.
*Denominator varies due to missing values for some variables.

Table 4.2. Comparisons of maternal, family and child factors between children with foreign-born and Canadian-born parents

Maternal Factors	Migrant (n=452) n(%)	Canadian (n=1129) n(%)	ρ value
Depression during pregnancy (24 weeks)	(n=452)	(n=1127)	
Yes (Edinburgh >=10)	99 (21.9%)	144(12.8%)	<0.0001
No (Edinburgh <10)	353 (78.1%)	983(87.2%)	
Postnatal depression (4 or 12 months)	(n=371)	(n=946)	
Yes (Edinburgh >=10)	92 (24.8%)	174 (18.4%)	0.006
No (Edinburgh <10)	279 (75.2)	772 (81.6%)	
Postpartum anxiety (4 or 12 months)	(n=348)	(n=929)	
Yes (Spielberger State >40)	150 (43.1%)	288 (31.0%)	<0.0001
No (<40)	198 (56.9%)	641 (69.0%)	
Physical health (12 or 24 months postpartum)	(n=372)	(n=957)	
Fair-Poor	57(15.3)	105(11)	<0.020
Excellent-Good	315(84.7)	852(89.7)	
Self reported history of mental health	(n=451)	(n=1129)	
Yes	140 (31%)	381 (33.7%)	0.302
No	311 (69%)	748(66.3%)	
Difficulty access to prenatal care	(n=428)	(n=1092)	
Yes	22(4.9%)	51(4.6%)	0.766
No	423(95.1%)	1060(95.4%)	
Mother's age	(n=428)	(n=1092)	
<30 years old	114 (26.6%)	390 (35.7%)	0.001
≥30 years old	314 (73.4%)	702(64.3%)	
Mother's education	(n=450)	(n=1129)	
High school or less	30(6.7%)	100(8.9%)	0.153
Some or completed postsecondary	420(93.3%)	1029(91.1%)	
Family Factors			
Marital status	(n=452)	(n=1129)	
Other	22 (4.9%)	46(4.1%)	0.483
Married/Common law	430(95.1%)	1083 (95.9%)	
Total annual household income (before taxes and deductions)	(n=434)	(1088)	
< $80,000	159 (36.6%)	257 (23.6%)	<0.0001
≥ $80,000	275 (63.4%)	831(76.4%)	

Social support at 12 or 24 months			
Report low social support (NLSCY Social Support Scale<1SD)	159(41.7)	223(22.8)	<0.0001
Did not report low social support (NLSCY Social Support Scale>1SD)	222(58.3)	754(77.2)	
Use formal community resources at 12 or 24 months	(n=443)	(n=1121)	
No	6(1.4)	8(0.7)	0.178
Yes	437(98.6)	1113(99.3)	
Use informal community resources at 12 or 24 months			
No	(n=404)	(n=1050)	
Yes	115(28.5)	181(17.2)	<0.0001
	289(71.5)	869(82.8)	
Number of adults in the household	(n=365)	(n=946)	
More than 2 adults	58 (15.9%)	73(7.7%)	<0.0001
1 or 2 adults	307 (84.1%)	873(92.3%)	
Number of children in the household	(n=102)	(n=273)	
2 or more child	47 (46.1%)	133(48.7%)	0.649
1 child	55(53.9%)	140(51.3%)	
Adult reads to baby at 12 months	(n=366)	(n=946)	
No	16(4.4%)	7 (0.7%)	<0.0001
Yes	350 (95.6%)	939(99.3%)	
Adult reads daily to the child at 24 months	(n=450)	(n=1129)	
No (weekly/monthly)	0 (0%)	0(0%)	0.646
Yes (Daily)	450 (100%)	1129(100%)	
Adult plays imitation games with your child at 24 months	(n=450)	(n=1127)	0.007
No	12 (2.7%)	10 (0.9%)	
Yes	438(97.3%)	1117(99.1%)	
Adult sings to child at 24 months	(n=450)	(n=1129)	
No	7(1.6%)	7(0.6%)	0.073
Yes	443(98.4%)	1122(99.4%)	
Adult plays pretend games with your child at 24 months	(n=449)	(n=1128)	
No	14(3.1%)	18(1.6%)	0.053
Yes	435(96.9%)	1110(98.4%)	

Adult scribbles and draws crayons, markers, etc. with your child at 24 months	(n=450)	(n=1128)	
No	9(2.0%)	7(0.6%)	0.014
Yes	441(98.0%)	1121(99.4%)	
Adult plays with educational toys with your child at 24 months	(n=449)	(n=1129)	
No	7(1.6%)	3(0.3%)	0.003
Yes	442(98.4%)	1126(99.7%)	
Adult plays with toys that promote learning the alphabet with your child at 24 months	(n=449)	(n=1129)	
No	14(3.1%)	29(2.6%)	0.545
Yes	435(96.9%)	1100(97.4%)	
Visit the library at 24 months	(n=449)	(n=1128)	
No	185(41.2%)	468(41.5%)	0.917
Yes	264(58.8%)	660(58.5%)	
Child factors			
Gender	(n=436)	(n=1104)	
Boy	221(50.7)	576(52.2)	0.611
Girl	215(49.3)	528(47.8)	
Preterm birth	(n=431)	(n=1099)	
Yes (≤36 weeks)	36(8.4%)	67(6.1%)	0.113
No (≥37 weeks)	395(91.6%)	1032(93.9%)	
Kind of childcare at 12 months	(n=364)	(n=945)	
Majority outside of home care	158(43.4%)	426(45.1%)	0.585
Majority parents care	206(56.6%)	519(54.9%)	
Kind of childcare at 24 months	(n=449)	(n=1129)	
Majority parents care	193(43.0%)	528(46.8%)	0.174
Majority outside of home care	256(57.0%)	601(53.2%)	
Child health at 24months	(n=450)	(n=1128)	
Fair-Poor	3(0.7%)	10(0.9%)	0.663
Excellent-Good	447(99.3%)	1118(99.1%)	
Child has a chronic health condition at 24 months	(n=445)	(n=1119)	
Yes	12(2.7%)	28(2.5%)	0.826
No	433(97.3%)	1091(97.5%)	

Screen time at 24 months	(n=450)	(n=1129)	
More than 1 hr./day	162(36.0%)	339(30.0%)	0.021
None to less than 1 hr./day	288(64.0%)	790(70.0%)	

Chi-Square test was used to assess the differences.

Table 4.3. Relation between the independent variables for children with foreign-born parents

	Prenatal depression	Postnatal depression (4 or 12 M)	Postnatal anxiety (4 or 12 M)	Physical health at12 or 24	Difficulty accessing prenatal care	History of mental health	Annual income	Social Support at 12 or 24M	Informal resources at 12 or 24 M	Number of adult in the household	Play pretend game	Visit library	Gender	Childcare at 12M	Childcare at 24M	Screen time at 24M	Time in Canada	Migration experience	Primarily language	Work outside of home
Prenatal depression	1.00																			
Postnatal depression	0.296**	1.00																		
Postnatal anxiety	0.375**	0.514**	1.00																	
Physical health @12 or 24	-0.149*	-0.155*	-0.277**	1.00																
Difficulty accessing prenatal care	-0.138*	-0.062	-0.156*	0.071	1.00															
History of mental health	0.300**	0.166**	0.189**	-0.43	-0.148**	1.00														
Annual income	-0.153**	-0.155*	-0.211**	0.177**	0.073	0.041	1.00													
Social Support at 12 or 24	-0.293**	-0.262**	-0.402**	0.174**	0.032	-0.155**	0.165**	1.00												
Informal resources	-0.039	-0.027	-0.028	0.029	0.027	0.034	0.094	0.075	1.00											
Number of adult in the household	0.106	-0.013	0.106	-0.080	-0.053	-0.084	-0.079	-0.021	-0.074	1.00										
Play pretend game	-0.042	-0.173**	-0.0167**	0.093	0.0106	-0.005	0.120*	0.193**	0.018	-0.149*	1.00									
Visit library	-0.089	0.020	0.039	0.003	-0.031	0.038	-0.081	0.022	0.077	-0.036	0.080	1.00								
Gender	-0.123*	-0.045	-0.054	0.042	0.037	-0.055	-0.002	0.074	0.030	0.000	0.051	0.027	1.00							
Childcare at 12M	-0.038	0.071	0.002	0.079	-0.043	0.056	0.144*	0.128*	-0.002	0.0131*	0.024	-0.009	-0.032	1.00						
Childcare at 24M	-0.070	0.077	0.053	-0.011	0.038	0.011	0.124*	0.100	0.087	0.009	0.033	-0.088	-0.003	0.553**	1.00					
Screen time at 24M	0.162**	0.188**	0.185**	-0.081	-0.008	0.036	-0.145**	-0.212**	-0.034	0.100	-0.090	-0.048	-0.093	0.050	0.072	1.00				
Time in Canada	0.138*	0.112	0.210**	-0.135*	-0.043	-0.119*	-0.314**	-0.145*	-0.210**	0.150*	-0.041	0.001	0.003	-0.72	-0.118*	0.107	1.00			
Migration experience	0.081	-0.076	-0.038	0.216**	-0.025	0.157*	0.027	-0.063	-0.011	-0.007	0.063	-0.142	0.031	-0.091	-0.031	0.120	0.011	1.00		
Primarily language	0.156**	0.143*	0.228**	-0.202**	-0.011	-0.050	-0.315**	-0.210**	-0.208**	0.205**	-0.098	0.070	0.052	-0.018	-0.011	0.137*	0.464**	-0.135	1.00	
Work outside of home	-0.093	-0.127	-0.096	0.086	0.027	-0.133	-0.027	-0.001	-0.006	-0.104	-0.035	0.055	0.029	0.027	0.115	-0.079	-0.058	0.012	-0.223**	1.00

*. Correlation is significant at the 0.05 level (2-tailed).

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

Table 4.4. Relation between the independent variables for children with Canadian-born parents

	Prenatal depression	Postnatal depression at 4 or 12 M	Postnatal anxiety at 4 or 12 M	Physical health at12 or 24 M	Difficulty accessing prenatal care	History of mental health	Mother's age	Marital status	Annual income	Social Support at 12 or 24 M	Informal community resources at 12 or 24 M	Number of children in the household	Play pretend game	Play with alphabet game	Gender	Preterm	Childcare at 12 M	Childcare at 24 M	Screen time at 24M
Prenatal depression	1.00																		
Postnatal depression	0.355**	1.00																	
Postnatal anxiety	0.317**	0.545**	1.00																
Physical health at12 or 24 M	-0.168**	-0.184**	-0.22**	1.00															
Difficulty accessing prenatal care	-0.47	-0.61	-0.067*	0.050	1.00														
History of mental health	0.203**	0.193**	0.229**	-0.073*	-0.026	1.00													
Mother's age	-0.028	0.036	0.043	0.065*	-0.013	0.061*	1.00												
Marital status	0.099**	0.102**	0.073*	-0.156**	0.021	0.075*	-0.095**	1.00											
Annual income	-0.114**	-0.053	-0.062	0.141**	0.009	0.050	0.254**	-0.185**	1.00										
Social Support at 12 or 24 M	-0.213**	-0.257**	-0.313**	0.204**	0.081*	-0.083*	-0.041	-0.050	0.077**	1.00									
Use informal community resources	0.059	-0.040	0.013	0.036	-0.022	0.027	-0.055	-0.073*	0.069*	0.048	1.00								
Number of children in the household	-0.030	-0.009	-0.025	0.022	0.056	-0.091	0.243**	-0.073	-0.037	-0.041	0.008	1.00							
Play pretend game	-0.058	-0.002	-0.048	-0.017	-0.027	-0.014	-0.007	0.026	0.046	0.058	0.013	0.103	1.00						
Play with alphabet game	-0.042	0.048	-0.005	0.000	0.018	-0.050	0.020	0.033	0.046	0.052	-0.028	0.039	0.024	1.00					
Gender	0.038	-0.007	0.016	-0.034	0.023	0.050	-0.008	-0.006	0.016	-0.060	-0.043	0.031	0.081**	0.010	1.00				
Preterm	0.122**	0.129**	0.095**	-0.028	-0.023	0.054	-0.014	0.049	-0.043	-0.078*	0.013	0.047	0.003	-0.030	-0.028	1.00			
Childcare at 12 M	-0.035	-0.021	-0.008	0.011	-0.021	-0.056	0.032	0.043	0.157**	0.096**	-0.056	-0.257**	-0.005	0.045	0.049	-0.040	1.00		
Childcare at 24 M	0.021	0.005	0.067*	0.021	-0.051	-0.017	0.076*	0.010	0.115**	0.036	-0.069*	-0.113	-0.063*	0.016	0.044	-0.019	0.573**	1.00	
Screen time at 24 M	0.075*	0.064*	0.060	-0.141**	0.012	0.036	-0.031	0.074*	-0.082**	-0.115**	-0.050	0.146*	0.022	0.033	0.021	0.053	-0.107**	-0.102**	1.00

*. Correlation is significant at the 0.05 level (2-tailed).

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

Table 4.5. Final multivariable model for factors associated with communication development of children with foreign-born parents

Independent Variable	Scored <=1SD (below monitoring zone) n (%)	Scored >1SD (On schedule) n (%)	UOR (95% CI)	AOR (95% CI)
Maternal factors				
Depression during pregnancy (24 weeks)				
Yes (EPDS >=10)	21(38.2)	58(21.5)	2.26(1.22-4.18) ρ=0.009	2.38(0.95-5.94) ρ=0.063
No (EPDS <10)	34(61.8)	212(78.5)	1.00	1.00
Postnatal depression (4 or 12 months)				
Yes (EPDS >=10)	17(35.4)	51(23.6)	1.77(0.91-3.47) ρ=0.093	1.25(0.46-3.42) ρ=0.665
No (EPDS <10)	31(64.6)	165(76.4)	1.00	1.00
Postpartum Anxiety (4 or 12 months)				
Yes (SAI >40)	29(64.4)	94(45.4)	2.18(1.12-4.25) ρ=0.022	1.46(0.57-3.77) ρ=0.435
No (SAI <40)	16(35.6)	113(54.6)	1.00	1.00
Physical Health (12M or 24 M postpartum)				
Fair –Poor	11(22.9)	34(15.8)	1.58(0.74-3.41) ρ=0.24	1.40(0.55-3.57) ρ=0.477
Excellent –Good	37(77.1)	181(84.2)	1.00	1.00
Self Reported History of mental health issues				
Yes	19(34.5)	86(31.9)	1.13(0.61-2.08) ρ=0.70	1.35(0.65-2.81) ρ=0.423
No	36(65.5)	184(68.1)	1.00	1.00
Difficulty Access to Prenatal Care				
Yes	3(4.3)	13(5.2)	0.84(0.23-3.02) ρ=0.784	-
No	66(95.7)	239(94.8)	1.00	-
Mother's Education				
High school or less	4(7.4)	19(7)	1.05(0.34-3.23) ρ=0.928	-
Some or Completed post Secondary	50(92.6)	250(93)	1.00	-
Mother's age				
29 or less	17(32.1)	68(26.8)	1.29(0.68-2.45) ρ=0.433	- -
30 or more	36(67.9)	186(73.2)	1.00	

Family factors				
Marital status				
Other (Single, Divorced, Separated)	3(5.5)	11(4.1)	1.36(0.37-5.04) ρ=0.647	-
Married/Common Law	52(94.5)	259(95.9)	1.00	-
Total Annual household Income (before taxes)				
Less than $80,000	28(52.8)	99(38.4)	1.80(0.99-3.26) ρ=0.053	1.56(0.67-3.65) ρ=0.303
$80,000 or more	25(47.2)	159(61.6)	1.00	1.00
Self Report Social support at 12 or 24 Months postpartum				
Low social support (NLSCY <1SD)	28(57.1)	99(44.6)	1.65(0.89-3.09) ρ=0.113	1.19(0.48-2.99) ρ=0.706
High social support (NLSCY >1SD)	21(42.9)	123(55.4)	1.00	1.00
Use Informal Community Resources at 12 or 24M				
No	18(36.7)	62(26.5)	1.61(0.85-3.08) ρ=0.150	1.98(0.83-4.71) ρ=0.124
Yes	31(63.3)	172(73.5)	1.00	1.00
Number of adults (18 or older) in the household				
1 or 2 adults	37(78.7)	173(82.4)	0.79(0.36-1.73) ρ=0.558	-
More than 2 adults	10(21.3)	37(17.6)	1.00	-
Number of children in the household				
1	9(56.3)	29(50.9)	1.24(0.41-3.79) ρ=0.704	-
2 or more	7(43.8)	28(49.1)	1.00	-
Adult plays pretend games with the child at 24 months				
No	6(10.9)	6(2.2)	5.33(1.65-17.20) ρ=0.018	1.29(0.09-17.77) ρ=0.848
Yes	49(89.1)	261(97.8)	1.00	1.00
Adult plays with toys that promote learning the alphabet with your child at 24M				
No	3(4.4)	7(2.7)	1.64(0.41-6.50) ρ=0.485	-
Yes	65(95.6)	248(97.3)	1.00	-
Visit the library at 24 months				
No	25 (45.5)	102(38.1)	1.36(0.76-2.44) ρ=0.307	1.38(0.69-2.76) ρ=0.368
Yes	30(54.5)	166(61.9)	1.00	1.00

Child factors				
Gender				
Boy	38(71.7)	125(47.7)	2.78(1.46-5.29) ρ=0.001	3.09(1.26-7.54) ρ=0.013
Girl	15(28.3)	137(52.3)	1.00	1.00
Preterm birth				
Yes (<=36 weeks GA)	5(9.6)	23(8.9)	1.09(0.39-3.00) ρ=0.872	-
No (>=37 weeks GA)	47(90.4)	235(91.1)	1.00	-
Type of childcare at 12 months				
Primarily parents care	33(71.7)	111(52.6)	2.29(1.14-4.59) ρ=0.019	5.04(1.79-14.21) ρ=0.002
Primarily outside of home care	13(28.3)	100(47.4)	1.00	1.00
Type of childcare at 24 months				
Primarily parents care	28(50.9)	107(40.1)	1.55(0.87-2.78) ρ=0.139	2.73(1.04-7.07) ρ=0.041
Primarily outside of home care	27(49.1)	160(59.9)	1.00	1.00
Screen time at 24 months/day				
1hr or more	27(49.1)	89(33.2)	1.94(1.08-3.49) ρ=0.026	1.43(0.62-3.28) ρ=0.405
None to less than 1hr	28(50.9)	179(66.8)	1.00	1.00
Migration Factors				
Migration Experience				
Refugee/other	7(20)	33(22.9)	0.84(0.34-2.10) ρ=0.71	-
Citizen/ Immigrant	28(80)	111(77.1)	1.00	-
Years in Canada				
Less than 5 years	25(45.5)	88(33.0)	1.54(0.86-2.75) ρ=0.143	1.37(0.55-3.41) ρ=0.495
5 years or more	33(54.5)	179(67)	1.00	1.00
Are you able to communicate in English				
No	1(1.9)	3(1.1)	1.71(0.18-16.78) ρ=0.644	-
Yes	52(98.1)	267(98.9)	1.00	-
Primarily language at home				
Other	24(43.6)	111(41.1)	1.11(0.62-1.99) ρ=0.729	-
English	31(56.4)	159(58.9)	1.00	-

Table 4.6. Final multivariable model for factors associated with communication development of children with Canadian-born parents

Independent Variable	Scored <=1SD (Below monitoring zone) n (%)	Scored >1SD (On schedule) n (%)	UOR (95% CI)	AOR (95% CI)
Maternal factors				
Depression during pregnancy (24 weeks)				
Yes (EPDS >=10)	23(16.8)	117(12.2)	1.45(0.89-2.37) ρ=0.134	1.32(0.72-2.43) ρ=0.371
No (EPDS <10)	114(83.2)	842(87.8)	1.00	1.00
Postnatal depression (4 or 12 months)				
Yes (EPDS >=10)	22(19.1)	145(18)	1.08(0.66-1.78) ρ=0.766	-
No (EPDS <10)	93(80.9)	661(82)	1.00	-
Postpartum Anxiety (4 or 12 months)				
Yes (SAI >40)	31(29)	244(30.7)	0.92(0.59-1.44) ρ=0.716	-
No (SAI <40)	76(71)	551(69.3)	1.00	-
Physical Health (12M or 24 M postpartum)				
Fair –Poor	12(10.7)	89(10.8)	0.99(0.52-1.87) ρ=0.971	1.40(0.55-3.57) ρ=0.477
Excellent –Good	100(89.3)	733(89.2)	1.00	1.00
Self Reported History of mental health issues				
Yes	52(38)	317(33)	1.24(0.86-1.80) ρ=0.249	-
No	85(62)	644(67)	1.00	-
Difficulty Access to Prenatal Care				
Yes	3(1.8)	48(5.2)	0.32(1-1.05) ρ=0.06	-
No	168(98.2)	867(94.8)	1.00	-
Mother's Education				
High school or less	13(9.5)	82(8.5)	1.12(0.61-2.08) ρ=0.709	-
Some or Completed post Secondary	124(90.5)	879(91.5)	1.00	-
Mother's age				
29 or less	45(34.6)	335(36)	0.94(0.64-1.38) ρ=0.760	-
30 or more	85(65.4)	596(64)	1.00	-

Family factors				
Marital status				-
Other (Single, Divorced, Separated)	7(5.1)	35(3.6)	1.42(0.62-3.27) ρ=0.404	-
Married/Common Law	130(94.9)	926(96.4)	1.00	
Total Annual household Income (before taxes)				
Less than $80,000	33(25.8)	222(23.9)	1.11(0.73-1.69) ρ=0.635	1.56(0.67-3.65) ρ=0.303
$80,000 or more	95(74.2)	708(76.1)	1.00	1.00
Self Report Social support at 12 or 24 Months postpartum				
Low social support (NLSCY <1SD)	35(29.7)	183(21.9)	1.50(0.98-2.30) ρ=0.062	1.18(0.71-1.95) ρ=0.521
High social support (NLSCY >1SD)	83(70.3)	652(78.1)	1.00	1.00
Use Informal Community Resources at 12 or 24M				
No	26(21.5)	149(16.6)	1.38(0.86-2.20) ρ=0.178	1.44(0.88-2.37) ρ=0.150
Yes	95(78.5)	751(83.4)	1.00	1.00
Number of adults (18 or older) in the household				
1 or 2 adults	105(94.6)	747(92)	1.52(0.64-3.60) ρ=0.338	-
More than 2 adults	6(5.4)	65(8)	1.00	-
Number of children in the household				
1	11(44)	124(51.9)	7.73(0.32-1.67) ρ=0.454	-
2 or more	14(56)	115(48.1)	1.00	-
Adult plays pretend games with the child at 24 months				
No	8(5.8)	10(1)	5.89(2.28-15.20) ρ=0.0002	3.56(1.12-11.37) ρ=0.032
Yes	129(94.2)	950(99)	1.00	1.00
Adult plays with toys that promote learning the alphabet with your child at 24M				
No	5(3.6)	23(2.4)	1.55(0.58-4.13) ρ=0.386	-
Yes	132(96.4)	938(97.6)	1.00	-
Visit the library at 24 months				
No	53(38.7)	403(42)	0.87(0.60-1.26) ρ=0.464	-
Yes	84(61.3)	557(58)	1.00	-

Child factors				
Gender				
Boy	85(63.4)	472(50.3)	1.72(1.18-2.50) ρ=0.004	1.89(1.22-2.91) ρ=0.004
Girl	49(36.6)	467(49.7)	1.00	1.00
Preterm birth				
Yes (<=36 weeks GA)	14(10.4)	49(5.2)	2.11(1.13-3.93) ρ=0.019	2.35(1.16-4.78) ρ=0.018
No (>=37 weeks GA)	120(89.6)	885(94.8)	1.00	1.00
Type of childcare at 12 months				
Primarily parents care	74(67.3)	436(53.7)	1.77(1.16-2.70) ρ=0.007	1.47(0.87-2.50) ρ=0.155
Primarily outside of home care	36(32.7)	376(46.3)	1.00	1.00
Type of childcare at 24 months				
Primarily parents care	72(52.6)	442(46)	1.30(0.91-1.86) ρ=0.150	1.20(0.72-2.00) ρ=0.495
Primarily outside of home care	65(47.4)	519(54)	1.00	1.00
Screen time at 24 months/day				
1hr or more	50(36.5)	278(28.9)	1.41(0.97-2.05) ρ=0.07	1.54(1.00-2.37) ρ=0.052
None to less than 1hr	87(63.5)	683(71.1)	1.00	1.00

Table 4.7. Final multivariable model for factors associated with Social-emotional and behavioural development of children with foreign-born parents

	Social-emotional and behavioural competencies				Social-emotional and behavioural problem			
Independent Variable	Scored<=15th percentile (Possible deficit) n (%)	Scored >15th percentile (No problem) n (%)	UOR (95% CI)	AOR (95% CI)	Scored<=25th percentile (Possible deficit) n (%)	Scored >25th percentile (No problem) n (%)	UOR (95% CI)	AOR (95% CI)
Maternal factors								
Depression during pregnancy (24 weeks)								
Yes (EPDS >=10)	18(27.7)	61(23.2)	1.27(0.67-2.34 ρ=0.448	-	29(36.7)	50(20.1)	2.31(1.33-4.01) ρ=0.003	1.74(0.45-6.64) ρ=0.421
No (EPDS <10)	47(72.3)	202(76.8)	1.00	-	50(63.3)	199(79.9)	1.00	1.00
Postnatal depression (4 or 12 months)				-				
Yes (EPDS >=10)	15(27.8)	57(26.3)	1.08(0.55-2.11) ρ=0.822	-	15(27.8)	57(26.3)	1.08(0.55-2.11) ρ=0.822	-
No (EPDS <10)	39(72.2)	160(73.7)	1.00	-	39(72.2)	160(73.7)	1.00	-
Postpartum Anxiety (4 or 12 months)				-				
Yes (SAI >40)	29(58)	95(45.9)	1.63(0.87-3.04) ρ=0.126	1.35(0.44-4.14) ρ=0.600	41(70.7)	83(41.7)	3.37(1.79-6.34) ρ<0.0001	1.43(0.40-5.16) ρ=0.584
No (SAI <40)	21(42)	112(54.1)	1.00	1.00	17(29.3)	116(58.3)	1.00	1.00
Physical Health (12M or 24 M postpartum)				-				
Fair –Poor	12(22.2)	35(16.1)	1.49(0.71-3.10) ρ=0.292	-	18(29.5)	29(13.8)	2.61(1.33-5.13) ρ=0.005	5.08(1.06-26.17) ρ=0.045
Excellent –Good	42(77.8)	182(83.9)	1.00	-	43(70.5)	181(86.2)	1.00	1.00
Self Reported History of mental health issues								
Yes	15(23.1)	91(34.6)	0.57(0.30-1.07) ρ=0.078	4.61(1.18-18.00) ρ=0.028	33(41.8)	73(29.3)	1.73(1.02-2.92) ρ=0.040	1.84(0.50-6.75) ρ=0.360
No	50(76.9)	172(65.4)	1.00	1.00	46(58.2)	176(70.7)	1.00	1.00
Difficulty Access to Prenatal Care								
Yes	2(3.1)	14(5.4)	1.80(0.40-8.13)	-	6(7.9)	10(4)	2.04(0.72-5.81)	1.12(0.11-11.61)

			ρ=0.445				ρ=182	ρ=0.925
No	63(96.9)	245(94.6)	1.00	-	70(92.1)	238(96)	1.00	1.00
				-				
Mother's Education								
High school or less	58(90.6)	245(93.5)	1.49(0.56-3.95) ρ=0.421		7(9)	16(6.5)	1.43(0.57-3.61) ρ=0.450	-
Some or Completed post Secondary	6(9.4)	17(6.5)	1.00	-	71(91)	232(93.5)	1.00	-
				-				
Mother's age								
29 or less	20(33.3)	66(26)	1.42(0.78-2.61) ρ=0.252	-	22(30.1)	64(26.6)	1.19(0.67-2.12) ρ=0.548	-
30 or more	40(66.7)	188(74)	1.00	-	51(69.9)	177(73.4)	1.00	-
				-				
Family factors								
Marital status								
Other (Single, Divorced, Separated)	1(1.5)	13(4.9)	0.30(0.04-2.34) ρ=0.251	-	4(5.1)	10(4)	1.27(0.39-4.18) ρ=0.689	-
Married/Common Law	64(98.5)	250(95.1)	1.00	-	75(94.9)	239(96)	1.00	-
				-				
Total Annual household Income (before taxes)								
Less than $80,000	33(53.2)	98(39)	1.78(1.02-3.11) ρ=0.044	1.2(0.40-3.67) ρ=0.752	43(56.6)	88(37.1)	2.21(1.31-3.73) ρ=0.003	1.01(0.29-3.47) ρ=0.988
$80,000 or more	29(46.8)	153(61)	1.00	1.00	33(43.4)	149(62.9)	1.00	1.00
				-				
Self Report Social support at 12 or 24 Months postpartum								
Low social support (NLSCY <1SD)	25(45.5)	103(46.6)	0.95(0.53-1.72) ρ=0.878	-	42(64.6)	86(40.8)	2.65(1.49-4.73) ρ<0.001	1.49(0.42-5.26) ρ=0.539
High social support (NLSCY >1SD)	30(54.5)	118(53.4)	1.00	-	23(35.4)	125(59.2)	1.00	1.00
Use Informal Community Resources at 12 or 24M								

No	26(47.3)	57(24.7)	2.74(1.49-5.03) ρ=0.001	3.72(1.26-10.97) ρ=0.017	23(35.4)	60(27.1)	1.47(0.82-2.65) ρ=0.200	2.67(0.86-8.32) ρ=0.090
Yes	29(52.7)	174(75.3)	1.00	1.00	42(64.6)	161(72.9)	1.00	1.00
				-				
Number of adults (18 or older) in the household								
1 or 2 adults	40(75.5)	177(84.3)	0.57(0.28-1.19) ρ=0.134	0.78(0.20-2.99) ρ=0.778	42(76.4)	175(84.1)	0.61(0.30-1.26) ρ=0.180	0.75(0.20-2.81) ρ=0.665
More than 2 adults	13(24.5)	33(15.7)	1.00	1.00	13(23.6)	33(15.9)	1.00	1.00
				-				
Number of children in the household								
1	10(71.4)	26(41.9)	2.5(0.72-8.71) ρ=0.054	-	6(40)	34(55.7)	0.53(0.17-1.67) ρ=0.278	-
2 or more	4(28.6)	36(58.1)	1.00	-	9(60)	27(44.3)	1.00	-
Adult plays pretend games with the child at 24 months								
No	7(10.8)	4(1.9)	6.20(1.90-20.24) ρ=0.002	-	5(6.3)	7(2.8)	2.33(0.72-7.55) ρ=0.160	1.92(0.10-36.97) ρ=0.667
Yes	58(89.2)	257(98.1)	1.00	-	74(93.7)	241(97.2)	1.00	1.00
Adult plays with toys that promote learning the alphabet with your child at 24M								
No	6(2.3)	4(6.2)	2.80(0.77-10.22) ρ=0.120		2(0.8)	5(6.3)	8.35(1.59-43.90) ρ=0.012	-
Yes	256(97.7)	61(93.8)	1.00		247(99.2)	74(93.7)	1.00	-
				-				
Visit the library at 24 months								
No	22(33.8)	104(39.5)	0.78(0.44-1.38) ρ=0.398	-	25(31.6)	101(40.6)	0.68(0.40-1.16) ρ=0.157	0.60(0.16-2.18) ρ=0.599
Yes	43(66.2)	159(60.5)	1.00	-	54(68.4)	148(59.4)	1.00	1.00
				-				
Child factors								
Gender								
Boy	35(57.4)	129(49.8)	1.36(0.77-2.38) ρ=0.288	-	36(46.8)	128(52.7)	0.79(0.47-1.32) ρ=0.365	-
Girl	26(42.6)	130(50.2)	1.00	-	41(53.2)	115(47.3)	1.00	-
				-				

Preterm birth								
Yes (<=36 weeks GA)	6(10)	23(9)	1.12(0.44-2.89) ρ=0.813	-	9(12.5)	20(8.2)	1.59(0.69-3.67) ρ=0.274	-
No (>=37 weeks GA)	54(90)	232(91)	1.00	-	63(87.5)	223(91.8)	1.00	-
				-				
Type of childcare at 12 months								
Primarily parents care	29(55.8)	117(55.5)	1.01(0.55-1.87) ρ=0.967	-	38(69.1)	108(51.9)	2.07(1.10-3.90) ρ=0.024	4.65(1.14-19.03) ρ=0.033
Primarily outside of home care	23(44.2)	94(44.5)	1.00	-	17(30.9)	100(48.1)	1.00	1.00
Type of childcare at 24 months								
Primarily parents care	33(50.8)	102(38.9)	1.62(0.94-2.79) ρ=0.084	1.30(0.46-3.69) ρ=0.617	39(49.4)	96(38.7)	1.54(0.93-2.57) ρ=0.095	1.36(0.38-4.83) ρ=0.637
Primarily outside of home care	32(49.2)	160(61.1)	1.00	1.00	40(50.6)	152(61.3)	1.00	1.00
				-				
Screen time at 24 months/day								
1hr or more	25(38.5)	93(35.4)	1.14(0.65-2.00) ρ=0.641	-	37(46.8)	81(32.5)	1.83(1.09-3.60) ρ=0.022	2.65(79-8.85) ρ=0.114
None to less than 1hr	40(61.5)	170(64.6)	1.00	-	42(53.2)	168(67.5)	1.00	1.00
				-				
Migration Factors								
				-				
Migration Experience								
Refugee/other	9(20)	33(23.9)	0.80(0.35-1.82) ρ=0.588	-	10(16.9)	32(25.8)	0.59(0.27-1.29) ρ=0.186	0.23(0.05-1.11) ρ=0.067
Citizen/ Immigrant	36(80)	105(76.1)	1.00	-	49(83.1)	92(74.2)	1.00	1.00
Years in Canada								
Less than 5 years	29(45.3)	85(32.6)	1.72(0.98-299) ρ=0.057	1.34(0.42-4.25) ρ=0.602	39(50)	75(30.4)	2.29(1.36-3.86) ρ=0.002	1.45(0.44-4.76) ρ=0.542
5 years or more	35(54.7)	176(67.4)	1.00	1.00	39(50)	172(69.6)	1.00	1.00
				-				
Are you able to communicate in English								

No	0(0)	4(1.5)	0.45(0.02-8.38) ρ=0.589	-	2(2.5)	2(0.8)	3.18(0.44-22.97) ρ=0.251	-
Yes	64(100)	258(98.5)	1.00	-	77(97.5)	245(99.2)	1.00	-
Primarily language at home				-				
Other	30(46.2)	108(41.1)	1.23(0.71-2.12) ρ=0.457	-	52(65.8)	86(34.5)	3.65(2.14-6.22) ρ<0.0001	4.83(1.15-20.31) ρ=0.032
English	35(53.8)	155(58.9)	1.00	-	27(34.2)	163(65.5)	1.00	1.00

Table 4.8 Final multivariable model for factors associated with Social-emotional and behavioural development of children with Canadian-born parents

	Social-emotional and behavioural competencies				Social-emotional and behavioural problem			
Independent Variable	Scored <=15th percentile (Possible deficit) n (%)	Scored >15th percentile (No problem) n (%)	UOR (95% CI)	AOR (95% CI)	Scored <=25th percentile (Possible deficit) n (%)	Scored >25th percentile (No problem) n (%)	UOR (95% CI)	AOR (95% CI)
Maternal factors								
Depression during pregnancy (24 weeks)								
Yes (EPDS >=10)	10(8.1)	43(4.3)	1.94(0.95-3.97) ρ=0.069	1.47(0.62-3.50) ρ=0.386	34(24.5)	108(11)	2.61(1.69-4.04) ρ<0.0001	2.59(0.721-9.28) ρ=0.145
No (EPDS <10)	114(91.9)	951(95.7)	1.00	1.00	105(75.5)	871(89)	1.00	1.00
Postnatal depression (4 or 12 months)								
Yes (EPDS >=10)	15(14.3)	65(7.9)	1.93(1.06-3.53) ρ=0.032	1.20(0.55-2.57) ρ=0.651	34(29.8)	139(16.7)	2.23(1.43-3.48) ρ=0.0004	1.70(0.41-7.01) ρ=0.463
No (EPDS <10)	90(85.7)	754(92.1)	1.00	1.00	76(69.7)	694(83.3)	1.00	1.00
Postpartum Anxiety (4 or 12 months)								
Yes (SAI >40)	48(44.4)	238(29.1)	1.95(1.29-2.93) ρ=0.001	1.45(0.87-2.42) ρ=0.160	51(45.5)	235(28.9)	2.06(1.38-3.07) ρ<0.0001	1.81(0.62-5.25) ρ=0.279
No (SAI <40)	60(55.6)	579(70.9)	1.00	1.00	61(54.5)	578(71.1)	1.00	1.00
Physical Health (12M or 24 M postpartum)								
Fair –Poor	10(9.5)	43(5.2)	1.93(0.94-3.97) ρ=0.073	1.17(0.46-2.98) ρ=0.736	25(21.6)	78(9.4)	2.66(1.62-4.39) ρ<0.0001	9.95(2.70-36.84) ρ=0.001
Excellent –Good	95(90.5)	789(94.8)	1.00	1.00	91(78.4)	756(90.6)	1.00	1.00
Self Reported History of mental health issues								
Yes	53(42.7)	324(32.5)	1.55(01.06-2.26) ρ=0.024	1.02(0.63-1.65) ρ=0.925	68(48.9)	309(31.5)	2.08(1.46-2.98) ρ<0.0001	3.26(1.19-8.98) ρ=0.022
No	71(57.3)	672(67.5)	1.00	1.00	71(51.1)	672(68.5)	1.00	1.00

Difficulty Access to Prenatal Care								
Yes	46(4.7)	4(3.2)	1.48(0.52-4.18) ρ=0.460	-	9(6.7)	41(4.2)	1.62(0.77-3.40) ρ=0.207	2.18(0.18-26.04) ρ=0.541
No	933(95.3)	120(96.8)	1.00		126(93.3)	927(95.8)	1.00	1.00
				-				
Mother's Education								
High school or less	12(9.7)	87(8.7)	1.12(0.59-2.11) ρ=0.727	-	13(9.4)	86(8.8)	1.07(0.58-1.98) ρ=0.820	-
Some or Completed post Secondary	112(90.3)	909(91.3)	1.00	-	126(90.6)	895(91.2)	1.00	-
				-				
Mother's age								
29 or less	39(32.0)	350(36.3)	0.83(0.55-1.24) ρ=0.35	-	62(46.3)	327(34.3)	1.65(1.14-2.38) ρ=0.007	1.74(0.64-4.72) ρ=0.275
30 or more	83(68.0)	615(63.7)	1.00	-	72(53.7)	626(65.7)	1.00	1.00
Family factors								
Marital status								
Other (Single, Divorced, Separated)	10(8.1)	35(3.5)	2.41(1.16-4.99) ρ=0.018	1.78(0.64-4.90) ρ=0.268	13(9.4)	32(3.3)	3.06(1.56-5.98) ρ=0.001	8.19(0.51-31.42) ρ=0.132
Married/Common Law	114(91.9)	961(96.5)	1.00	1.00	126(90.6)	949(96.7)	1.00	1.00
Total Annual household Income (before taxes)								
Less than $80,000	22(18.3)	93(9.7)	2.09(1.26-3.48) ρ=0.004	1.68(0.90-3.15) ρ=0.103	43(32.1)	213(22.5)	1.63(1.10-2.41) ρ=0.015	1.06(0.34-3.27) ρ=0.921
$80,000 or more	98(81.7)	867(90.3)	1.00	1.00	91(67.9)	733(77.5)	1.00	1.00
Self Report Social support at 12 or 24 Months postpartum								
Low social support (NLSCY <1SD)	23(21.7)	118(14.2)	1.68(1.02-2.77) ρ=0.043	1.11(0.60-2.04) ρ=0.739	41(34.7)	181(21.3)	1.97(1.30-2.98) ρ=0.001	1.09(0.33-3.65) ρ=0.889
High social support (NLSCY >1SD)	83(78.3)	714(85.8)	1.00	1.00	77(65.3)	670(78.7)	1.00	1.00
				-				
Use Informal Community Resources at 12 or 24M								

No	39(37.1)	292(35.7)	1.06(0.70-1.62) ρ=0.778	-	21(17.1)	158(17.2)	0.99(0.60-1.63 ρ=0.973	-
Yes	66(62.9)	525(64.3)	1.00	-	102(82.9)	761(82.8)	1.00	-
Number of adults (18 or older) in the household				-				
1 or 2 adults	95(89.6)	774(92.9)	0.66(0.33-1.30) ρ=0.227		101(90.2)	768(92.9)	0.71(0.36-1.39) ρ=0.312	-
More than 2 adults	11(10.4)	59(7.1)	1.00	-	11(9.8)	59(7.1)	1.00	-
Number of children in the household				-				
1	19(50.0)	112(48.5)	1.06(0.53-2.11) ρ=0.863	-	24(72.7)	114(48.3)	2.85(1.27-6.40) ρ=0.011	2.98(1.01-8.80) ρ=0.049
2 or more	19(50.0)	119(51.5)	1.00	-	9(27.3)	122(51.7)	1.00	1.00
Adult plays pretend games with the child at 24 months								
No	6(4.8)	12(1.2)	4.17(1.54-11.30) ρ=0.005	3.26(1.03-10.38) ρ=0.045	6(4.3)	12(1.2)	3.64(1.34-9.86) ρ=0.011	2.47(0.17-37.05) ρ=0.512
Yes	118(95.2)	983(98.8)	1.00	1.00	133(95.7)	968(98.8)	1.00	1.00
Adult plays with toys that promote learning the alphabet with your child at 24M								
No	6(4.8)	23(2.3)	2.15(0.86-5.39) ρ=0.102	1.46(0.50-4.32) ρ=0.492	5(3.6)	24(2.4)	1.49(0.56-3.97) ρ=0.427	-
Yes	118(95.2)	973(97.7)	1.00	1.00	134(96.4)	957(97.6)	1.00	-
Visit the library at 24 months								
No	56(45.2)	410(41.2)	1.18(0.81-1.71) ρ=0.400	-	60(43.5)	406(41.4)	1.09(0.76-1.56) ρ=0.641	-
Yes	68(54.8)	585(58.8)	1.00	-	78(56.5)	575(58.6)	1.00	-
Child factors								
Gender								
Boy	70(57.9)	503(51.4)	1.30(0.89-1.90) ρ=0.180	1.18(0.75-1.84) ρ=0.480	65(48.1)	508(52.6)	0.84(0.58-1.20) ρ=0.328	-
Girl	51(42.1)	476(48.6)	1.00	1.00	70(51.9)	457(47.4)	1.00	-
Preterm birth				-				

Yes (<=36 weeks GA)	10(8.3)	56(5.7)	1.48(0.73-2.98) ρ=0.276	-	8(6.0)	58(6.0)	0.99(0.46-2.12) ρ=0.976	-
No (>=37 weeks GA)	111(91.7)	918(94.3)	1.00	-	126(94.0)	903(94.0)	1.00	-
				-				
Type of childcare at 12 months								
Primarily parents care	62(58.5)	454(54.6)	1.17(0.78-1.77) ρ=0.445	-	55(49.1)	461(55.8)	0.76(0.52-1.13) ρ=0.182	0.69(0.23-2.01) ρ=0.492
Primarily outside of home care	44(41.5)	378(45.4)	1.00	-	57(50.9)	365(44.2)	1.00	1.00
				-				
Type of childcare at 24 months								
Primarily parents care	54(43.5)	469(47.1)	0.87(0.60-1.26) ρ=0.456	-	56(40.3)	467(47.6)	0.74(0.52-1.07) ρ=0.107	0.83(0.29-2.35) ρ=0.722
Primarily outside of home care	70(56.5)	527(52.9)	1.00	-	83(59.7)	514(52.4)	1.00	1.00
				-				
Screen time at 24 months/day								
1hr or more	41(33.1)	297(29.8)	1.16(0.78-1.73) ρ=0.458	-	60(43.2)	278(28.3)	1.92(1.34-2.76) ρ<0.0001	1.76(0.66-4.73) ρ=0.263
None to less than 1hr	83(66.9)	699(70.2)	1.00	-	79(56.8)	703(71.7)	1.00	1.00

Chapter 5: Recommendations and Implications for Policy Development and Nursing Practice

We found that children with foreign-born parents had significantly higher rates of possible delay in communication, and social-emotional behavioural development compared to children with Canadian-born parents. Our findings suggest that the parenting practices and stimulating activities provided by foreign-born parents differ from Canadian-born parents, which can negatively influence the communication and emotional-social development of their children. However, outside of home resources such as exposure to non-parental care and informal community resources were protective factors for optimal development of this group of children. By better understanding the influencing factors, interventional programs can be created to optimize early childhood development for children in immigrant families.

Clinical Implications

In order to ensure the health of children in immigrant families, healthcare providers including nurses need to know more about how children from immigrant parents achieve developmental milestones. Furthermore, there is a need to know whether their developmental trajectories differ from their Canadian peers, as well as the significance of any differences (Cote, 2011). However, in order to intervene and improve their health, there is also a need to understand what the risk and protective factors are to achieving optimal health. This knowledge can help healthcare providers, when assessing this group of children, to better understand their needs. By understanding their needs, they will be able to advocate for them and also link them to proper resources and services in order to help children in immigrant families to reach their optimal health and development. The knowledge generated from this research can also direct health promotion, which is one of the central goals of nursing. Children in immigrant families may benefit from parenting support in order to improve the quality of the home environment. Promoting parent-child interactions and stimulating activities to improve responsiveness, to

increase attachment, and to encourage learning, book reading, play activities, positive discipline, and problem-solving related to children's development are some examples of items that could be incorporated into strategies for parenting support (Engle et al., 2011).

Research Implications

Since focusing on early childhood development for children in immigrant families as a field of study is in the early stages of development, the first step should be to identify the differences so that other researchers can build on the results of inquiries into the health of children from immigrant parents. There is a need to identify early disparities in health and development among children in immigrant families and to identify the predictors of such disparities. However, there is also a need to understand what the barriers or facilitators are to health equity by exploring the perceptions of different groups such as the immigrant family, health care provider, community workers, and teachers. The results of these research studies can generate needed knowledge for future interventional studies, specifically targeted to the early childhood period,as well as health services and management strategies.

It is important to recognize that statistical testing and epidemiological approaches to research have their own limitations such as the fact that participant perception may not be included in research findings. Therefore, it is important to supplement research inquiry in this area with a qualitative approach by exploring the perceptions of different groups such as the immigrant family, health care providers, community workers, and teachers. This approach will strengthen any interventional studies performed in the future with the ultimate goal of improving the health of children from immigrant parents.

Highlighting the problem of disparities can be the first step to starting a dialog between multidisciplinary scientists in order to highlight this important field of study. Inclusive

multidisciplinary research is an approach to better understanding any phenomena related to human health as it involves the physical, social, biological, and environmental domains (Gohlke & Portier, 2007). As an exceptionally effective mode of enquiry, this approach can lead to a compound of evidence (Phoenix et al., 2013). The nursing discipline is positioned well to be one of the most influential members of the multidisciplinary research team within the human health field due to its association with health care systems and also the discipline's professional holistic view on health and wellbeing.

Resilience research is highly relevant to fostering excellence in child development (Luthar, 2013; Rutter, 2012). It is one of the most popular and useful fields of study when working with vulnerable groups. Resilience is a process of positive adaptation or competence in spite of significant adversity (Luthar, Cicchetti, & Becker, 2000; Masten, 2011). Immigrant children and their families face many adversities compared to their native-born counterparts and it is therefore appropriate to ponder the resiliency of this group of children.

In order to assist these children in achieving their optimal potentials, multiple strategies and protective interventions are required. In order to maximize their strengths, it is important to identify the protective pathways for those who do well in spite of adversity and better understand the pathways to coping with adversity. Understanding these protective pathways can be an important step in a needs assessment and can help with the allocation of resources for this group of children in order to support optimal development.

It is important to note when working with vulnerable groups that not all have negative outcomes; indeed, some have optimal outcomes despite adversities (Masten, 2011). Many children from immigrant families face multiple risks (e.g., resettlement stress, mental health vulnerabilities, poverty, family separation, and social isolation) (Beiser, 2005; Bornstein, &

Bohr, 2011; Cote, 2011; De Maio, 2010; Gushulak, Pottie, Hatcher, Torres, & DesMeules, 2011; Kingston et al., 2011; Newbold & Danforth, 2003).

Policy Implications

"Data do not, of themselves, change the world. They make change possible – by identifying needs, supporting advocacy, and gauging progress. What matters most is that decision-makers use the data to make positive change, and that the data are available for children and communities to use in holding duty-bearers to account." (United Nations Children's Fund, 2014, p. 1).

Understanding the origins of positive development is an important foundation of any successful intervention (Sameroff, 2013). The results of these analyses generate knowledge required to set priorities and multifaceted interventions for early childhood development programs and policies targeted to children in immigrant families. It can inform policy across health, education, and social sectors to ensure that this group of children has appropriate services and opportunities to support their early development and future opportunities.

The main goal of promoting resilience in children is to identify the elements of their lives that can be nurtured or altered in order to achieve healthy development (Masten, 2013). Furthermore, in order to understand resilience in children, it is not only important to measure both risks and resources but also important to recognize that resiliency for young children is highly dependent on their family, communities, and personal resources (Luthar, 2013; Masten, 2013; Ungar, 2012; Ungar, 2010). These perspectives imply that resiliency is complex and highly contextual. In order to understand resilience and achive optimal development during the early childhood period- the most vital time of development- there is a need to have more information specific to this group of children in order to promote the development of early

resilient functioning rather than more costly and sometimes irreversible treatments. Identifying the sources of resilience in competent children who are facing adversity is vital for building interventions to increase the resilience in less competent children (Sameroff, 2013).

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