



UNIVERSITY OF TORONTO

MARCH 29, 2017

**The Big Brother-Big Sister Program: A Proposal for
the Jamaican Early Childhood Commission to
Alleviate Child Behavioural Developmental
Discrepancies in Lone Parent Households**

Zi Yuan Yang Ashley Motilall
Nikhil Chhabra Wadia Forrester
Manny Singh Ayah Abdeldayem

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1 Introduction

Over the past several years, the Jamaican society has been experiencing a steady decline in the standard of family life with single parent households on the rise (Early Childhood Commission 2017). The effects of such households have far-reaching effects not only on the academic achievement of children but also on their behavior and ability to socialize, thereby creating behavioral discrepancies between children raised in dual family households and those in single parent families. While current programs such as the Early Childhood commission and Reach Up and Learn in Jamaica seek to improve the quality of early childhood care, education and development for children 0-8 years, much work still needs to be done in order to alleviate some of these incongruities. In Canada and The United States of America the establishment of the Big Brother's Big Sisters Program in 1904 has been shown to have significant youth outcomes on children raised in single parent households through mentorship programs (Park et al, 2016). Hence, incorporating a Big Brother-Big Sister program into the Jamaican Early Childhood Commission will assist in alleviating the behavioral developmental discrepancies between children of 0-8 years in single-parent households.

1.1 Background on Role of Family in Child Development

Throughout early childhood, the family provides the most significant attachments along with the care and stimulation required for child growth and development. The quality of care – physical, affective and social- is associated with the state of life conditions, both socio-economical and psychosocial (Duncombe, Havighurst, Holland, Frankling, 2012). This period has the po-

tential to shape a child's social and behavioral adaptations into adolescence as it is the most sensitive period of development where maximum growth and development occur. It is marked by increased neuroplasticity with brain growth and synaptic pruning (elimination of synapses in the brain that are weaker, allowing for the growth of a stronger, more efficient brain) playing major roles (Dreher, Hudgins, 2010). Over the past three decades or so, significant literature has developed assessing the impact of family structure on child wellbeing. Notably, the structure and environment in which it the family structure manifests itself continues to be a persistent predictor of youth developmental outcomes. Much of current literature documents the accumulating body of evidence that children raised in different family contexts display differential patterns of outcomes across a wide range of developmental domains. For instance, it is possible that children who grow up in different types of families undergo various environmental processes and as a consequence exhibit different developmental patterns. These patterns can go on to have positive or negative effects into adolescence (Burchinal, Vernon-Feagans, Cox, Investigo, 2008).

Increasingly, there has been interest in the development patterns of children raised in lone-parent families compared to those raised in dual parent families. Single parent families have had a persistently high prevalence over the past two decades as out-of-marriage childbearing and marital dissolution continue to rise. Studies comparing children raised in single-parent families with those raised amongst both biological parents do better on educational achievement, adjustment in schools and in terms of overall behaviour into adolescence. While a part of this difference is often widely associated with the single mothers' lower educational attainment, less social support, fewer economic resources, and more stressful environments, Dreher and Hudgins

(2010) found that even children in mostly white, middle-class stepfamilies did less well on a range of behavioral outcomes in comparison to their two-parent families counterparts. This suggests that the presence of a second parent is important for a child’s development and wellbeing.

1.2 Effects of Children Raised in Single Parent Households

The detrimental effects of a single parent family household on child wellbeing is multifaceted. For instance, Longitudinal national survey studies have shown that children reared in dual family households (i.e. with two biological parents) tend to remain in school longer and engage in less risky behavior (Duncombe et al., 2012). A large birth cohort observational study conducted in Britain demonstrated that compared to children living with both biological parents, those with single mothers as; well as those living with a step-father, were 50% more likely to be admitted to a hospital and more than twice as likely to have multiple admissions. Moreover, children raised in single parent household are more likely than their peers from two-parent families to engage in risky behavior and to suffer health consequences when they reach adolescents. A major study in Britain assessed 14, 000 children born between 2000 and 2002 and found that 12 percent of children brought up by one parent displayed a series of behavioral problems by the age of seven compared to just six percent of youngsters raised by both natural parents. Another study involved researchers who surveyed mothers to gauge children’s behaviour (Wen, 2008). Mother’s were required to rate their hyperactivity, conduct , emotional problems and relationships with peers. Using this researchers grouped the children into three categories ranging from “normal” to “serious behavioural problems” and determined that children with lone parents were

most likely to be badly behaved with 12 percent falling into this category compared to only six percent living with two parents.

Such discrepancies in development were largely associated with the state and parenting style of lone parents. Single parents raising children alone are more likely to be under economic strain and social pressure and subsequently both mental well-being and physical health may be impaired (Wen, 2008). These heightened levels of distress are linked to negative parenting behaviors such as rejection and harsh discipline which are in turn associated with children's poor behavioral developmental patterns such as poor goal orientation, low levels of self-adequacy and social competence. Specifically, the mental health and physical well-being of the parent plays a large role in children's development as it largely determines the mentorship and intimacy capacity the parent is capable of providing. This mentorship and intimacy relationship is more nurtured in two parent households due to shared responsibilities and enhanced emotional, mental and physical well-being. Single parents are notably at a disadvantage with respect to mental well-being which can lead to problematic parental socialization with children. They can afford less time and attention for their children (due to strains from various sources) and so, tend to provide lower levels of parental support and supervision. For example, children raised in single mother households tend to receive less parental involvement in school work, less supervision, and less parental control and influence which may lead to heightened levels of parent-child conflict undermining parent-child trust (Lee et al., 2007). This lack of parental socialization found amongst single-parent families manifests itself in lack of commitment, reciprocity, and trust in a child's social relationships, undermining a child's trust in people in general and potentially increasing his/her risk of behavioral problems. Such behaviors may translate into adolescence and result in lower

levels of academic achievement, higher dropout rates (with boys more negatively affected than girls); as well as in delinquent activity including drug and alcohol addiction.

1.3 Applications to Jamaica

With such behavioral differences observed amongst different family households, the application of such issues globally and the notion of addressing such issues can aid in alleviating behavioral problems amongst developing youth. In the context of Jamaica, it is now approximated that over a third of the country's children have no father figure and that over 90% of household have the parental role being performed by the birth mother or grandmother (Graham, 2017). This negative impact is seen and felt not only within the immediate family but also within the realm of financial resources and recurrent child neglect. Notably, opposite outcomes have been observed in two parent households harboring an involved father; which resulted in better physical and mental well-being. However, positive effects were observed only with an involved father and not just one which is physically present. Hence, the notion of parental socialization also plays a major role in the context of Jamaican households (Early Childhood Commission, 2017). Finding measures to fulfill missing aspects of parental socialization in single parent households in Jamaica could help eliminate child related behavioral problems later on in life which would translate to a more efficient and educated society, as many such processes are thought to occur due to differences in biology.

2 The Biology Behind Single Mother Parenting and it's Social Effects

There are various social, behavioural, and biological effects that can occur due to the environment that a child grows up in during early childhood development, especially in single mother households. The biological and psychological effects of single mother parenting on children will be discussed while being related to the social and behavioural effects that are seen later in life.

2.1 Biological and Psychological Effects of Single Mother Parenting on Children

In normal, two-parent families, there is enough interaction and lack of stress associated with the child to allow for sufficient early childhood development. With appropriate interaction and affectionate caregiving, there is a positive impact on the oxytocin levels of the child as they are expected to increase (Rilling and Young 2014). Child attachment behaviours are also established eventually, leading to a mentally healthy child capable of building relationships (Rilling and Young 2014). When a child is raised in a single-parent household with only a mother, there may not be enough interaction with the mother due to poverty associated with single-parent households. This would lead to the child not acquiring essential child attachment behaviours as well as having lower levels of oxytocin compared to children raised in a favourable environment (Rilling and Young 2014). Children who have had a lack of or no parental bonding have previously shown changes in brain development. Studies that focused on children from orphanages observed these changes in brain development when parental bonding was not formed

between parents and children. The results indicated that there were larger amygdalae, which corresponds to anxiety as well as internalizing problems, and altered connections with the prefrontal cortex (responsible for emotion regulation) for children that were in orphanages (Rilling and Young 2014). There has also been research based on animals, specifically degus, which consisted of a group of degus who were removed from their fathers as well as a control group (Wang, 2009). The results indicated that the group that was removed from their father experienced changes to the development of their nerve cells in the form of less dense and shorter dendrites (Wang, 2009). The researcher, Dr. Anna Katharina Braun, explains that shorter dendrites were found in areas of the brain that controlled the emotional response and decision-making, leading to the degus without the father exhibiting aggressive behaviour (Wang, 2009). A similar process can be identified in humans as well, making the study valuable in potentially analyzing the effects of single-mother parenting without a father.

The brain is an organ that is reactive and adapting to different environments, especially during early childhood development (Phillips and Shonkoff 2000). A variety of childhood experiences as well as the influence of genes are incorporated into the development of the neurochemistry and structure of the brain (Phillips and Shonkoff 2000). The architecture of the brain and abilities that the child has are developed through the building upon of simple circuits and skills that become more advanced through stimulation (National Scientific Council On the Developing Child, 2007). Children who are raised in single-parent families with mothers are more likely to develop psychosocial issues like psychiatric disorder, social, and academic problems later in life (Lipman, Boyle, Dooley, Offord 2002). The presence of low income in single-parent households usually produces a stressful environment

where there is inconsistent support and parenting from the mother, which leads to psychological effects (Lipman et al., 2002). The presence of toxic stress has a constant effect on a developing child's nervous system and their stress hormone response mechanisms which can cause damage to the brain or even lead to behavioural, physical, and mental health problems (National Scientific Council On the Developing Child, 2007). Single mothers who do not have much education may not be providing the resources for children to be stimulated or for them to have a capacity to learn during their early years which would alter the brain in terms of cognition (Lipman et al., 2002). Research shows that mothers who tended to go out and work during early childhood development, especially within the first year, produced an effect on the children where cognitive skills were quite low at the age of 3 or above (Waldfogel, 2006). In order for cognitive, emotional, and social skills to develop properly, interaction with others is extremely required especially in developing linguistic skills; in single-mother households this is probably not happening because the parent has to work harder to support the child as well as herself (National Scientific Council On the Developing Child, 2007).

Low socioeconomic status and poverty related to single-mother parenting only exacerbates the problems that occur with early childhood development since opportunities to engage children are missing and sometimes the amount or duration of breastfeeding that is required for proper nutrition is lacking during the first year of life. That is why public policy and programs need to be developed, especially in the context of Jamaica; so that children will have a better chance in learning at school in their future. There are existing programs in Canada and the United States which have been established to assist children in single mother households through having interactions with others in the form of mentors. The next step in the paper will be to

identify current programs that exist and their effectiveness in approaching the problem of behavioural discrepancies as a result of child development in single-mother households. In particular, this paper argues for the implementation of a Big Brother-Big Sister program in conjunction with The Early Childhood Commission in Jamaica.

3 Big Brother's and Big Sisters Program

Big Brothers and Big Sisters (BBBS) is a non-profit organization established in 1904 in Canada and the United States of America that matches youths from low-income or single-parent families with a caring adult mentor (Park et al, 2016). Their goal is to provide the child with a positive and caring role model and mentor, and promoting the importance of education to the child. The mentor encourages self-confidence, leadership skills, and building strong relationships with family and friends (Park et al, 2016). In the end the child should have a fun and enjoyable experience from the program. Furthermore, the program helps keep children away from drugs and low self-esteem issues (Park et al, 2016). The goal of the mentor is also responsible for encouraging the child to engage in responsible behaviour by having a strong understanding of what is morally right or wrong (Park et al, 2016). Ultimately, children that have lost their mother or father can have an older mentor that they can look up to and learn from. Therefore the highest priority will be given to boys aged 6-14 without fathers or children from single-parent households, and not surprisingly about three-quarters of BBBS children are from single-mother households (BBBS of Ajax-Pickering, 2012). Overall, this is not a replacement for their lost parents but rather a means in which they can get some of that support and education that is

crucial to the child's development that cannot be provided by their parents.

The BBBS program is very organized and there are many rules that keep it this way. From both the mentor and youth, it requires two scheduled outings for several hours every month with a minimum 1-year commitment (BBBS of Ajax-Pickering, 2012). Additionally, caseworkers are paid employees of BBBS and are assigned to a mentor to oversee their relationship with the child (BBBS of Ajax-Pickering, 2012). This includes matching the mentor and child and ensuring the mentor is aware and understands their role as a mentor (BBBS of Ajax-Pickering, 2012). Mentors must be at least 18 years of age and must have been a resident of the Region in which they wish to be a mentor (BBBS of Ajax-Pickering, 2012). Furthermore, a criminal background check must be conducted for any potential mentor (BBBS of Ajax-Pickering, 2012). If there are any sexual offenses or regular drug use they cannot participate in the BBBS program, but other than this volunteers must wait 2 years after a criminal sentence to be eligible to participate (BBBS of Ajax-Pickering, 2012). Prospective mentors must be able to dedicate at least 8 hours a week towards spending time with their designated child (BBBS of Ajax-Pickering, 2012). Also, three references and an interview with a BBBS employee are required and if the applicant passes all of these stages they can start training, which comprises of a Child Safety Training video and lasts for 12 months (BBBS of Ajax-Pickering, 2012). After all of these requirements are passed the mentor will be accepted into the BBBS programs and will be matched with a child (BBBS of Ajax-Pickering, 2012). Therefore, this ensures the program has good quality and safe mentors to aid in these childrens' developments.

Specific activities between the mentor and child can vary and include: playing sports, watching movies, helping with homework, or just socializing

(Grossman, 1998). Studies have found that this program works very well in improving a child's behaviour, academic performance, and overall development. A study found that mentorship duration was significantly associated with youth outcomes (Park et al, 2016). These outcomes include academic performance, using community and school resources, avoiding drug use and teen pregnancy (Park et al, 2016). Youths enrolled in the BBBS program are 45.8% less likely to abuse illegal drugs than their counterparts who do not participate in this program (Grossman, 1998). Minority youths were 70% less likely to abuse drugs and 27.4% less likely to start underage drinking, with a greater effect being seen on young girls who were half as likely to begin underage drinking (Grossman, 1998). Additionally, youths were 3% less likely to hit their peers or siblings (Grossman, 1998). The BBBS program was also significantly associated with increased academic performance as children in the BBBS program had a mean GPA of 2.71 compared to a control of 2.63 (Grossman, 1998). Youths also skipped less school with BBBS children skipping 52% fewer days than the control and were also 37% less likely to lie to their parents than the control (Grossman, 1998). Most importantly, a study found that children in the BBBS program were more likely to feel that they have a "special adult" in their lives (Bergin Bergin, 2009). A special adult is the ideal mentor of the BBBS program; one reaches the goals that the BBBS program thrives to achieve (Bergin Bergin, 2009). This relationship is crucial in the healthy development of a child. Therefore it is very clear that the BBBS program is making a difference in the development of children who have lost a parent.

Overall it seems that the BBBS program is well-organized and safe organization that has strong evidence supporting its goal in improving the development of children from single parent households.

4 The Early Child Commission and the Big Brother-Big Sister Program

So far, a biological connection between youth developmental outcomes and single-parent upbringing has been established in the context of Jamaica. As a result, the Big Brother-Big Sister (BBBS) Program was proposed due to evidence revealing its potential to mediate the disparities seen in children raised by single parents. However, before describing the implementation of the BBBS program, a few issues must be addressed. Must this program be engrafted in the existing Jamaican frameworks geared toward early childhood advancement? If so, what overarching system should it be incorporated in, and in what fashion?

To address the first question, there are some benefits that can arise from collaborating with pre-existing systems. These systems may have already garnered some sort of private and public support – whether it be in the form of finances, institutional establishment, or socio cultural exposure/acceptance (“The Early Childhood Commission”; “The Early Childhood Commission Act”, 2003). As an independent organization, establishing and sustaining support during implementation may pose some feasibility issues. From the perspective of governance, if the underlying vision of the established system aligns with the objectives of the current leadership (i.e. the Jamaican government), these programs can receive more direct assistance and attention from the relevant Ministries (“The Early Childhood Commission Act”, 2003). There could also be the possibility of forming networks with influential policy makers and implementers that can accelerate program formation. This view is relevant to that of the Early Childhood Commission (ECC) in Jamaica (“The Early Childhood Commission”).

4.1 The Early Childhood Commission: Goals, Organization, and Function

The Early Childhood Commission was founded in 2003 via the Early Childhood Commission Act (“The Early Childhood Commission Act”, 2003). One of the main objectives of the ECC and the Jamaican government is to improve the standard of growth, instruction and supervision of children from 0 to 8 years (“Our Values”). This is based on an underlying perspective that all children should receive the opportunity to develop in a stimulating and promotive environment and eventually grow to realize their full potential (“Our Values”). In general, the operations of the ECC are governed by three major divisions – Regulation and Monitoring, Sector Support Services, and Cross Sectoral Coordination (“The Early Childhood Commission”). The Regulation and Monitoring Department oversees the matriculation and function of Early Childhood Institutions (ECIs), locations where a minimum of four children under six years old can stay for 6 hours or less (e.g. daycare or kindergarten)(“The Early Childhood Commission”). Sector support services generally offer assistance to ECIs and Early Childhood Practitioners, who are individuals trained and involved in interaction with children and the monitoring of the ECIs (“The Early Childhood Commission”). The division of Cross Sectoral Coordination manages the formation of programs and the assistance of novel community interventions focused on the development of young children (“The Early Childhood Commission”).

The Ministry of Education, joint investors and the ECC have formulated a National Strategic Plan for 2008-2013 and 2013-2018 that identifies five critical areas to be considered for the development of successful ECD programs (“The Early Childhood Commission”). These areas include the assistance and training of parental methods, the establishment of prevention-

based health-based practices, the maintenance and successful operations of ECIs, and the identification, assessment and intervention of children susceptible to developmental deficiencies (“The Early Childhood Commission”).

The roles of the ECC involve consulting the Jamaican governmental departments on policies, initiatives and actions, formulating relevant programs and plans, overseeing ECIs and other early child development (ECD) programs, collaborating with investors, allocating funds from budgets or donor establishments and performing ongoing research efforts (“The Early Childhood Commission”). In 2016, the ECC received \$20,000,000 from partnering investors including the Culture, Health, Arts, Sports and Education (CHASE) Fund, The New York-based Union of Jamaica Alumni Associations, West Portland Member of Parliament and the Project for the Advancement of Childhood Education Canada (Hunter, 2017). Other investors such as the Jamaica Public Service Foundation, Sandals Foundation, Rockhouse Foundation, United Way of Jamaica, and the Jamaica Social Investment Fund are also collaborating with ECC to assist in the formation of ECD programs (Hunter, 2017). In 2008, the Government of Jamaica was reported to have spent \$69, 000,000 on early child development, which was calculated to be approximately \$213 per child (“ECC to Develop National Strategic Plan for Early Childhood Sector”, 2008). Past studies have shown that ECD initiatives in Jamaica have been beneficial for both children and their caregivers (Powell, Baker-Henningham, Walker, Gernay, Grantham-McGregor, 2004). Hence, seeing that ECC has garnered substantial support for its initiatives, incorporation of the BBSP can be an effective method of execution.

4.2 Critical Considerations for Implementation of the Big Brother-Big Sister Program

For policy implementation of the BBBS Program, the Cross Sectoral Coordination Department of ECC must be informed of the value of the program (“The Early Childhood Commission”). The value of BBBS Program lies in the fact that it is more of a deinstitutionalized and external method of cultivating early child development. This may enable the program to be considered complementary to the ECIs. If successful, the impact of ECC could be further expanded, while still fulfilling its core value of early child advancement (“Our Values”). To initiate the program, a targeted approach centered in Kingston, Jamaica could be employed. Kingston is the capital of Jamaica, with a population of 89,057 as of 2011 (“Population Usually Resident in Jamaica, by Parish:2011”, 2011). Although considered the smallest parish in Jamaica, Kingston is considered as the urban center of the island (“Parish Profile: Kingston”). Many universities are located within (e.g. University of Technology, Jamaica – Kingston, JA) or in close proximity (University of the West Indies – Mona, St. Andrew’s, JA) to the capital (“The University of the West Indies”; “University of Technology, Jamaica”). However, many inner-city regions in Kingston contain children that are susceptible to developmental issues, notably those that live in single parent homes (McGregor-Grantham Hawke, 1971).

For implementation, 1-2 centers could be established in Kingston as a resource, training and consultation area for caseworkers and volunteers. ECD professionals could be recruited and distributed in each region of Kingston (Kingston Western, Kingston Central, and Kingston Eastern Port Royal) to manage the cases between volunteers and families (BBBS of Ajax-Pickering, 2012; “Kingston”; Roaf, 1994). The target cohort for volunteers would in-

volve individuals 18 years of age and older, who would have completed an application, passed a background criminal check, are willing to dedicate 1-2 hours once or twice a week to interact with their child, and presented at least 2 references that can attest to their interest and experience in investing in positive development of young children (BBBS of Ajax-Pickering, 2012). If volunteer applicants are approved, training would proceed. This training could involve informing volunteers of their role/relationship with the child, the activities they are legally allowed to perform with them and any repercussions that may arise due to misconduct (Galvin, 1989). Volunteers would be matched according to region, experience and compatibility (i.e. sociocultural) with the family at hand (Galvin, 1989; Roaf, 1994). In addition to this screening process, volunteers would have to dedicate at least 6 months of sustained effort to the program, to assist in establishing a relationship between themselves and the child (BBBS of Ajax-Pickering, 2012). It is hoped that the proximity of this initiative to universities, could cater to a larger number of interested applicants to the program. During the matching and orientation process, the caseworker would have to play an integral role in establishing mutual trust and accountability between the BBBS Program, the family, the volunteer and the child (“Integrated Approaches to Supporting Parents”).

The next section will proceed to delve into the economic feasibility of BBBS Program implementation.

5 Economics of the Big Brother-Big Sister Program

It is a common belief that things of higher price equate to better performance, better quality, and better value. While that may be true for most tangible goods, it is not the case for services such as the one provided by the Big Brother-Big Sister program. Why? The reason is because charitable programs have a big social purpose, and the quality of the service is proportional to the size of the purpose, if done right. This section of the paper argues that incorporating a Big Brother-Big Sister program into the Jamaican Early Childhood Commission is a good move from an economic perspective as well. The core argument is that there is no reduction of value from having a low cost, volunteer driven program, and that the economic benefits from the program is greatly higher than the costs.

The cost of running the Big Brother-Big Sister program is low compared to similar programs such as the Jamaica home visit program (Reach Up and Learn). This is primarily because the Big Brother-Big Sister program utilizes passionate volunteers and have minimal organizational layers. According to estimates by the respectable Blueprints Programs (Blueprints, 2017), it costs about \$1,312 USD per youth matched with a mentor in Big Brother-Big Sister America. This cost is expected to be half or less for the same implementation in Jamaica because of lower salaries for executives, cost of office space, and cost of office supplies. This is a reasonable belief as, according to the very respected website Trading Economics (Trading Economics, 2017), the gross domestic product per capita is \$5,000 USD in Jamaica in 2017. The USA had \$51,638 per capita during the same period. This is, roughly, a 10 times difference, which implies that the cost of hiring workers for the Big

Brother-Big Sister program could be 10 times lower in Jamaica. This paper assumes that the direct cost is only half of that of USA's costs to be a conservative estimate. Therefore, the direct cost of matching 250 children will be $(1312/2)*250 = 164,000$ USD per year.

In microeconomic theory, opportunity cost is the cost incurred by not enjoying the benefit that would have been had by taking the second best available choice. In the case of the Big Brother-Big Sister program, there is opportunity costs to volunteers who take time out of their day. How much money is that time worth? According to Big Brother-Big Sister's website (Big Brother Big Sister, 2017), the program asks volunteers to commit one visit per week for a year. If we assume each interaction is 4 hours long and a person working a full time job has 40 hours a week, this would be 10% of a working person's time. Using 2017 GDP per capita, 10% of \$5,000 USD is \$500 USD. Therefore, there is approximately \$500 USD in opportunity cost per volunteer. So, in a standard batch of 250 volunteers, the opportunity cost is estimated to be $250*500 = 125,000$ USD. The total cost is the direct cost plus the opportunity cost, which is \$289,000 USD.

In order for the program to make economic sense, the future benefits of investing in this program must be greater than the costs. This is to say, can 250 people generate \$289,000 USD surplus in the future for the Jamaican economy because of the Big Brother-Big Sister program? This paper argues yes. The economic benefits from having the Big Brother-Big Sister program can be potentially much bigger than the direct costs plus the opportunity costs. A longitudinal Jamaican study (Walker et al, 2011) showed that weekly play sessions with the mothers from the ages of 9 month to 24 months increases children's IQ, education attainment, general knowledge and reduces violent behaviour. They followed these children and assessed

them again at the age of 22. The researchers found that children with the psychosocial stimulation (weekly play sessions) had a marked reduction in participating in physical violence, violent crime, and use of weapons. Walker et al, reported an odds ratio of 0.33 (weekly stimulation/control group) for 22 year olds involved in violent crime. This suggest that having weekly play sessions in the early childhood has a significant impact on crime behaviours later in life. How much is that worth in dollars? According to a joint report by the United Nations Office and the World Bank, they estimated that the cost of crime in Jamaica, which is a sum of health care costs, lost productivity, and public expenditure on security, to be 3.7% of Jamaica's GDP in 2003 (United Nations Office on Drugs and Crime and the Latin America and the Caribbean Region of the World Bank, 2007). The homicide rates have increased from 36/100,000 in 2003 to 40.9/100,000 in 2016, which is roughly a 13% increase. So, there is reason to believe the percentage cost to GDP would be higher than 3.7% in 2016. Jamaica has made 14.36 billion USD in GDP in 2013. Therefore, the cost of crime would amount to $(0.037) \times (14.36 \text{ billion}) = \$531,320,000 \text{ USD}$. Of course, the real cost of crime is much more than just health care costs, lost productivity, and public expenditure on security. There is also losses from foreign tourism, and decreased levels in foreign direct investment. According to a paper by Maginnis (Maginnis, 1997), he points out that the most reliable indicator of violent crime in a community is the proportion of fatherless families. Going back to the Walker et al study where they found an odds ratio of 0.33 for violent crime. This is a very significant, 66%, decrease in crime just from having weekly play sessions. As mentioned earlier by Graham (Graham, 2017), more than one third of children in Jamaica have no father in the household. So, if Jamaica implements a Big Brother Big Sister program it could potentially drop the cost of crime

by 66% in the coming generations, which is 350,671,200 USD per year. That much money could fund roughly 450,000 children per year which is almost double the number of children under 9 in Jamaica (United States Census Bureau, 2017). Therefore, the cost of implementing a Big Brother-Big Sister program make economic sense.

Although the Big Brother- Big Sister program is beneficial from an economic lens, there are some consequences of the proposed program. The next section will discuss that in detail.

6 Drawbacks of the Proposed Big Brother and Big Sister Program

Although the proposed intervention is socially beneficial, cost-effective and culturally tuned for early childhood development in lone parent households of Jamaica, it does not cover an important aspect that ensures children reach their full potential: nutrition.

6.1 Neurological Effects of Nutrition on Child Development

Nutrition is crucial during early child neuronal development especially ages up to two (preschool) and can have long-lasting effects on academic performance up to ages 8 to 9. (Bryan et al., 2004). This is vulnerable part of the demographic in which the Big Brother Big Sister program targets. Executive functions such as critical thinking, problem solving, memory formation and attention span is regulated by the frontal lobe of the brain and rapidly emerges during these stages. However, when faced with deprivation

of macronutrients and micronutrients, development of this area is delayed and IQ as well as performance in school decreases (Bryan et al., 2004). For instance, iron deficiency affects neuronal myelination and is important in neurotransmitter production of serotonin, norepinephrine, dopamine, and GABA. Evidence has shown that these neurotransmitters, more specifically GABA and dopamine cover the same spatial dispersion of iron in the brain leading the researchers to conclude that it may play a role in the reuptake of some of these neuropeptides. If children are iron deficient, this places more strains on parts of the brain such as the prefrontal cortex, hippocampus and the striatum leading to stunted development. Iodine, folate and vitamin B₁₂ are other nutrients that are important in preventing cognitive deficits that lead to behavioural abnormalities (Bryan et al., 2004).

6.2 Nutrition in Jamaican Children of Lone Parent Households

Evidently, nutrition has been seen to affect cognitive functions and thus behavioural, emotional and academic performance. Importantly, 30% of children, 5 years or younger in third world countries, suffer from growth retardation and stunting (Walker, Chang, Powell, Simonoff and Grantham-McGregor, 2007a). Studies conducted in poor households of Kingston, Jamaica have found that when children, ages 2 were supplemented with a milk formula, they had additional negative psychological outcomes than those who were not stunted and had some form of professional home-care visits (included play sessions with children and mothers for the purpose of stimulation). Even when stunted and stimulated with a home-care visit, hyperactivity functions in undernourished children were consistent. (Walker et al., 2007a). Most importantly, without nutrition, these children exhib-

ited increased levels of depression, anxiety and issues with self-esteem than non-stunted participants at late stages of adolescents, ages 17 (Walker et al., 2007a). These disorders associated with stunting has been associated with an increase in cortisol levels in Jamaican children. Furthermore, this can lead to changes in the hypothalamic-pituitary response causing changes in the allostatic response (Fernald and Grantham-McGregor, 1998). Other prospective studies conducted in Jamaica have shown that although stimulation (such as a Big Brother Big Sister program) for stunted children alone increases IQ scores compared to stunted children without stimulation, it does not extend to the IQ levels of non-stunted children. This is a continual finding from infants, ages 9-24 months, to teenagers at 17-18 years of age. (Walker et al., 2007b).

The Big Brother program is founded on a natural relationship whereby the mentor is a “role model”. This does not ensure that material resources, such as nutrients, are supplied. Evidently, nourishment does show significant impact on early childhood development even when combined with home visit programs. Moreover, in single parent households of Jamaica, stunting (decreased height for average age) was 4.83 times more likely to be developed compared to two parent families (Bronte-Tinkew, 2004). This is most likely due to socio-economic status where parental investment is hindered by poverty especially when there is only one source of income. In female headed households, this may be less of a concern than in single male households because women will completely allocate their income to ensure their children are fed (Bronte-Tinkew, 2004). Whereas, in single father households, 29% of their earnings will be used for personal use (including alcohol).

Therefore, this unique mentorship program, if economically supported, could provide substantial benefits to the neurological and thus behavioural

development Jamaican children in single parent families by ensuring that supplementation along with the social interaction of the volunteer is implemented.

6.3 Inadequate Supply of Concrete Resources

In addition to nutrition, educational resources such as books and other stimulatory learning instruments to lone parent families are not provided through volunteers in the proposed program. Since socioeconomic status correlate with the resources that the children can use, a poor household setting, despite social interactions with a volunteer member, might not have the appropriate material to lead to further stimulation. Household structure in which children are only supported by one parent subsequently results in lower amount of educational supplies and ultimately lower the opportunity for increased social competence and decrease child well-being (Bronte-Tinkew and DeJong, 2004). Bronte Tinkew and DeJong (2004) further denotes that there is a “resource dilution” in which an increase in the number of siblings in an incomplete household can lead to additional inaccessibility to materials and school aid.

If the budget were to increase, the use of concrete material would help children improve with behaviour. For example, a pilot program called the Incredible Years Intervention was implemented in Kingston, Jamaica and presented a workshop cultivated for children coming from a low socioeconomic status background to alleviate for the behavioural issues (Baker-Henningham, Walker, Powell and Gardner, 2009). Despite this being conducted in a school setting and despite this being a teacher-student relationship, they successfully conveyed the social, emotional and behavioural lesson to children using different materials and assignments. Through role plays, blocks, puzzles, and

hand puppets, the socialization messages that contained rules with friendship and dealing with anger can enhance understanding (Baker-Henningham et al., 2009). More specifically, this can lead to heightened interaction and engagement between the Big Brother and Big Sister mentor and child to improve early development in lone parent households.

Regardless of the consequences, the Big Brother Big Sister program is economically sound and provides sufficient levels of stimulation to Jamaican lone parent households through the special relationships created with the mentors.

7 Conclusion

In conclusion, with the increasing amount of disadvantaged single parent families, the call for implementation of a Big Brother Big Sister program through the Jamaican Early Years Commission would provide as a solution to deal with the behavioural difficulties in children aged 0-8 in lone parent families. This program will ensure that a mentor is present to assist the mother in

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