

Comprehensive Longitudinal Studies of Child Health, Development and Behaviour in Jamaica: Findings and Policy Impact

M Samms-Vaughan

ABSTRACT

Background: Birth cohort and other longitudinal studies of children's health, development and behaviour have provided important information on child and adult outcomes. This has allowed evidence based policy and programme development targeted at issues specific to countries. Few studies have been conducted in developing countries. This paper reports on the findings and policy implications of two comprehensive longitudinal studies in Jamaica

Method: The findings of the Jamaican Birth Cohort Studies, conducted between 1986 and 2003, and the Profiles Project, a longitudinal study commencing in 1999 when children were six years, were reviewed. Recommendations from the studies and their impact on policy and programme development for Jamaican children were identified

Results: Policy and programme impact were identified in areas of child poverty intervention, parenting, social activities, violence and aggression, health and nutrition, screening and early intervention, setting of standards for early childhood institutions, gender, early childhood indicators and education and training. Policy and programme impact were national, regional and international.

Conclusion: Comprehensive longitudinal studies of children in developing countries, though costly, provide wide-ranging and important information for policy and programme development.

Estudios Longitudinales Integrales Sobre el Comportamiento, Desarrollo y Salud Infantil en Jamaica: Hallazgos e Impacto de las Políticas

M Samms-Vaughan

RESUMEN

Antecedentes: Tanto los estudios longitudinales de cohorte de nacimiento como otros estudios longitudinales sobre el comportamiento, desarrollo y salud infantil, han brindando importante información sobre la evolución de niños y adultos. Esto ha hecho posible el desarrollo de programas y políticas basadas en la evidencia, dirigidos a problemas específicos de cada país. En los países en desarrollo se han llevado a cabo pocos estudios de esta clase. Este trabajo reporta los hallazgos así como las implicaciones para las políticas, de dos estudios longitudinales en Jamaica.

Metodología: Se revisaron los hallazgos de los Estudios Jamaicanos de Cohorte de Nacimiento, llevados a cabo entre 1986 y 2003, así como el Proyecto de Perfiles – un estudio longitudinal que comenzó cuando los niños tenían seis años de edad. Se identificaron recomendaciones a partir de los estudios y su impacto sobre las políticas y el desarrollo de programas para niños jamaicanos.

Resultados: Se identificó el impacto de las políticas y programas en áreas de reducción de pobreza, crianza de hijos, actividades sociales, violencia y agresión, salud y nutrición, pesquisa e intervención precoz, establecimiento de normas para las instituciones de la niñez temprana, género, indicadores de niñez temprana, y educación y entrenamiento. Se consideró el impacto de las políticas y los programas a nivel nacional, regional e internacional.

Conclusión: En los países en vías de desarrollo, los estudios integrales longitudinales – a pesar de ser costosos – proveen un amplio espectro de información importante para el desarrollo de políticas y programas.

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INTRODUCTION

Britain established itself as the leader in longitudinal studies of children when the participants in the first birth cohort study in 1946, which included all births taking place in England, Scotland and Wales in a week, were followed through childhood and into adulthood (1). The population has been followed to 57 years (2003), with some 30 study contacts. Similar studies took place in 1958 and 1970 (2, 3). Over the next 60 years, some 27 longitudinal cohort studies have been documented in the review literature (4). More recent smaller regional studies, such as *Growing up in Scotland* (2004), *Born in Bradford* (2006), *Growing up in Ireland* (2007) [5–7], and more recent studies such as the *Young Lives Project* which includes 2000 children each in Ethiopia, India, Peru and Vietnam (8) are not included in the literature review. The *Jamaican Birth Cohort Studies*, which had their beginning as the *Jamaican Perinatal Mortality and Morbidity Study* in 1986 (9) are also not included.

Birth cohort and other longitudinal studies of children have evaluated child outcomes of survival and health, growth and development, educational attainment and behaviour, as well as predictors of adult health and disease, social status, educational attainment and well being. Risk and protective factors have been identified and health, social and educational policy have been influenced.

The benefits to be obtained from longitudinal studies have resulted in the initiation of a number of comprehensive studies in a range of countries over the last few years (4). Few studies have been conducted in developed countries.

Though the importance of longitudinal studies of children has been established, cost is often prohibitive for developing nations.

The University of the West Indies (UWI), now in its 60th year, undertook the *Jamaican Perinatal Mortality and Morbidity Survey* in 1986, heralding the beginning of the *Jamaican Birth Cohort Studies*. With study participants seen most recently in 2007–2008, the UWI has followed a birth cohort for more than a third of its existence. A second longitudinal study, known as the *Profiles Project*, identified children at six years in 1999 and followed them to twelve years. This paper reports on some of the important research findings emanating from comprehensive longitudinal studies of Jamaican children's health, development and behaviour and their influence on policy and programme development locally, regionally and internationally.

BACKGROUND AND METHODOLOGY OF THE STUDIES

The Jamaican Birth Cohort Studies

The *Jamaican Perinatal Mortality and Morbidity Study*, a collaborative effort between the Ministry of Health and the Department of Paediatrics at UWI, was designed to identify factors associated with maternal, perinatal and neonatal mortality and morbidity in order to implement interventions to improve outcome. Data were collected on 10 527 (97%)

of the 10 879 registered live births in the country between September 1 – October 31, 1986 (9). Maternal interview with a structured questionnaire recorded demographic details, socio-economic and marital status, past obstetric history, antenatal course, delivery and the status of the infant at birth. Details of neonatal admission and perinatal and neonatal death were included, where applicable. In order to ensure a large sample for analysis, neonatal admissions were included for an additional four-month period to February 1987 and perinatal and neonatal deaths for an additional ten-month period to August 1987. Babies and mothers were seen again at six weeks, when questionnaires on maternal health and infant health and nutritional status were completed.

Similar to the British birth cohort studies, the Jamaican birth cohort follow-up studies were designed to identify factors impacting Jamaican children's health, development and behaviour in order to improve outcome. The follow-up studies included only those cohort children resident in Kingston and St Andrew, the two most urban of Jamaica's fourteen geopolitical divisions known as parishes. The first was conducted from 1997–1998 at 11–12 years and the second from 2001–2003 at 15–16 years. Cohort children were identified from school records using their date of birth. At the first follow-up study, 1720 children or 87.1% of the expected population were seen, and at the second, 1565 children were seen. Questionnaires were administered by trained research nurses and were completed by children, parents and teachers; academic and cognitive tests were also administered and anthropometric measurements taken.

The Profiles Project

The Consultative Group on Early Childhood Care and Development identified as a significant problem the high rates of school failure in children, especially noticeable at entry to primary school and occurring particularly in developing countries. Jamaica was one of four countries identified for action research to address this problem. Through a collaborative effort between the UWI's Caribbean Child Development Centre and the Section of Child Health, the development of a comprehensive profile of children's health, development and behaviour at six years was undertaken in 1999 to find solutions to the problem.

A nationally representative sample of 245 children from six parishes was identified using standard household survey sampling techniques. Comprehensive evaluations were performed similar to those undertaken in the *Jamaican Birth Cohort Studies*. Follow-up studies at seven years in 2000 and nine years from 2002–2003 were also conducted. At seven years, when the children were in the first grade of primary school, 130 or 53.1% of the original sample were seen. At nine years, at the end of their third primary year, 116 children, 47.3% of the original sample, were seen.

The recommendations from these studies and their impact on policy and programme development were reviewed.

The Jamaican Birth Cohort Studies and the Profiles Project received ethical approval from the UHWI/UWI Faculty of Medical Sciences Ethical Committee

STUDY FINDINGS, POLICY AND PROGRAMME IMPACT

The longitudinal studies have resulted in two major book publications (10,11) which comprehensively addressed factors impacting on health, development and behaviour at six years and eleven to twelve years; as well as a third book to which the studies contributed significantly (12) and a fourth which converted the technical details of the findings at six years to a parent guide to child development (13). There were also a number of technical reports (14–20), four book chapters (21–24) and seven peer-reviewed original publications (25–31) addressing a range of issues in child development and behaviour.

These have been the basis of the studies' impact on policy and programme development which are listed below.

Child Poverty Intervention

Low socio-economic status had significant and negative direct effects on children's cognitive, academic and behavioural outcomes (10,11). Indirect effects through such factors as parenting education, the quality of the home learning environment and nutrition were also identified. The Profiles Project demonstrated that failure to provide intervention at the pre-school years resulted in widening academic and behaviour disparity between children of lower and higher socio-economic classes (11) and the birth cohort studies demonstrated the long term negative impact of inadequate early childhood educational experiences which were more common among the lower socio-economic groups (10). Targeted intervention to break the cycle of social and educational poverty was recommended by both studies. As a result, the social indicators developed from the Profiles Project (24, 26) are being used to develop instruments for targeting children and families at risk as part of the country's National Strategic Plan (NSP) for Early Childhood Development (ECD) 2008–2013 (32) co-ordinated by the Early Childhood Commission (ECC). The ECC is a statutory body of the Government of Jamaica with responsibility for policy recommendations and the development, co-ordination and monitoring of plans and programmes to improve early childhood development.

Parenting

The studies investigated different aspects of parenting, using a variety of instruments. Relatively low levels of tertiary education of parents (5–30%), as was found, is not unexpected in a developing country (10,11). Cohabiting parental unions, including common-law and married unions, declined from 51% at a child's birth to 42% at 11–12 years and 36% at 15–16 years, with a gradual fall in the proportion of common-law unions and a small increase in marriages

(10–12). The proportion of children living with their mothers was between 75 and 80% throughout their lives but the proportion living with their fathers fell from just under 50% at 5–6 years to just under 40% at 15–16 years (10–12). Jamaican parents had high levels of total parental stress, much higher, for example, than that experienced by parents in the United States of America (11). Parents living in poorer circumstances had higher parenting and life stress levels. There was limited parental stimulation in the home of six-year old children, particularly those from the lower socio-economic groups (11). Limited parental participation in children's activities, such as reading and television viewing (10,11), were also identified.

Low levels of parental education, high levels of parental stress and limited stimulation in the home significantly and negatively impacted on a range of child outcomes including cognitive function, academic achievement, behaviour problems and behaviour strengths (11). Jamaican children who lived in the less emotionally stable common-law and visiting unions, and those in single-parent homes or homes with a biological and surrogate parent had more problem behaviours and lower cognitive and academic achievement (10, 11). Though its effects on children's outcomes were not as strong or as global in impact, limited parental participation in children's activities also impacted negatively on cognitive, academic and behavioural outcomes (11).

Because of its demonstrated importance, parenting education was considered a national priority and the development of national parent education programmes was recommended by the studies.

The findings from the research on parenting have been used to guide the development of Jamaica's National Parenting Policy as well as parenting programmes and public education parenting messages.

Social Activities

The most common social activities prior to the adolescent years were church attendance and television viewing. Some 75 to 83% of children attended church regularly (10, 11). Fewer participated in organised activities (54% at 12 years) or read books regularly. Only 70% of six-year olds and 61% of eleven year olds had read books within the previous month (10, 11). The situation worsened at 16 years when the most common weekly social activities were watching television and listening to music (95–96%) and the least common were reading (51%) and playing active sports [43%] (20). Attending supervised activities, reading and attending church were associated with improved academic performance and behaviour (10,11). Excessive television viewing, of more than 20 hours per week at 12 years, was associated with impaired cognitive function, academic performance and behaviour problems (10).

The studies recommended the development of community based extra-curricular activities, including reading

clubs (10, 11). The study of 12-year olds also recommended that television viewing be limited (11). The Broadcasting Commission of Jamaica, charged with the responsibility of regulation and monitoring of the electronic communication sector, utilised the information from the study of 12-year olds to develop the Children's Programming Code and also for public education messages to support media literacy. The information on reading has informed the development of research projects piloting the implementation of community-based child development councils to ensure the welfare of young children.

Violence and Aggression

Jamaican children had high levels of exposure to violence in all its forms throughout childhood (16, 18, 19, 29, 30). Two-thirds of parents of six-year olds reported using psychological aggression and 46% reported corporal punishment use within the previous week (30). Among the most serious forms of violence witnessed by 11–12 year olds were stab wounds (44%), shooting (26%) and rape (4%) [29]. These children were also victims of stabbing (13%), rape (2%) and shooting (1%). However, the commonest form of victimization, experienced by 37% of children, was the loss of a close relative or family friend. While 22% of these children witnessed severe forms of domestic violence in the home, 5% of girls were pushed and slapped and 2% beaten with an implement by their boyfriends (20). Children's exposure to violence accounted for four of the ten independent factors associated with externalizing behaviours of delinquency and aggression in 12-year olds. Other risk factors included impaired family functioning, poor school achievement, frequent change of mother figure and risk behaviours of drug use, suicidal ideation and carrying a weapon (16). Exposure to violence is known to have devastating impact on learning and behaviour. The biological impact of children's exposure to violence was documented when 12-year olds with high levels of exposure to community violence demonstrated higher levels of cortisol on arrival at school (16).

The identification of factors associated with aggressive behaviour have been used to guide interventions by the Violence Prevention Alliance, including improving literacy and increased participation in supervised activities. The Caribbean region has been identified as one of the regions in the world most resistant to the removal of corporal punishment. Data on corporal punishment informed a CARICOM initiative to promote reform in policy, legislation and practice within the framework of advocacy, public education and training in positive disciplinary practices.

Data on corporal punishment also informed the Caribbean report on corporal punishment which, in turn, informed the UN Secretary General's Study on Violence against Children (34).

Health and Nutrition

The studies found generally good physical health, with almost 90% of parents reporting their children as healthy (11). The most common serious illnesses were diarrhoeal disease (6.4%) and asthma (4.9%) and the most common accident/injury experience was burns and/or scalds (10%). Nutritionally, Jamaican children were more likely to be overweight than underweight, highlighting the epidemiological transition of the country to chronic diseases (25). Though the proportion of undernourished children was small, these children suffered significant cognitive and academic impairment.

The studies recommended early identification and treatment of nutritional disorders, to be assisted by the revitalisation of the school health system, with services commencing at the early childhood level. Study data were used to inform the National Strategic Plan for the Promotion of Healthy Lifestyles in Jamaica (33).

Screening and Early Intervention

The Profiles Project found that 35% and 10% of six-year olds were in need of further hearing and vision evaluations, respectively (11). At 12-years, 4% and 3% of children were unable to identify letters and numbers, respectively, despite being in an age appropriate class (10). Parent and teacher reports identified very few of the 13% of children who reported drug use and the 12% who reported suicidal thoughts (10). The studies therefore recommended the introduction of routine screening and early intervention for sensory impairment, behaviour and educational disorders in the early childhood period and throughout the primary years. The information from the Profiles Project was used to inform a UNICEF supported Situational Assessment on Screening, Early Intervention and Referral for Health, Developmental and Behavioural Disorders (31). The Situation Analysis was also used by the Early Childhood Commission (ECC) to inform the development of a National Plan of Action for Screening, Referral and Early Intervention. The ECC further utilized information from the studies to identify the need for readiness evaluations prior to entry to primary school and thus inform the NSP for ECD (32).

Standards for Early Childhood Institutions

Children who attended community based public pre-schools (basic schools) performed less well academically at primary school than those who attended private pre-schools, regardless of social status (10). This suggested discrimination in the quality of pre-school education provided and led to recommendations for the establishment of minimum standards for early childhood and primary schools. The use of the Early Childhood Environment Rating Scale (ECERS) to identify inadequacies in the quality of the Grade 1 environment in both public and private schools (11) supported the

widespread use of this standardized measure to evaluate the quality of early childhood institutions throughout the Caribbean (35). This also informed the development of the Early Childhood Act and Regulations (2005) for the regulation and management of early childhood institutions in Jamaica, the Standards for the Operation and Management of Early Childhood Institutions in Jamaica (2008) and the development of regional standards for early childhood development services (36).

Gender

The Profiles Project showed that boys and girls had similar cognitive potential and academic performance in reading, spelling and arithmetic from the pre-school years to the third grade in primary school (11). However, at the sixth grade, while having similar cognitive potential, boys had significantly lower academic performance in all three subjects (10). This suggests that the academic environment does not promote the academic achievement of boys and needs further study. Boys also showed diminishing leisure-reading with time ranging from 70% at 6 years, 63% at 12 years and 46% at 16 years. In comparison, leisure reading prevalence for girls remained between 74 and 82% over the same period (10, 11, 20). In similar manner, boys also disengage from other protective factors such as attending organized activities and church over time (10, 11, 20). In contrast, boys report significantly more corporal punishment at school (18).

The research has been used to highlight the plight of boys and advocate for changes in teacher training curricula and parenting programmes to include the developmental differences between boys and girls.

Early Childhood Indicators

The development of indicators for the Profiles Project (15, 26) informed the selection of indicators for the monitoring of the impact of interventions in the NSP for ECD (32), through a parenting and child development module in the annual national household survey, the Survey of Living Conditions. This work has also informed current UNICEF supported activities aimed at the development of global indicators for parenting and early childhood development.

Education and Training

The research findings are used to inform undergraduate and postgraduate curricula in child development in the Health Sciences, Social Sciences and Education. The findings are also an important reference source for research on children and have stimulated other research projects in the field of child development.

Predictors of Health Status in Later Childhood and Adulthood

Linkages between the perinatal data and the study of 12-year olds demonstrated significant associations between maternal oral contraceptive use in pregnancy and asthma or wheezing

and coughing in childhood (28). Additionally, the presence of complications in pregnancy was a risk factor for hayfever. The results suggest that asthma in childhood may be programmed *in utero*.

The potential of the Jamaican Birth Cohort studies to identify associations between perinatal and early childhood factors and adult health is currently being investigated, with the first follow-up study as adults conducted between 2006 and 2008, at the age of 20 to 22 years.

CONCLUSION

Despite their initial cost, comprehensive longitudinal studies of children have impacted significantly on Jamaica's policy and programme development. The importance of the existence of local data allowing for evidence-based policy and programme development should not be underestimated. The studies also assume regional importance as many Caribbean countries, which do not have the capacity to plan/implement longitudinal studies, often find the information relevant for policy and programme planning.

The studies are now 11 and 23 years old. There has been much advances in our understanding of children's development since the onset of these studies. More recent longitudinal studies now collect biological samples because of the importance of biological data (37). Additionally, there has been advances in the measurement of child outcomes. There have also been new methodologies for longitudinal studies, such as continuous collection of data from a whole year's birth, which are more cost effective (37). New conditions such as HIV/AIDS and an increase in the prevalence of disorders, such as autism, emerging since the origin of the Jamaican studies suggest new areas for longitudinal study.

The British Birth Cohort Studies were originally initiated twelve years apart. It is therefore time for a new birth cohort study in Jamaica to provide information to guide the development of policies and programmes to meet current societal needs.

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