

THE IMPACT OF ENVIRONMENTAL FACTORS ON CHILDREN'S HEALTH AND WELL-BEING

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Abstract

Access to safe and clean drinking water is essential, and clean water is necessary for children's health. Numerous illnesses, especially waterborne illnesses like diarrhea, can be brought on by contaminated water. A number of waterborne illnesses, such as diarrhea, which is still one of the world's top causes of mortality for children under five, can be brought on by contaminated water sources. Dehydration from diarrhea can be fatal, particularly in environments with inadequate resources. Furthermore, a child's cognitive and developmental abilities may suffer significant and permanent harm if exposed to heavy metals like lead through tainted water supplies or paint containing lead. To protect children's health, exposure to waterborne pollutants must be avoided. The developing brains of children are greatly impacted by environmental contaminants. Learning disabilities, attention deficits, and behavioral issues can arise from exposure to toxins like as lead, mercury, pesticides, and industrial pollutants, which can impair neurodevelopment. Even low exposure levels during critical embryonic stages may have long-term consequences. Exposure to toxins during pregnancy is particularly risky since it may affect the neurodevelopment of the unborn child. The health of children is greatly influenced by socioeconomic conditions.

Keywords: behavioral, contaminants, irreversible effects, waterborne diseases

1. INTRODUCTION

They may reside in places with poor housing quality, poor sanitation, and limited access to healthcare. Furthermore, children's malnutrition and associated health problems may be influenced by disparities in their access to nutritional food. Addressing socioeconomic disparities is essential to lowering environmental health hazards and promoting fair access to resources that promote child health [1]. Climate change, which is driven by environmental factors including greenhouse gas emissions and deforestation, poses a threat to pediatric health. Rising temperatures can exacerbate heat-related illnesses, and children are disproportionately affected by more frequent extreme weather events that can cause suffering and displacement [2]. Changes in disease patterns brought on by climate change expand the geographic reach of vector-borne diseases including dengue fever and malaria. Infectious illnesses that were formerly limited to specific geographic regions are now more likely to affect children [11]. We all want the places where our kids live, learn, and play to be healthy. However, there are a number of reasons why children are more susceptible and at greater risk for health issues due to detrimental environmental variables [12]. Compared to adults, children consume more food, liquids, and air. Youngsters often play on the floor and ground and put things in their mouths. The development of protective body systems, such as those that process chemicals within the body and filter contaminants from the air, is still in its early stages. The causes of diseases and disorders are not always known by scientists and doctors. Development and general health are influenced by numerous factors. Certain illnesses are inherited and can be handed down from parents to children via grandparents. Injuries from objects in our surroundings can result in certain health issues. The majority of experts concur that both likely contribute to the development of diseases; this is known as the gene-environment interaction[3]. More knowledge about these relationships, according to researchers, may help prevent certain health issues. By safeguarding youngsters, we can potentially enhance their adult health. In their shared responsibility to safeguard children's health, parents and guardians receive support from their communities, public health specialists, medical professionals, and the local, state, and federal governments. Environmental factors might be external, like societal circumstances or pollutants in the air, water, and soil, or internal, like stress. The harmful effects of air pollution, which can affect more than just the lungs, are especially dangerous for children.

Automobile emissions and fumes from manufacturing, power generation, and chemical production—particularly from coal-fueled power plants—are the primary sources of air pollution [4]. Volcanic eruptions and wildfires are further causes. The extensive Children's Health Study, which is financed by NIEHS, examines how air pollution affects respiratory health over the long run. Higher air pollution levels have been connected to a rise in respiratory infections and quantifiable lung damage [16]. Even relatively low quantities of particulate matter, a form of air pollution, can change a child's developing brain between the ages of 9 and 10.

2. REVIEW OF LITERATURE

This influence may subsequently raise the likelihood of emotional and cognitive issues during adolescence. One metalloid that naturally exists in soil and groundwater is arsenic, which is carcinogenic. Early exposure to arsenic is linked to increased risk of infection, liver and lung dysfunction, effects on neurodevelopment and cognition, and abnormalities of the skin, according to the American Academy of Pediatrics. Future health problems could be a possibility for kids exposed to arsenic. These results offer unique proof that environmental exposure throughout early life may be linked to an adult's chance of developing cancer. Contaminated paint dust and soil are the main causes of elevated blood lead levels in youngsters. Contaminated water and air are additional sources [5]. The timing and degree of lead exposure in youngsters are still being determined by researchers. With the use of baby teeth as a novel means of identifying and measuring chemical exposure, researchers funded by NIEHS have linked increased levels of lead in baby teeth to autism in children. The effects of lead exposure are worsened by racial segregation, according to NIEHS and other NIH-funded studies. For over 26,000 children born in 2000, the study correlated comprehensive birth records with information from standardized tests and lead screening.

As racial segregation rose, test scores among youngsters with greater blood lead levels declined. As blood lead levels rose, this effect became more noticeable. NIEHS-funded research suggests that neighborhood features, especially high unemployment and poverty, may present an environmental risk to children's growing brains. In addition to having more pollution, disadvantaged communities may also lack access to parks, recreational facilities, wholesome food, and high-quality health care. The effects of lead exposure may worsen in racially segregated environments [6]. For nearly 26,000 children, a study connected comprehensive birth records with Census data, standardized testing, and lead screening. As racial segregation rose, test results declined among the youngsters with greater blood lead levels. As blood lead levels rose, this effect became more pronounced. According to research, exposure to specific environmental elements during pregnancy affects the likelihood of developing certain diseases later in life. Children's healthy growth and quality of life can be enhanced by gaining a better understanding of the developmental causes of health and illness. Certain diseases may be less likely to occur if prenatal nutrition is followed [13].

According to study from NIEHS, pregnant women who ate better and spent less time around dangerous chemicals had a higher chance of giving birth to healthy children who would be better equipped to handle environmental stressors in the future [10]. ASD risk was decreased in children whose mothers took a folic acid-containing prenatal vitamin early in their pregnancies. Additionally, when women began taking folic acid-containing prenatal vitamins in the first month of their subsequent pregnancies, the incidence of autism in children with autism spectrum disease was halved [8]. Genetics and exposure to air pollution during pregnancy were linked to an increased risk of ASD, according to research supported by NIEHS [7]. Other researchers supported by NIEHS have found that pregnant women who are bothered by illnesses like diabetes, obesity, or infections, or who are exposed to pesticides, are also more likely to give birth to a child with ASD. Its incidence may be influenced by prenatal nutrition or chemical exposure.

3. MATERIALS AND METHODS

For example, children of mothers who took vitamins, including folic acid, before and during pregnancy had a lower risk of developing childhood leukemia. Other studies found that children whose mothers were exposed to pesticides during pregnancy or whose fathers were exposed to them around the time of conception were more likely to develop leukemia. Asthma is a chronic lung disease that can be brought on by exposure to mold, air pollution, bug allergies, tobacco smoke, and other substances. Researchers are still figuring out what can trigger asthma in the first place. According to one study, children who grow up in houses with a lot of molds from buildings that have been damaged by water have a higher chance of developing asthma by the time they are seven years old. Children's asthma has been repeatedly demonstrated to be triggered by exposure to air pollution [14]. Children with asthma seem to benefit from vitamin D, according to research supported by NIEHS. Asthma symptoms were worse in children with low blood vitamin D levels than in those with higher levels. Children exposed to high concentrations of flame retardants and polybrominated diphenyl ethers were shown to have neurodevelopmental impairments, including attention deficit hyperactivity disorder symptoms, fine motor

coordination issues, and decreased cognition. Carpets, mattresses, electronics, electrical equipment, and building materials are frequently treated with flame-retardant chemicals.

Burning fossil fuels and other combustion processes releases air pollutants known as polycyclic aromatic hydrocarbons (PAH). Research has consistently shown that exposure to PAH is linked to behavioral issues and poorer IQ scores. Girls' puberty is evolving. Compared to decades before, girls in the United States seem to be experiencing their first menstrual periods approximately six months earlier on average. Endocrine disruptors are compounds that can alter puberty. These substances have the ability to mimic or disrupt the body's hormones, changing the equilibrium required for healthy growth and development. Significant biological impacts can result from minor hormone changes. Early onset puberty is being linked by NIEHS and other studies to exposure to endocrine disruptors. Frequent use of endocrine disruptor-containing personal care products throughout adolescence is linked to a higher risk of breast cancer in later life [9]. Among the often-occurring endocrine disruptors are substances known as phenols, parabens, and phthalates. Examples of research translation include clinical guidelines, policies, educational activities and toolkits, public health initiatives and practices, communication strategies, risk management strategies, and other materials. These products are meant to protect and improve children's environmental health.

NIEHS Scholars in Pediatric and Reproductive Environmental Health By educating pediatricians, obstetricians, gynecologists, and other related professionals, this program seeks to create a network of healthcare professionals who can handle the complexities of pediatric and reproductive environmental health. The NIH The primary areas of focus for ECHO researchers are neurodevelopment, obesity, upper and lower airway health, positive health, such as a sense of well-being, and prenatal, perinatal, and postnatal outcomes. NIEHS takes part in ECHO studies. Reducing environmental hazards could prevent one out of every four baby fatalities. In 2012, 1.7 million children under five died as a result of environmental conditions. From conception through infancy, adolescence, and maturity, environmental dangers affect children's health and development. A child's future is shaped by their surroundings: Exposures throughout early life have an impact on adult health because environmental risk factors can change fetal programming and early growth. Particularly in underdeveloped countries, pollution and bad environmental conditions are major contributors to childhood illnesses, impairments, and deaths.

4. RESULT AND DISCUSSION

Two out of three respondents (67%) agree that their early family and friends had a significant influence on who they are now, and the majority (55%) also say the same about society as a whole, according to a study done by Ipsos for the Royal Foundation. People are more likely to cite friends, instructors, and extended relatives when asked who specifically affected them.

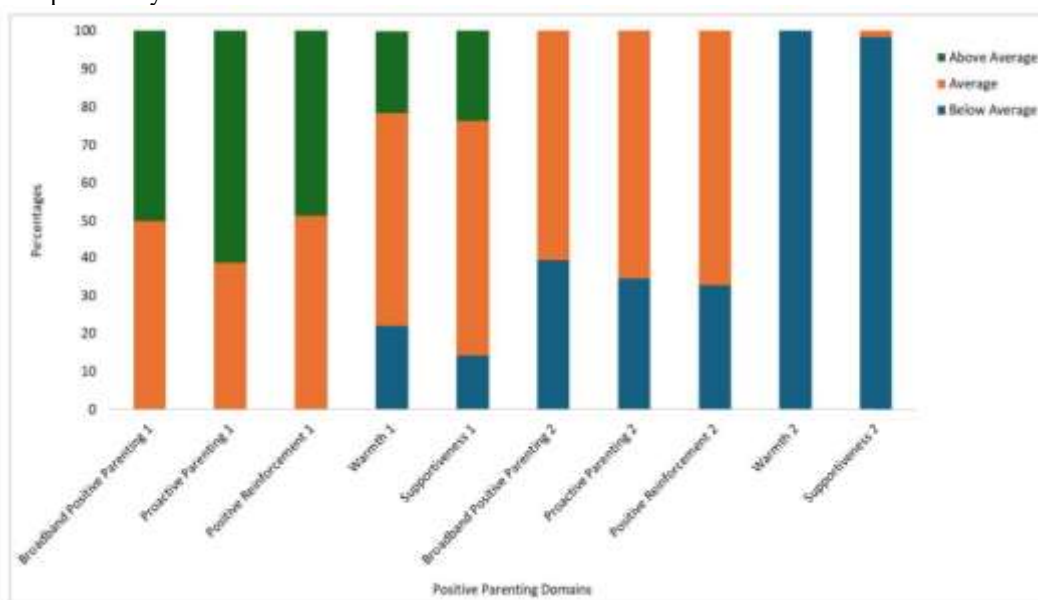


Figure 1: Physical Environment

These individuals frequently assist with childcare, support their schooling, or encourage them to follow their passions. Young people, Londoners, and those with higher incomes have the greatest appreciation for the influence that the wider world has on children. A child's growth and development are greatly influenced by a variety of external influences, including the support that adults in their early years give them[15].

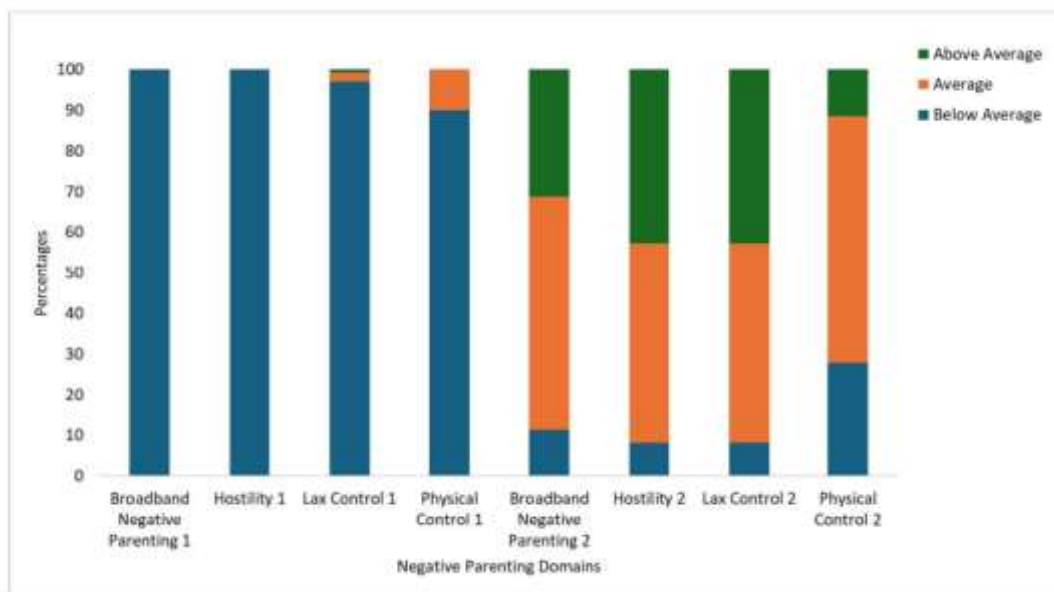


Figure 2: Socio-economic Status

According to research, each of these elements can influence a child's development in a favorable or negative way, contribute significantly to it, and produce differences in the possible outcomes for kids. Promoting a child's success in later life requires an understanding of and attention to the various environmental influences influencing their development.

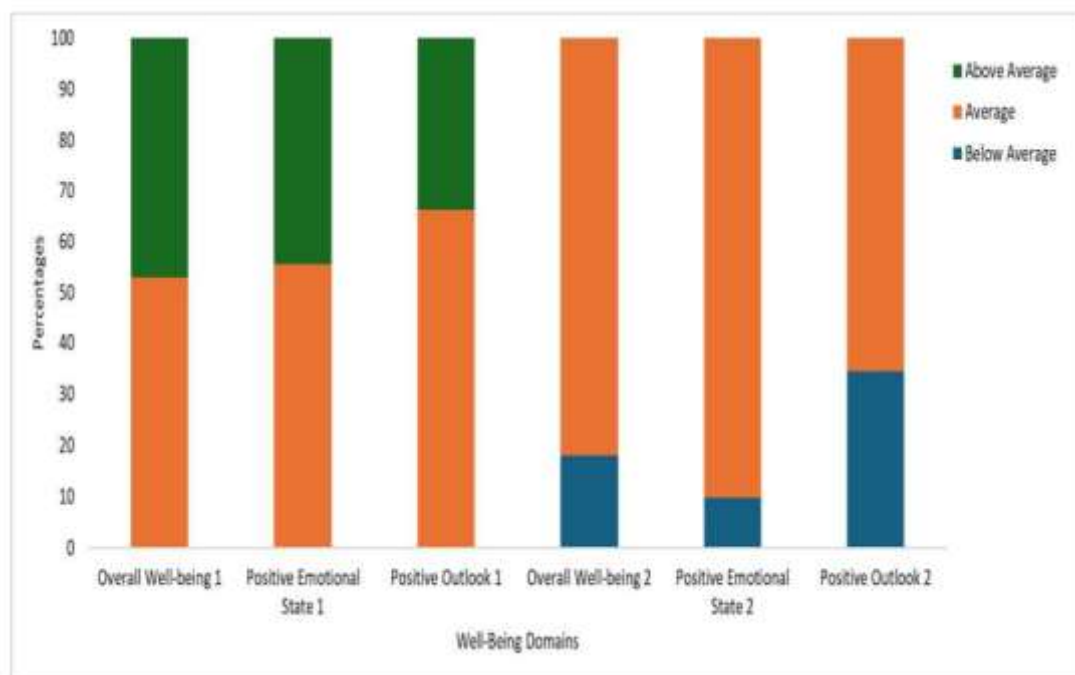


Figure 3: Family Dynamics and Relationships

The child must be raised in a nurturing atmosphere where they can grow and flourish, and this requires cooperation from all stakeholders, including parents, caregivers, the larger family, healthcare, education, social services, and community groups. This article will go into greater detail about the environments that are known to affect children's growth and development as well as how these numerous elements are crucial to a child's overall development.

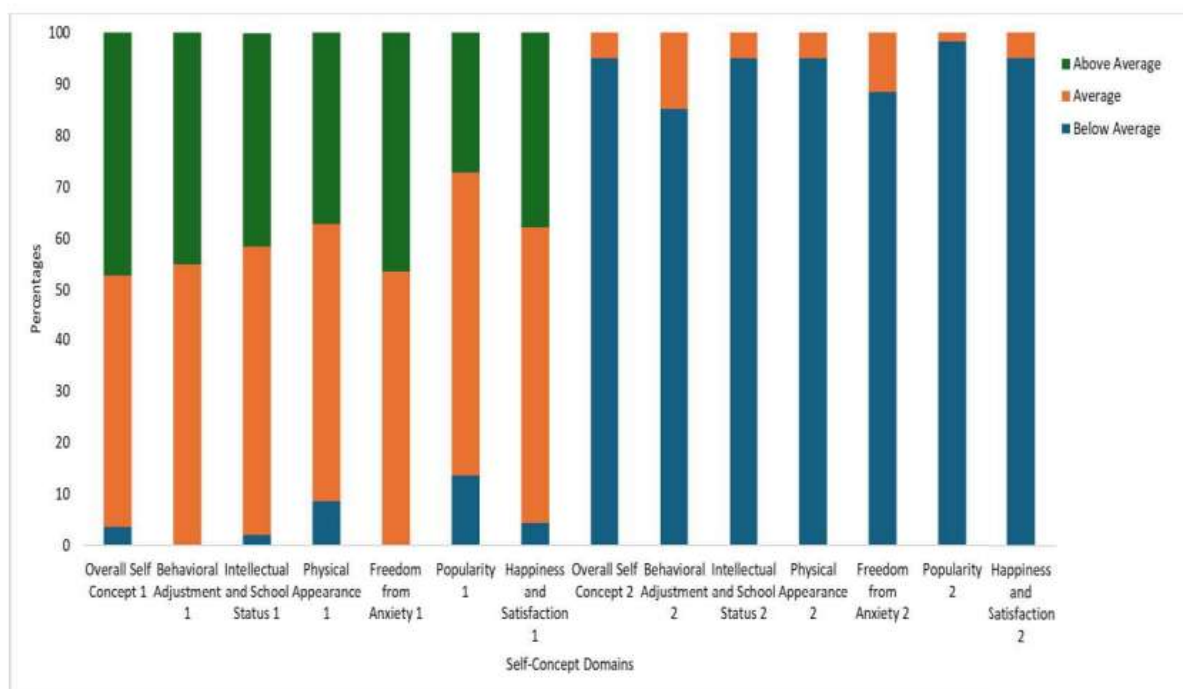


Figure 4: Nutrition and Diet

This argument persisted throughout the 20th century, and although these two viewpoints were frequently diametrically opposed, they both held the belief that the dominant forces in development were a person's environment and individual experiences, or nurture. Since nature and nurture are intertwined, the nature vs. nurture debate is less pertinent today that we know more about how the brain works and how genes influence the circumstances we encounter.

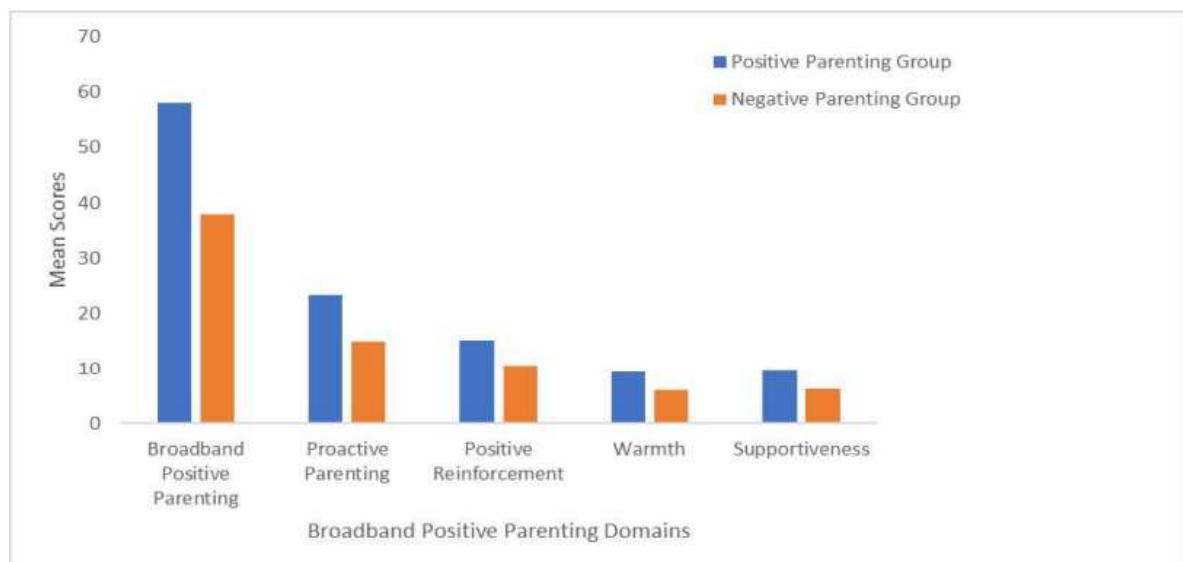


Figure 5: Authoritative parenting

Positive protective factors and negative events are examples of early interactions, environments, and experiences that can either promote or hinder healthy development.

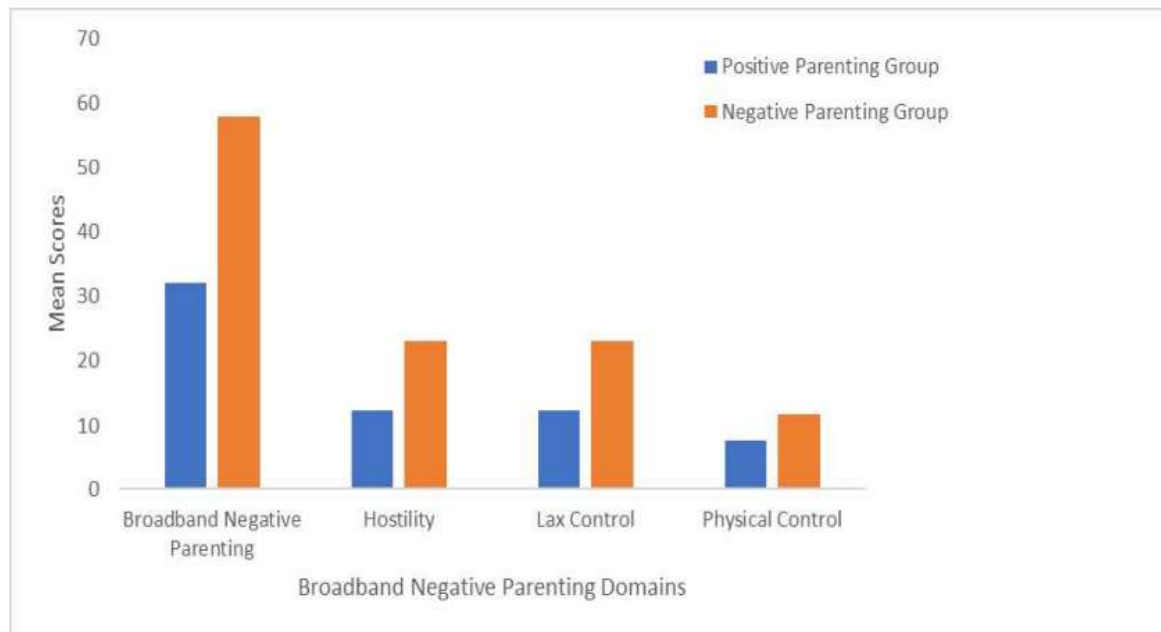


Figure 6: Strong family bonds and supportive networks

From birth, the interaction of a child's environment and genetics shapes their identity and future. Although a child's genetic directions may act as a blueprint for growth, the environment can influence how they are expressed, altered, or even inhibited.

5. CONCLUSION

Physical characteristics like height and eye color, as well as non-physical characteristics like being naturally introverted or outgoing, might be included in the phenotypic. A blueprint is usually a two-dimensional set of drawings that provides a detailed depiction of the architect's proposed building. If two separate builders use radically different materials to construct the structure according to the plan, the result will be buildings that are comparable but different. If you consider the genetic blueprint and other environmental impacts in this way, you can see how, although while genetics undoubtedly play a part, environmental circumstances also profoundly influence a child's development and growth. Numerous anecdotal accounts of families facing housing deprivation indicate that housing can have a variety of effects on a child's health, safety, and well-being. Although humans are more prone to infection in colder climates, there is little quantitative data connecting childhood infection rates to a lack of home warmth. Bacteria and viruses thrive in moist environments, and there is some evidence that children's respiratory infections are caused by damp and moldy dwellings. An estimated £1.4 billion is spent annually by the NHS on treating illnesses brought on by living in wet or cold dwellings. According to the government, air pollution poses the biggest threat to public health in the United Kingdom. Because they breathe more quickly than adults, children are more susceptible to the negative effects of air pollution. A review of the literature by the University of Manchester found that traffic-related air pollution, particularly nitrogen dioxide (NO₂) and particulate matter, has a detrimental impact on children's cognitive abilities, particularly working memory, a type of short-term memory required for task completion. A child's development depends on having access to opportunities for outside play, physical activity, and enough of fresh air.

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