



Care Beyond Newborn Survival Including Child Health and Early Childhood Development; Mental and Psychological Health

Swati Kalra¹ · Dheeraj Shah^{2,3}

Received: 27 December 2022 / Accepted: 19 April 2023 / Published online: 17 July 2023
© The Author(s), under exclusive licence to Dr. K C Chaudhuri Foundation 2023

Abstract

Last couple of decades have witnessed a substantial decline in child mortality. Now, the need of the hour is to ensure the quality survival of children beyond infancy. Adverse events in the first few years of life have a long-lasting effect on child's development, behavior and personality; and effective interventions during this time have maximum impact to prevent these consequences. Nurturing Care for Early Childhood Development (NC-ECD) is a concept adapted worldwide by health agencies to improve the level of optimum care to children in the first 1000 days as promotion of Early Childhood Development (ECD) is integral for overall social and financial progress of the country and its population. The five components of NC-ECD include good health, adequate nutrition, responsive caregiving, safety and security, and opportunities for early learning. This five-pillar approach emphasizes upon providing quality care by catering to needs like responsive caregiving, safe and secure environment and better learning opportunities apart from health and nutrition, which are already addressed by various health programs. Taking care of mental health of child as well as caregiver is another important aspect of providing optimum care to these children. To accomplish these goals, there is a need to integrate ECD with existing public health programmes with additional focus on elements of early learning opportunities, safety and security, and responsive caregiving.

Keywords Early childhood development · Learning · Nurturing care · Mental health · Parenting

Background

The last two decades have witnessed a tremendous progress in child survival with the global under-five mortality rate falling from 77 per 1000 live births in 2000 to 37 per 1000 live births in 2020 amounting to more than 50% reduction [1]. Improvement in immunization against preventable diseases, nutrition services and access to healthcare have contributed to this reduction, and hence led to better child survival beyond 5 y [2]. However, there are gross regional and socioeconomic inequities in child survival rates [3], and a large chunk (about 250 million) of the surviving children in low- and middle-income coun-

tries (LMIC) are estimated to be at a risk of not reaching their developmental potential [4] due to poor health, malnutrition, and unstimulating home environments. For these reasons, the Sustainable Development Goals (SDGs) consider Early Childhood Development (ECD) “as a priority and the key to achieving seven goals; namely, no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, and reduce inequalities [5]”. Global agencies such as WHO, UNICEF and the World Bank have also prioritized ECD in their initiatives, but there are recent setbacks to their efforts in form of a detrimental fall in all the indicators of women and child health, including maternal mortality, breastfeeding rates and immunization coverage [6]. The DPT3 vaccination rates in India are estimated to drop from 91% in 2019 to 85% in 2020 [7], and there is a worrying global decline in the measles vaccine coverage in 2020 and 2021 that has translated in large outbreaks of measles in India, Eastern Mediterranean, Europe and Africa in the year 2022 [8–10]. The major culprit behind this failure has been COVID-19 pandemic which disrupted the healthcare and support services through lockdowns, restricted non-

✉ Dheeraj Shah
dshah@ucms.ac.in; director@nihfw.org

¹ Department of Pediatrics, BSA Medical College and Hospital, Delhi, India

² Department of Pediatrics, University College of Medical Sciences and GTB Hospital, Delhi 110095, India

³ National Institute of Health & Family Welfare, New Delhi 110067, India

COVID healthcare availability, limited access to public transport, and public fear of contracting COVID-19. Under these circumstances, taking care of every child beyond newborn survival becomes utmost important so that the agenda of survive, thrive and transform set by Global Strategy for Women's, Children's and Adolescents' Health (2016–2030) is brought back on track [11].

Early Childhood Development: The Concept

There is scientific evidence to support the fact that experiences in early childhood not only have a profound impact on physical, social, emotional and cognitive development of the child, but also have a long-lasting impact on the health and well-being of the next generation [12]. This critical period of early childhood is often considered to span up to 6 y, and sometimes even up to 8 y of age, as the brain is growing and developing neural connections, and hence responsive to a stimulating environment. Therefore, it is very important to sensitize the developing brain during this period by exposing it to various positive experiences and repeating the exposures time and again to strengthen the neural connections. The brain development is based on the principles of neuroplasticity.

Neuroplasticity

Neuroplasticity refers to the “brain's ability to change, reorganize, or grow neural networks” on exposure to new experiences through *synaptic pruning*, a process where there is strengthening of some connections and elimination of others [13].

It plays an important role in learning in early childhood years. The brain development starts from the time of conception, and by the gestational age of 4 wk, nerve cells grow at the rate of about 250,000 every min. By the third trimester of pregnancy, the nerve cells begin to make connections between themselves through synapse formation leading to about 2,500 synapses of every neuron in the cerebral cortex at birth, which increase to about 15,000 by the age of three [13]. The synapses which are formed due to these experiences to which a child is exposed during these early years have long-lasting effects on their ability to learn and regulate their emotions. Therefore, the environment under which a child is nurtured during early childhood, has lifelong implications. Social issues like lack of education, poverty, dysfunctional families, child labor, violence, malnutrition, and homelessness are the major culprits which adversely affect not only the child development and behavior but also lead to problematic adulthood and poor economic condition of the families.

Factors Affecting Early Childhood Development

Maternal Nutrition and Health

Maternal nutrition before and during pregnancy is one of the most important factor in fetal development. Inadequate intake of good nutrition or poor nutritional status due to ill health during pregnancy causes poor weight gain during pregnancy and intrauterine growth restriction (IUGR), thereby affecting fetal brain development [14], and risk of low birth weight (LBW) deliveries. Furthermore, LBW babies are more likely to be stunted by age of two years. A high prevalence of childhood stunting, a marker of chronic undernutrition, is considered to be a proxy indicator of suboptimal cognitive development.

Childhood Nutrition

Breastfeeding: Breast milk is ideal and best food for infants as it provides optimal nutrition comprising of proteins, carbohydrates, fats, micronutrients and essential fatty acids needed for optimal cell function and growth [15]. The process of breastfeeding provides necessary touch, stimulation and comfort to the child, which also reduces stress and enhances the child development. Despite so many benefits, less than two-thirds (63.7%) of women in India are exclusively breastfeeding their children younger than 6 mo of age, exposing more than one-third to the risk of adverse development [16].

Complementary Feeding: Timely, appropriate, adequate and active complementary feeding is critical for development as infants from 6 mo to 24 mo are especially vulnerable to malnutrition and its consequences. However, as per Fifth National Family Health Survey (NFHS-5) data, only less than half (45.9%) of the infants aged 6–8 mo receive any complementary feeding, and only 11.3% of children 6–24 mo of age receive adequate complementary feeding [16].

Undernutrition: Chronic undernutrition during early years, whether because of dietary inadequacy or chronic illness, is a risk factor for adverse early child development leading to long-term consequences. Apart from macronutrients; iron, vitamin B12, zinc and iodine are important micronutrients, deficiency of which has adverse effects on growth and neurological development.

Parenting Factors

Young children are dependent on the personalized parental care, and its lack has a detrimental effect on the child's growth, development, behaviour and cognition. Caregivers need to be sensitive and responsive for achieving positive health and development outcomes in young children [17]. High levels of adversity and stress during early childhood can increase the risk of stress-related diseases and learning difficulties [14, 18].

Caregiver's Mental Health

A very important factor affecting mental and emotional health of a child is the quality of caregiving and the relationship that caregivers build with young children. According to the WHO, approximately 10% of pregnant women and 13% of women who have just given birth experience a mental disorder, primarily depression. In low-middle income countries (LMIC), about 22% of new mothers go through some form of post-partum depression [19], and are unable to provide ideal nurturing care to their newborn. Post COVID-19, this number is likely to have risen, and it has become necessary to give paramount importance to ECD.

Environmental Factors

Fetal exposure to environmental toxins like lead and arsenic before birth may have teratogenic effect on brain development and thus compromises child development. Infectious diseases in children also affect development through direct (e.g., meningitis, encephalitis) and indirect (e.g., undernutrition, stress) mechanisms.

Efforts to Promote Early Childhood Development

As already emphasized, the period from pregnancy to 5-6 y is the most critical period that lays the foundation for health, well-being, learning and productivity throughout a person's whole life, and has an impact on the health and well-being of the next generation. The Sustainable Development Goals have focussed on young children's development, considering it as the key to the transformation that the world seeks to achieve by 2030. National health agencies of India also have focussed on child health issues right from 1970s by launching various programmes and policies. One of the largest program *i.e.*, Integrated Child Development Services (ICDS) in 1976, focussed on child development mainly through nutrition. Community campaigns such as Mothers' Absolute Affection (MAA) program promote infant and young child feeding (IYCF); Special Newborn Care Units (SNCU) provide family-participatory care for sick newborns; and the

Nutritional Rehabilitation Centers (NRCs) provide inpatient management of children with severe acute malnutrition. ICDS has also now broadened its umbrella to cover pregnant women and lactating mothers along with children aged 0-6 y, offering a comprehensive package of services: supplementary nutrition, preschool non-formal education, nutrition and health education, immunization, health check-up and referral services [20]. Regarding brain development, the ICDS scheme provides early learning opportunity through pre-school education of 3-6 y-olds. Rashtriya Bal Swasthya Karyakram (RBSK), launched in 2013, aims to identify and treat birth defects and developmental disorders, including disabilities, besides identification and treatment of common illnesses in children at district level [20]. Besides these health programmes catering to the developmental needs of the children, health is now a high priority for Indian government with aims to improve accessibility, availability and affordability of health services in form of the Universal health coverage (The Ayushman Bharat programme) through its main components – Health and Wellness Centers, and National Health Protection Scheme [21].

Gaps in Ongoing Practices

Though a number of programmes and policies are in place, the overall picture of ECD in India is still not optimal. Only about one-fourth of newborns get an opportunity of a postnatal check within 2 d of birth. The prevalence of neurodevelopmental disorders is high; 12% among 2-9 y-olds according to a study conducted in five regions across India [22]. About one-third of children in India have low Early Child Development Index (ECDI) score, a composite indicator of ECD that assesses literacy-numeracy, learning/cognition, physical development and socioemotional development in 3-4 y-old children at the population level [23].

Early Interventions to Promote Child Health

“Just like changing the beginning of the story may change the whole story, nurturing care during early childhood affects the overall development of child [24].”

As highlighted earlier, promotion of ECD is now a priority to ensure optimum brain development of every single child. Children need the five components of nurturing care (Fig. 1) for early childhood development (NC-ECD) during early childhood years in a systematic way to reach their full potential [11, 12, 24, 25]. Over the last decades, the focus has been on management of acute illnesses by providing good health and adequate nutrition. As the country progresses, the other three components – safety and security, responsive caregiving and opportunities for early learning – need attention to ensure the quality.



Fig. 1 Five components of Nurturing Care Framework for Early Childhood Development (Source: World Health Organization, United Nations Children’s Fund, World Bank Group. Nurturing care for early childhood development: A framework for helping children survive and thrive to transform health and human potential. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO)

The Nurturing Care Framework (NCF) for ECD [25, 26] is an “umbrella program that provides comprehensive services focusing on infant stimulation; parent education; early education in homes and centers; health and nutrition education and care; sanitation; judicial protection against abuse, exploitation, violence and gender discrimination; and inclusive services for children with disabilities, street children and children with special needs. The framework proposes a three-level approach

of universal, targeted, and indicated support, to meet the needs of all children and their families, with incremental support for those at risk of developmental delays, or with additional needs such as due to developmental disabilities.”

All the five components of NC-ECD are inter-related and if implemented in unanimity, greatly enable children to reach their complete growth and development potential, including their mental and psychological health.

- a. *Good health:* To reach their highest potential, all children need high quality care and health services. A child primarily depends upon caregivers in the early childhood years. Therefore, the nurturing care framework emphasizes upon health and well-being of caregivers as well as children for optimum growth and development of the child. Parents and caregivers should monitor their children regularly for physical and emotional condition and protect them from household and environmental dangers [27]. There should be awareness about the preventive and promotive services available to them like immunization and follow-up services for routine and high-risk care. Parents should inculcate healthy habits in their children from the beginning including hygienic practices, hand washing and sanitation to minimize the risk of infections. NCF has formulated a three-tier system to strengthen the health support system in a way that the needs of all families and their children are taken care of (Box 1), and to ensure quality care to all groups of children.
- b. *Nutrition:* Taking care of nutritional needs of mother during pregnancy and lactation is the first step towards giving birth to a healthy child. Following birth, support for early initiation, exclusive breastfeeding and continued breastfeeding after 6 mo is the next most important step towards nutritional adequacy [28]. There should be

Box 1 Three-tier system to strengthen the health support system by Nurturing Care Framework

Level 1: Universal support- To benefit all families, caregivers and children in a country or district with primary focus on health promotion and primary prevention.

Level 2: Targeted support- Designed for children exposed to high risk factors like poverty, undernutrition, adolescent pregnancy, HIV, violence, displacement and humanitarian emergencies.

Level 3: Indicated support- For individual families or children who have additional needs like young children without caregivers, or with depressed mothers or violent homes, as well as children whose birthweight was very low, or who have disabilities, developmental difficulties, or severe malnutrition.

a check on inappropriate marketing of food products that can interfere with mother's choice to breastfeed in the best way. From the age of 6 mo, it becomes important to emphasize upon the importance of complementary feeding in addition to breastmilk so that these young kids get age appropriate macro- and micronutrients for the rapid growth of their body and brain. Children should be identified for any signs of malnutrition, including undernutrition and obesity, and targeted support should be provided to them as per the requirement.

- c. *Responsive caregiving*: Responsive caregiving includes “observing and responding to children's movements, sounds and gestures, and verbal requests.” It emphasizes upon protecting children against injuries and adverse conditions, enrich learning, timely recognition of illness, and building trust and social relationships. As infants and young children are completely dependent on their caregivers to recognize and respond to their needs, responsive caregiving with sensitivity and love facilitates better learning and social and emotional development of the child. Ways to promote responsive caregiving and provide opportunities for early learning interventions include training the providers to provide comfort, show love, and respond to and guide the child; provide suggestions to caregivers regarding involving the child in talking, sharing and play activities with safe household objects and toys; improving interaction between parents and children through age- and development-appropriate play and communication; and enhancing the quality and amount of time spent with their children. A very important step towards responsive parenting is to create awareness amongst parents regarding keeping a check over excess screen time. Recognizing the importance of digital wellness in responsive parenting, Indian Academy of Pediatrics (IAP) has issued a consensus statement and recommendations on screen time and digital wellness amongst different age groups, “which cautioned about the harms of excess screen time and also provided guidelines to parents on the permissible screen viewing time, digital hygiene, healthy use, and the right age for use of various platforms of social media [29].” The age specific guidelines are tabulated in Box 2. These guidelines emphasized that “families should ensure a warm, nurturing, supportive, fun filled and secure environment at home, and monitor their children's screen use to ensure that the content being watched is educational, age-appropriate and non-violent.” To disseminate these recommendations, IAP has issued parental guidelines to make families aware of these recommendations. There is a need to educate schools and pediatricians regarding the importance of

recording screen exposure and digital wellness as a part of routine child health assessment.

- d. *Opportunities for early learning*: “Learning is a built-in mechanism for human beings, ensuring our successful adaptation to changing circumstances.” It begins in the womb, initially as a biological mechanism called epigenesis [30]. Very early in a child's life, caregivers provide the foundation for early learning by making an eye contact with them, follow their gaze and interact with them through smiling, gentle talking and singing/humming. Busy caregivers can be counseled to talk with a child during feeding, bathing and other routine household tasks. Simple gestures like smiling and eye contact, talking and singing, modeling, imitation and simple games, like “peek-a-boo” help a child to learn about objects and their permanence. Playing with common but safe household items such as bottle caps, empty containers and cooking vessels help children to learn about the texture and feel of objects, besides their use. Sensitive, responsive and loving caregivers facilitate the child's early social and emotional development, promote secure emotional parent-child attachment, and help in their age-appropriate learning [31].
- e. *Security and safety*: Children are vulnerable to injury, pain and emotional stress. Toddlers are especially vulnerable to safety issues as they tend to touch and swallow objects with a potential to harm them. Children from low-income families are especially vulnerable due to lack of knowledge of child safety issues, and unavailability of experienced caregiver due to work-related compulsions. Harsh experiences like being beaten can cause stress and fear leading to mental and social maladjustment, which ultimately may lead to aggression, antisocial behavior, and mental health issues. We need to ensure caregivers' mental health, and work with them to prevent maltreatment of children. It is also very important to focus upon security issues such as abuse and neglect; globally, 23% of children are estimated to experience physical abuse, 36% emotional abuse, 16% neglect, and 8-18% sexual abuse [32, 33].

Nurturing Care for Children with Disabilities

Childhood disabilities impose huge emotional and economic consequences on the affected families and children. These children face challenges of inadequate access to early identification and timely intervention services, and inadequate financial and family support. Various frameworks have been proposed to deliver holistic intervention to these children [34]. The prime strategies to provide optimum care to these children include strengthening of community-based formal

Box 2 Screen time guidelines for parents and children (age 0-5 y)**Infants and children aged 0-23 mo**

- Children below 2 y age should not be exposed to any type of screen.
- Screen media (*e.g.*, smartphones, tablets, television) should not be used to facilitate feeding.
- Screen media should not be considered as an easy option to calm a crying/distressed child.
- Families should avoid incidental exposure of child to screen media by not leaving the devices on, and should avoid watching the screen while engaging with the child, or with the child in the same room.
- Parents should look out for and prevent screen exposure in their absence *e.g.*, when the child is being looked after by a domestic help or in a crèche or daycare center.
- Parents should involve child in physical play activities, storytelling, music, movement (dance), and age-appropriate toys to promote early childhood development.
- Minimal and occasional screen time may be allowed for social interaction with close family members staying at distant places.

Children aged 24-59 mo

- Limit screen time to a maximum of 1 h per day (with each session not more than 20-30 min); the lesser, the better.
- Use only one screen at a time. Do not start a habit of media multitasking.
- Screen time needs to be always supervised by the caregivers. Promote shared use of screen media between child and families to ensure interaction and quality exposure.
- Caregivers should ensure that the content being watched is educational, age-appropriate, non-violent, healthy, and preferably interactive.
- Do not use screen media during meals, within one hour before sleep, or during surface travel.
- Children should have at least 3 h of physical activities of any intensity (including at least one hour of physical activity of moderate-to-vigorous intensity), and 10–14 h of good quality sleep daily (younger the child, more the sleep duration).

Reproduced with permission from Indian Pediatrics (*Source*: Gupta P, Shah D, Bedi N, et al; for the IAP Guideline Committee on Digital Wellness and Screen Time in Infants, Children, and Adolescents. Indian Academy of Pediatrics guidelines on screen time and digital wellness in infants, children and adolescents. Indian Pediatr. 2022;59:235-44)

services and support; raising awareness in the community; social support from parents' groups and associations; and empowering caregivers and families [35].

Focus on Mental Health Issues

Mental and psychological health of children as well as caregivers plays an important role in optimum development of children. Children coming from troubled homes are three times more likely to develop developmental disorders later in life. Worldwide data from different studies is an eye-opener for the healthcare providers as it highlights the sad fact that 89% children come from either broken or unhappy homes where they are exposed to situations that might cause them trauma. Growing up in such environments during the early years can leave lasting impacts on children which includes poor nutritional status; stunted social, emotional and cognitive development; and risk of drug and alcohol abuse in older years. Further, they are at risk of various mental health issues such as depression, anxiety disorders, attention-deficit/hyperactivity disorder, conduct disorder, posttraumatic stress disorder, autism, and other neurodevelopmental disabilities at a very early age.

Caregiver's mental health issue is another important factor attributing to healthy development of child. As shown by neuroscientific studies, the quality of early relationships is reflected in the brain architecture, thus playing a key role in the child's personality development [36].

Ways to Improve Mental Health

Simple measures can help improve the mental health of mothers and thus provide better support to children. These include rooming-in and breastfeeding and kangaroo care as these are proven methods to relieve stress in both babies and mothers and make a baby feel safe and secure. Physical activity and exercise routines help to combat stress in new parents by raising endorphin and serotonin levels. There is a need to provide targeted support and counseling to pregnant women since they are at greater risk of going into depression or mood swings. The ability of parents and caregivers to provide responsive and nurturing care to babies and young children is shaped directly by their own experiences and mental health. For this reason, ECD programmes and parent-

ing interventions should emphasise on not just the wellbeing of children, but the caregivers themselves.

Key Strategies to Incorporate NC-ECD into Mainstream

There are several platforms within the public health systems that provide the opportunity to integrate ECD with some additional focus on elements of early learning opportunities, safety and security, and responsive caregiving. To successfully incorporate these services, first and foremost is to create awareness amongst all the primary health providers regarding NC-ECD program as they are the first point of contact with families. The health providers need to understand the importance of basic preventive health services for children – which are already available through various programmes – for optimal child development so that they emphasize on their delivery besides providing treatment of illness. Due and dedicated implementation of the existing programmes and improvement of health infrastructure and services can tackle the problem effectively. Stakeholders for children's health have to take a lead in advocacy through active participation as members in national advisory groups so that they are a part of the decision-making bodies for policies and plans related to ECD. Health personnel should be trained through preservice education [37], in-service training and continuing educational activities of existing work force so that a dedicated group of trained experts are available to provide services, support and advocacy. IAP has taken a lead in training its countrywide workforce in ECD interventions [38].

With increasing focus on ECD, some of the integration has already taken place in the policy; though, their incorporation into routine practice still has a long way to go. The revised Mother and Child Protection (MCP) card now includes assessment of child development and components of responsive parenting; however, the essence is yet to be captured by most health personnel who consider it just as a tool for recording immunization and growth [39]. National Health Mission (NHM), through its programs and schemes, provides a wide range of opportunities for integration of ECD services at vital contact points in community and health facilities (Box 3).

Box 3 Examples of contact opportunities within the public health system for providing nurturing care

Home Contacts

Home-Based Newborn Care Scheme: Counsel mothers/families on essential newborn care, exclusive breastfeeding, hand washing, and recognition of danger signs in infants 0-42 d; additional home visits for high-risk babies

Home-Based Care for the Young Child: Addresses health, nutrition, WASH (water, sanitation & hygiene), and ECD using Mother and Child Protection (MCP) Card as job aid for age-appropriate development milestones tracking, positive parenting practices, and early identification of warning signs. Prophylactic IFA supplement and behavior change communication for increasing iron intake.

Facility-based Contacts

Antenatal checkups: Provided on 9th of every month under Pradhan Mantri Surakshit Matritva Abhiyan; screening for high-risk pregnancies

Special Newborn care units: Family Participatory Care for sick newborns at district level

Sick child visits: Outpatient care and inpatient care (integrated management of newborn and childhood illnesses); skilled support for breastfeeding under Mothers' Absolute Affection program

Nutritional rehabilitation centers: Age-appropriate feeding, counseling and demonstration on structured play therapy for psychosocial stimulation of the malnourished child

Community-level Contacts

Community-based events under Poshan Abhiyan: Creating awareness on the first 1000 d; Anemia Mukh Bharat, Intensified Diarrhea Control Fortnight, Mother's Absolute Affection (MAA) program; Universal Immunization Program: Mission Indradhanush; Village Health, Sanitation and Nutrition Day (VHSND): Shared platform to provide health, nutrition, early childhood development, and sanitation services

Center-based Contacts

Health and wellness centers: Focus on promotive and preventive primary care for all age groups: outpatient management of common childhood illnesses, referrals for sick and malnourished children, multisectoral convergence for community-level action for a wide range of services

Anganwadi centers: Village outpost for health, nutrition, and early learning, for children up to age six. Hub for VHSND activities and screening of children under RBSK

ECD Early Childhood Development, *IFA* Iron and folic acid, *RBSK* Rashtriya Bal Swasthya Karyakram

Conclusions

Promotion of ECD is a prime investment for the country's progress, not only for social and physical development, but also in terms of financial prosperity, and emotional and ethical dimensions. Primary care workers and pediatricians should be empowered to provide ECD services and strengthen their support for families with young children. Quality implementation of ECD services in the system improve caregiving practices, provide better learning opportunities for children at their home, protect children from stress, harm, abuse and neglect, and improve children's mental and psychological health. Children who are raised in a nurturing home environment have optimum intelligence and emotional quotient scores, and have a potential of improving the country's development and economics. Therefore, protecting, promoting, and supporting early childhood development is essential to enable the country to reach its full human development potential.

Authors' Contributions SK carried out the literature search, and wrote the first draft of article; DS reviewed the manuscript for important intellectual content, revised it, and finalized it. Both authors approved the final version of the manuscript. DS will act as the guarantor for this paper.

Declarations

Conflict of Interest None.

References

- UNICEF. Under-five mortality. Available at: <https://data.unicef.org/topic/child-survival/under-five-mortality>. Accessed on 17th Dec 2022.
- Bishai D, Cohen R, Alfonso YN, et al. Factors contributing to maternal and child mortality reductions in 146 low- and middle-income countries between 1990 and 2010. *PLoS One*. 2016;11:e0144908.
- Lahariya C, Paul VK. Burden, differentials, and causes of child deaths in India. *Indian J Pediatr*. 2010;77:1312–21.
- Lu C, Black MM, Richter LM. Risk of poor development in young children in low-income and middle-income countries: An estimation and analysis at the global, regional and country level. *Lancet Glob Health*. 2016;4:e916–22.
- Tomlinson M, Hunt X, Daelmans B, et al. Optimising child and adolescent health and development through an integrated ecological life course approach. *BMJ*. 2021;372:m4784.
- World Health Organization & United Nations Children's Fund (UNICEF). Protect the progress: Rise, refocus and recover: 2020 Progress report on the every woman every child global strategy for women's, children's and adolescents' health (2016-2030). 2020. Available at: <https://apps.who.int/iris/handle/10665/336219>. Accessed on 24th Dec 2022.
- Summan A, Nandi A, Shet A, Laxminarayan R. The effect of the COVID-19 pandemic on routine childhood immunization coverage and timeliness in India: Retrospective analysis of the National Family Health Survey of 2019–2021 data. *Lancet Reg Health*. 2023;8:100099.
- Venkatesan P. Worrying global decline in measles immunisation. *Lancet Microbe*. 2022;3:e9.
- Vaidyanathan G. Massive measles outbreak threatens India's goal to eliminate disease by 2023. *Nature*. 2022 Dec 22. [Epub ahead of print]. <https://doi.org/10.1038/d41586-022-04480-z>.
- Abbasi J. Amid ohio measles outbreak, new global report warns of decreased vaccination during COVID-19 pandemic. *JAMA*. 2022 Dec 15. [Epub ahead of print]. <https://doi.org/10.1001/jama.2022.23241>.
- WHO, UNAIDS, UNFPA, UNICEF, UNWomen, The World Bank Group. Survive, Thrive, Transform. Global Strategy for Women's, Children's and Adolescents' Health: 2018 Report on Progress Towards 2030 Targets. Geneva: World Health Organization; 2018 (WHO/FWC/18.20).
- Britto PR, Lyles S, Proulx K, et al. Early childhood development interventions review group, for the Lancet early childhood development series steering committee. Nurturing care: Promoting early childhood development. *Lancet*. 2017;389:91–102.
- Ackerman S. The development and shaping of the brain. In Ackerman S, ed. Washington (DC): National Academies Press (US); Discovering the Brain. 1992. P.86-103. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK234146>. Accessed on 17th Dec 2022.
- Walker SP, Wachs TD, Gardner JM, et al. International Child Development Steering Group. Child development: Risk factors for adverse outcomes in developing countries. *Lancet*. 2007;369:145-57.
- Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: A meta-analysis. *Am J Clin Nutr*. 1999;70:525–35.
- International Institute for Population Sciences. National Family Health Survey- 5, 2019-21. India Fact Sheets. Available at: http://rchiips.org/nfhs/factsheet_NFHS-5.shtml. Accessed on 25th Dec 2022.
- Gee DG, Cohodes EM. Caregiving Influences on development: A sensitive period for biological embedding of predictability and safety cues. *Curr Dir Psychol Sci*. 2021;30:376–83.
- Trude ACB, Richter LM, Behrman JR, et al. Effects of responsive caregiving and learning opportunities during preschool ages on the association of early adversities and adolescent human capital: An analysis of birth cohorts in two middle-income countries. *Lancet Child Adolesc Health*. 2021;5:37–46.
- Fisher J, Cabral de Mello M, Patel V, et al. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: A systematic review. *Bull World Health Organ*. 2012;90:139-49G.
- Chattopadhyay N, Aneja S. The status of early childhood development in india: will we reach the countdown to 2030 targets? *Indian Pediatr*. 2021;58:S4-10.
- Lahariya C. "Ayushman Bharat" program and universal health coverage in India. *Indian Pediatr*. 2018;55:495–506.
- Arora NK, Nair MKC, Gulati S, et al. Neurodevelopmental disorders in children aged 2–9 years: Population-based burden estimates across five regions in India. *PLoS Med*. 2018;15:e1002615.
- McCoy DC, Peet ED, Ezzati M, et al. Early childhood developmental status in low- and middle-income countries: National, regional, and global prevalence estimates using predictive modeling. *PLoS Med*. 2016;13:e1002034.
- Transforming our World. The 2030 Agenda for Sustainable Development. New York: United Nations; 2015.
- World Health Organization, United Nations Children's Fund, World Bank Group. Nurturing care for early childhood development: A framework for helping children survive and thrive to transform health and human potential. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO.

26. Daelmans B, Manji SA, Raina N. Nurturing care for early childhood development: global perspective and guidance. *Indian Pediatr.* 2021;58:S11–5.
27. Richter LM, Daelmans B, Lombardi J, et al. Investing in the foundation of sustainable development: Pathways to scale up for early childhood development. *Lancet.* 2017;389:103–18.
28. Rollins NC, Bhandari N, Hajeebhoy N, et al. Why invest, and what it will take to improve breastfeeding practices? *Lancet.* 2016;387:491–504.
29. Gupta P, Shah D, Bedi N, et al; for the IAP Guideline Committee on Digital Wellness and Screen Time in Infants, Children, and Adolescents. Indian Academy of Pediatrics guidelines on screen time and digital wellness in infants, children and adolescents. *Indian Pediatr.* 2022;59:235–44.
30. van Ijzendoorn MH, Bakermans-Kranenburg MJ, Ebstein RP. Methylation matters in child development: Toward developmental behavioral epigenetics. *Child Dev Perspect.* 2011;5:305–10.
31. Tomlinson M, Cooper P, Murray L. The mother-infant relationship and infant attachment in a South African peri-urban settlement. *Child Dev.* 2005;76:1044–54.
32. World Health Organization. Global status report on preventing violence against children. 2020. Available at: <https://apps.who.int/iris/rest/bitstreams/1280976/retrieve>. Accessed on 17th Dec 2022.
33. Hillis S, Mercy J, Amobi A, Kress H. Global prevalence of past-year violence against children: A systematic review and minimum estimates. *Pediatrics.* 2016;137:e20154079.
34. Yousafzai AK, Lynch P, Gladstone M. Moving beyond prevalence studies: Screening and interventions for children with disabilities in low-income and middle income countries. *Arch Dis Child.* 2014;99:840–8.
35. Reichow B, Servili C, Yasamy MT, Barbui C, Saxena S. Non-specialist psychosocial interventions for children and adolescents with intellectual disability or lower functioning autism spectrum disorders: A systematic review. *PLoS Med.* 2013;10:e1001572;discussion e. 1001572.
36. Palamaro Munsell E, Kilmer RP, Cook JR, Reeve CL. The effects of caregiver social connections on caregiver, child, and family well-being. *Am J Orthopsychiatry.* 2012;82:137–45.
37. Sharma M, Singh T, Juneja M, et al; for Indian Academy of Pediatrics Task Force on NC-ECD in Medical Curriculum. Indian Academy of Pediatrics (IAP) task force recommendations for incorporating nurturing care for early childhood development (NC-ECD) in medical education in India. *Indian Pediatr.* 2022;59:137–41.
38. Mukherjee SB, Agrawal D, Mishra D, et al. Indian Academy of Pediatrics position paper on nurturing care for early childhood development. *Indian Pediatr.* 2021;58:962–9.
39. Evaluation of Usage of Mother and Child Protection Card by ICDS and Health Functionaries. New Delhi. National Institute of Public Cooperation and Child Development; Available at: <https://www.nipccd.nic.in/file/reports/mcpc.pdf>. Accessed on 26th Dec 2022.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.