I. Early child development: silent emergency or unique opportunity?

The early years of life represent a critical window of opportunity for a child’s development, a time when the brain is most sensitive to external influences. Early childhood is not only a period of special sensitivity to risk factors, but also a critical time when the benefits of early interventions are amplified, and the negative effects of risk can be reduced. This is underscored by the evidence from neuroscience which emphasizes the importance of nurturing care (adequate health, nutrition, responsive care, opportunities for learning and protection from harm and abuse) to all young children to enable them to reach their full potential. The first 1,000 days of life shape a child’s future. Nurturing care plays a vital role in giving children the best possible start in life: the mantra ‘Eat, Play, Love’ summarizes the need for opportunities in the environment of the young child for adequate nutrition, opportunities for play and safety and security. This brain architecture is a critical foundation for all future learning, behaviour and health. And while neural connections continue into adulthood, how these early connections form determine whether later connections are strong or weak foundations. As demonstrated by Heckman, the smartest investments in human development are those done earliest in the lifespan, as returns to ECD investments are considerably higher compared to equivalent investments in the later years – primary school, secondary school and after.

The healthy development of a baby’s brain depends on nurturing care, which benefits children, but it also about the knowledge and resources their families and other caregivers require to provide it. It refers to the enabling conditions created by public policies, programmes and services to ensure children’s good health and nutrition, protect them from threats and give them opportunities for early learning, through interactions that are responsive and emotionally supportive.

To support the development of their children, parents need time, resources, and services. This is made available through a) enhanced enabling (policy) environments; b) integrated services (for example frontline workers including health, social work, education nutrition); c) knowledge and agency for caregivers and parents such as tools, guidance, masterclasses and information; d) financial support and resources including financial literacy, child benefits, cash transfers and e) amplification of caregivers’ voices through social and digital media, parenting voices in community and policy platforms.

While the Covid-19 pandemic exacerbated the crisis of care and learning, it has also provided an opportunity to elevate the needs for parenting and family support and care. To continue to promote ECD services and interventions and ensure that every child is enabled to not only survive but thrive we must strengthen formative research models and enhance implementation research on ECD; leverage existing routine touchpoints to elevate the importance of holistic ECD; invest in system strengthening and capacity building of frontline health workers through innovative tools; raise awareness and partners including with parents and caregivers themselves to ensure child health and development; enhance direct support to parents through community engagement initiatives; and, empower policy makers and key stakeholders with the latest evidence and advocate for enhanced investments in ECD and parenting support programmes.

REFERENCES
2. Early Moments Matter | UNICEF: https://www.unicef.org/early-moments

II. Early child development through the lifecourse: lessons from international birth cohorts

The FinnBrain Birth Cohort Study (www.finnbrain.fi) is a general population-based pregnancy cohort, based at the University of Turku, Finland, Europe. To date, the cohort has been ongoing for 10 years. We present a comprehensive overview of the cohort’s key findings on how prenatal and early postnatal stress influence offspring development and health. Potential targets for interventions are described. Finally, the conceptual developments of health and disease (DoHaD) as well as toxic stress and adverse health outcomes related to it are discussed.

The cohort participants were recruited during a pregnancy ultrasound visit, at gestational week 12. The methods of data collection comprised questionnaires, register linkage, a range of biological samples, multimodal brain imaging and neuropsychological assessments. The number of children at baseline was 3808, while the cohort’s sub-studies with intense multidisciplinary designs and measurements typically include hundreds of children. The current follow-up ranges from pregnancy to the child age of five years, and the next data collection sweep of nine-year-old cohort participants will start in January 2022. Statistical methods include latent growth mixture modelling by which the longitudinal course of maternal distress symptoms has been depicted.

We have identified differential courses or trajectories of maternal distress symptoms. These trajectory categories relate to maternal characteristics and physiological stress measures: for example, consistently elevated depressive
symptoms levels are associated with elevated maternal hair cortisol concentrations during pregnancy (p=0.016). In the context of offspring health, chronic and consistently elevated – but not necessarily initially severe – maternal symptom levels have been linked with elevated child psychiatric symptoms at child ages of two and five years (manuscript; p values < 0.05), and the risk of paediatric conditions, such as food allergy (OR 2.2; p=0.015) in infancy. When investigating possible resilience factors, we have observed that the higher predictability of maternal caretaking behaviour predicts better offspring self-regulation. Finally, adverse experiences in parents’ own childhood may translate into signals that shape offspring health: we have reported an association between paternal early life adversity and offspring infant brain maturation.

Toxic stress is one of the mechanisms explaining how experiences shape our health. As both the severity and duration of the exposure is important, it is important to recognise mild to moderate level as well as chronic stress. The adverse health outcomes related to toxic stress are not limited only to brain related diseases or psychiatric disorders but also span certain somatic conditions. Toxic stress should be targeted effectively with the aim of removing its sources, decreasing its harmful influences and supporting resilience. Prenatal stress exposure possibly participates in shaping individual’s sensitivity to postnatal life circumstances. The predictability of parental caretaking behaviour potentially helps in building offspring self-regulation and thus could be an important target for interventions. It is worth acknowledging that today’s parents are yesterday’s children. Conveying these messages to policy makers is our responsibility.

REFERENCES

II. II LIFE COURSE PREDICTORS OF COGNITIVE FUNCTION IN CHILDHOOD AND ADOLESCENCE: FINDINGS FROM THE MYSORE PARTHENON BIRTH COHORT STUDY

The ‘developmental origins of health and disease (DOHaD)’ hypothesis proposes that altered nutrition during critical stages of fetal and postnatal growth predisposes individuals to long-term health consequences. Growth and development during early life are important determinants for optimum neuro-cognitive development. The Mysore Parthenon Cohort was established to examine the maternal and fetal determinants of offspring health outcomes. The study examined maternal nutritional indices, body size at birth, postnatal size and infant feeding practices as predictors of childhood and adolescent cognitive function.

The Parthenon Cohort comprised 663 babies without major congenital anomalies born at Holdsworth Memorial Hospital, Mysore, India, during 1997–1998. Maternal anthropometry, oral glucose tolerance test and serum 25 (OH) vitamin D, vitamin B12, folate and homocysteine concentrations were measured at 30±2 weeks of gestation. Children had detailed anthropometric assessments at birth and at 6–12-monthly intervals subsequently. Data on breast-feeding was collected during the first, second and third year follow-up visits. Detailed cardiovascular investigations were done at ages 5, 9.5 and 13.5 years. Cognitive function was assessed during childhood (9.5 years; n=542) and adolescence (13.5 years; n=545) using three core tests from the Kaufman Assessment Battery for Children and additional tests, measuring learning, long-term retrieval/ storage, short-term memory, reasoning, verbal fluency, visuo-spatial ability, attention and concentration. Data on parents’ socio-economic status (SES) and education levels, maternal intelligence and home environment were recorded at the same time.

Our results showed that vitamin D and B12 deficiency was present in 67% and 41% of mothers, respectively, during pregnancy, but folate deficiency was low (~3%). The incidence of maternal gestational diabetes (GDM) was ~6%. Offspring mean birth weight was 2.97 kg. Both GDM and micronutrient imbalance as well as newborn size were associated with offspring cardiometabolic risk outcomes in childhood and adolescence.

Overall, cognitive scores were higher for girls than boys. All cognitive scores increased with increasing SES and parental educational level. Urban children performed better than rural children. Offspring cognitive scores increased linearly with increase in maternal folate levels both during childhood and adolescence (p<0.05). Offspring of GDM mothers also performed better than those born to non-GDM mothers. For each SD increase in birthweight and head circumference there was a ~0.10 SD increase in cognitive scores, independent of socio-demographic confounders (P<0.05). Breast-feeding duration was unrelated to children’s cognitive function. All the cognitive test scores increased with increase in concurrently-measured BMI and skinfold thickness (p<0.05).

In conclusion, the Parthenon cohort study found that early nutritional status predicted offspring cognitive ability during childhood and adolescence. In this population, where undernutrition is more prevalent than overweight/obesity, higher adiposity measures are indicative of better nutrition. Positive associations with maternal GDM indicate that fetal overnutrition in a chronically undernourished population may have beneficial effects on fetal brain growth and function.

REFERENCES