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# Genetics And Biological Determinants In The Development Of Humans

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**Abstract**
Genetic determinism is the idea that genes have greater causative power than is generally accepted by scientists, and that genes are responsible for the development of features. Belief in genetic determinism is both an educational and social issue since it contradicts scientific knowledge and may contribute to the emergence of intolerance such as racism and prejudice against sexual orientation. Adapting occurs in biological systems in response to molecules and the molar surroundings. Genetic and neurological systems would thus be dynamic (cybernetic), in contrast to previous conceptualisations in which genes and minds are fixed in form and function. We begin this article by looking at the core ideas of the genetically determined theory. In this cross-sectional, predicting correlation study, all 92 children aged 24 to 36 months who took part in the preschool programme network. To create the sociodemographic and mother and child health profile, a self-made survey was used. The indicator used to indicate growth was height-for-age. Using the Bayley Scale of Infant and Toddler Development, cognitive and linguistic development were evaluated. The Home Observation for Measure of the Environmental was used to evaluate the home environment, while the Infant/Toddler Environment Scale was used to evaluate the quality of educational settings. A self-made survey was used to evaluate the neighbourhood's quality. A multivariate linear regression was used for the purpose of the research. Most of the households had parents with low levels of education and were from socioeconomic class D. Cognitive and language development were under average in 28.6% and 28.3% of patients, respectively, while stunted growth was seen in 14.1% of cases. 69.6% of homes were considered development-risky, and there were not enough educational institutions. The findings revealed that among the children who took part, stunting was very prevalent and their cognitive and linguistic development was below average. The relationship between growth and development and biological and environmental variables has been established. On the other hand, environmental factors were linked to development, whereas biological factors were more closely linked to development.

**Keywords: -** Genetic Determinism, Sexual Orientation, Molecular Environments, Home Observation, Toddler Development, Biological Variables.

## I. INTRODUCTION

The concept of genetic determinism is described in a variety of ways [1]. In this study, we extend the concept of genetic attribution and characterise genetic determinism as the belief that genes possess a higher causative power than is typically acknowledged in science and that genes directly contribute to the development of human traits at the individual level. A one-to-one relationship between genes, proteins, functions, and phenotypes is often the focus of simplistic understandings of genetics, as if specific traits or illnesses were frequently associated with a single gene [1, 2]. Since the gene is thought to be the direct source of a certain physical trait or behaviour, it is given more weight than any scientific explanation. A societal and educational problem, this overemphasis on the importance of genes in creating characteristics [2, 3] has been compared to a scientific viewpoint. The idea that genetic determinism is a democratic issue has been put up because the power of genes may serve a variety of social goals. For instance, genetics first seems to provide rational, empirically based explanations for social categories such as gender and race [3, 4]. However, the naturalistic fallacy might be used as an example of the claim that what is natural, in this instance genetically programmed, is inherently good or true [3, 5]. Consequently, it is thought that biological factors reinforce the social distinctions between groups, albeit this is up for discussion.

Through initiatives like vaccination coverage, prenatal care, and breastfeeding promotion, Brazil has seen a decline in childhood death rates in recent years. Researchers, the government, and medical experts have focused on monitoring proper child growth and development in this fresh environment [5]. From a scientific perspective, it has long been known that the idea that a gene alone determines phenotypic features is a "strawman model"—an instrumental model employed in genetic research that focuses on the genetic element (nature). Since surroundings was not the focus of genetic investigations, it disregarded environmental variables (nurture) [2]. According to Thomas Hunt Morgan, the environment has a significant role in the formation of physical characteristics as early as the 1930s. It follows that understanding genetics and how the environment affects biological outcomes may help people believe less in genetic determinism [4]. The notion that gene action is probabilistic and strongly dependent on surroundings through regulatory mechanisms of gene activity, which has been reinforced in recent decades by the development of genomics and epigenetics, further contradicts the notion that genes are the only active agents in the formation of phenotypes. Therefore, it is possible that knowledge of modern genetics and genomics may disprove ideas regarding biological determinism and the over-attribution of genes to the development of traits [2, 4]. Determinism is a philosophical doctrine that holds that everything that happens, including human action, is completely predestined by past events or entities. People begin to believe that there is just one possible future as a result, and that future occurrences are predictable. In relation to deterministic philosophical ideas that had developed in ancient Greece, human free will—which is clearly denied if deterministic—was examined [5, 6]. Fatalism was the primary topic of the first debate, which focused on whether there was a fate that could not be avoided? This has been one of the most contentious philosophical subjects ever since. The discovery of rules and regular patterns in nature after the seventeenth-century Scientific Revolution and the Enlightenment led to the assumption that determinism originated from nature itself rather than destiny or divine providence [2, 4]. Since then, one of the main philosophical debates has been whether "nature" or "nurture" can be credited with producing individual variances in the physical and behavioural characteristics of species in general and humans in particular. We mentioned earlier that gene-P does not automatically lead to genetic deterministic ideas. One potential issue is when laypeople, usually due to a lack of scientific knowledge, fail to comprehend that gene-P is instrumentalist and instead perceive it as a realist idea, confusing it with gene-D [4]. In this case, the realism gene (DNA) is linked with the instrumentalist gene's phenotypic power (genes-for-traits). The foundation for genetic deterministic beliefs is therefore laid by the development of a potent non-scientific genetic deterministic explanatory model that empowers the DNA, the "essence placeholder," to determine phenotypic characteristics and behaviours [1, 3]. It has been shown in earlier studies that this confusion is widespread in textbook discourse throughout the globe and that high school biology learners lack the scientific knowledge necessary to distinguish between various genetic models [1]. Research in genetics, genomics, and related sciences has grown so rapidly and profoundly in recent decades that we now have a completely different knowledge of genes and genomes and how they relate to cell physiology, development, and phenotypic features. A more probabilistic view of the link between genes and phenotypes seems to be replacing a more deterministic one in the scientific community [3, 4]. These developments have shown that gene function and activity should be seen as nested within many levels of hierarchy, where intricate webs of component interactions govern [4]. Therefore, the probabilistic comprehension of gene structure, behaviour, and functions necessitates that genes be situated within intricate informational networks and pathways. In addition to genetics knowledge—or more accurately, ignorance of modern genetics knowledge—beliefs in genetic determinism have also been proposed to be ingrained in social discourses that shape people's perceptions or as theoretical frameworks for understanding the social world in psychology [5]. For instance, some have claimed that genetic determinism, or "genetic essentialism," as they call it, may have its roots in profound views about social processes rather than being the product of basic scientific misunderstandings or simplifications. According to psychological study, people's thoughts typically essentialize the specific things they come into contact with [6, 7]. Psychological essentialism is characterised by the belief in a causal link between essence and predicted features as well as the stability of essential [8]. In this process, natural selection reorganises the architectures of species by modifying genotypes (DNA) via mutation. The time scale at which populations adapt is intermediate and often falls within one or a few life spans. Different partly heritable skill sets may be used for various difficulties due to genetic variety reflected in population variation among individuals. In only one or two lifetimes, for instance, human societies have both produced and then adapted to the transition from a mostly rural lifestyle to a sophisticated industrial environment [8, 9]. Over little periods of time, defined in fractions of a lifetime, people adapt. Quick adaptation is a feature that has evolved throughout time. Humans are the most adaptive of all animals because we have opposable thumbs, hands liberated by upright mobility, enlarged forebrains, and the ability to use symbolic language. Our biological and genetic processes contribute to adaptation in health and hinder it in disease, as discussed in this chapter [9, 10]. Most of the specifics of biological development and behavioural function may be deduced by comprehending the implications of the idea of adaptation in biological structures. By doing this, we swiftly challenge two established beliefs in the hopes of gaining fresh insights [9, 10]. In the first place, we cannot assume that genetically mediated features are set and unchangeable if we believe that evolution has "designed" our genomes to maximise diversity [7]. Conversely, if our genomes are geared towards maximising adaptation, we would anticipate that genetic variables would be a significant driver in change, even among individuals and over short periods of time. The study of human genetic illnesses, such as chromosome abnormalities and inborn metabolic inefficiencies, is primarily responsible for the belief that genetic variables impacting behaviour are permanent. Because normal or even half-normal genotype allow the individual to adapt to widely variable doses of the chemical, harmful amounts of phenylalanine are avoided even with significant ingestion. Since a single gene's expression is integrated within a biological system that is governed by several other genetic and environmental variables, gene regulation (expression) and epigenesis are becoming more important concepts for understanding development [7]. The typical Mendelian disorders include genes that are sufficiently defective that they overshadow auxiliary modifiers. Such obvious errors in the environment divert our attention from the delicate, complex, and ever-changing properties of biological systems that allow them to be flexible and self-regulating. Second, there has long been a belief that the central nervous system is hardwired and challenging to change by adulthood. From the perspective of adaptability, this would be ridiculous since we are always learning, changing, and adapting throughout our lives [8, 9]. The brain does alter as a result of experience, and the underlying physiology is influenced by hereditary factors. Similar to how seeing broken genes leads to the incorrect conclusion that genetic repercussions are unchangeable, the idea that the central nervous system (CNS) is a fixed structure has been influenced by the fact that damaged brains (such as those caused by stroke or trauma) do not heal [9, 10]. However, in a healthy brain, synaptic connections and neural circuits are continuously changed to increase flexibility. "Gene-environment interaction" is a term that has many different meanings and applications. A few clarifications are provided before the description of epigenesis that follows [9, 10]. In an analysis of variance, the G × E interaction notion, which has its roots in early quantitative genetics, particularly agricultural genetics, is strictly equivalent to an interacting effect. Consequently, the G × E interaction implies that distinct genotypes react differently to various environments. Using the various genotypes of rice and wheat as a fast example, imagine planting part of each in a moist environment and others in a dry one. The rice thrived in the damp circumstances, while the wheat failed and drowned. The rice wilted under the dry conditions, whereas the wheat flourished [5]. One of the most well researched mechanisms for the epigenetic regulation of mammalian gene expression is the methylation of cytosine, which along with adenine, thiamine, and guanine forms the four-letter alphabet of DNA. The DNA's structure is altered by this methylation of cytosine, rendering the genetic material contained there unintelligible and nullified—the gene is effectively shut off. On the other hand, the gene may be expressed when DNA methylation is removed [4, 6]. Developmental processes, nutrition, viral infections, ageing, and chance are just a few of the numerous factors that affect DNA methylation. Clinical diseases like Rett syndrome, which include mental retardation, autistic-like behaviours, and other neurological abnormalities in females, are caused by failure of methylation processes [4, 5]. Prenatal and early postnatal diet is also thought to have an impact on the development of type 2 diabetes, cardiovascular disease, obesity, and cancer in adulthood, via epigenetic pathways controlled by DNA methylation [8, 9]. The size of the offspring's hippocampus area in adulthood may be influenced by the mother's attitude towards her young offspring, depending on the child's genotypes. These epigenetic mechanisms may help to explain this. The emergence of schizophrenia and depression is being more speculatively explained by epigenetic theorising [10]. In terms of epigenetics, even traits like ability are being re-examined, although not in the same manner as a biochemical study.

## II. METHOD

Children in the research were between the ages of 24 and 36 months and had normal development [9,11], meaning they had neither acquired nor congenital problems[12]. 92 children were included in the research after 96 children were deemed eligible and some respondents were excluded for not cooperating with the study or for not having parental agreement. The following metrics were used to assess growth: the body mass index ( BMI ) for age, weight for age, height for age, and weight for age. The World Health Organisation (WHO) recommends these metrics as key Z-score levels. The gold standard for evaluating childhood growth in scholarly research, the Bayley Scale of Infant and Toddler Development (Bayley III),14 was used to evaluate child development [13]. Activities, Listening and Talking, Personal Care Routines, Space and Furnishings [14], and Staff-Child Interaction. The quality of the home environment was assessed using the Home Observations for Measuring of the Environment (HOME) inventory, which comprises six subscales: parental responsiveness [14], accepting the child, environment organisation, instructional materials, parental engagement, and diversity of knowledge.

A questionnaire based on literature was used to conduct the qualitative evaluation of the neighbourhood's environment. It asked respondents about their opinions regarding the quality and accessibility of both public and private services, as well as the social relationships among neighbours.

The inferential and descriptive analyses were conducted using SPSS for Window (IBM Corp., 2011). IBM SPSS Statistics for Windows, Version 20.0, [15]. The association between the biological and environmental conditions and the phenomenon being studied was investigated at a significance level of 0.05 in the univariate linear regressions and multivariable regression analysis. The independent variables having a p-value of less than 0.20 in the Spearman's correlation test were included in the univariate analysis, which showed no multicollinearity with the other variables.

## III. RESULTS

Table 1 provides the socioeconomic and biological characteristics of the 92 children that were part in the investigation.

Table 1 The biological profiling and social-economic factors of the 92 respondents.

| **Variables** | **Categories** | **N (92)** | **%** |
|---|---|---|---|
| **Gender** | M | 52 | 53.6 |
| | F | 40 | 43.9 |
| **Schooling Level of the Parents** | Illiterate or not having completed the 4th grade | 12 | 18.9 |
| | Completed fourth grade. | 32 | 21.98 |
| | Completed elementary school | 26 | 21.5 |
| | Completed high school | 9 | 4.6 |
| | Illiterate or not having completed the fourth grade | 5 | 2.6 |

| | | | |
|---|---|---|---|
| | Completed fourth grade. | 32 | 31.2 |
| | Completed elementary school | 28 | 18.2 |
| | Completed high school | 19 | 14.5 |
| | Completed a university or college | 4 | 2.6 |
| **Class of Social Economic Status** | C1 | 14 | 11.25 |
| | C2 | 32 | 21.2 |
| | D | 5 | 4.6 |
| | E | 38 | 31.2 |
| **Family Type** | Mononuclear | 11 | 5.6 |
| | Nuclear | 34 | 32.2 |
| | Increased Mononuclear | 24 | 22.3 |
| | The Mononuclear Expense | 23 | 11.9 |
| **Maternal Age** | 18-31 | 67 | 39.8 |
| **N. of Siblings** | 31-47 | 25 | 12.55 |
| **Number of household members** | ≥3 | 66 | 36.96 |
| | ≥5 | 24 | 12.48 |
| | ≥6 | 52 | 22.69 |
| **Pregnancy Problems** | Yes | 30 | 15.12 |
| | No | 64 | 63.2 |
| **Prenatal Consultations** | <6 | 62 | 11.69 |
| | ≥6 | 52 | 25.69 |
| **Gestational age (in weeks)** | Preterm | 38 | 16.59 |
| | Full-term | 6 | 3.59 |
| **Birth weight (kg)** | ≤2.5 | 3 | 1.95 |
| | >2.5 | 87 | 69.89 |
| **Birth length** | <3rd percentile | 9 | 3.69 |
| | >3rd percentile | 78 | 18.89 |
| **Material breastfeeding** | Yes | 91 | 59.89 |
| | No | 2 | 1.59 |
| **Months of exclusive breastfeeding** | <6 | 56 | 17.89 |
| | ≥6 | 33 | 11.59 |
| **Chronic diseases** | Yes | 44 | 26.59 |
| | No | 47 | 36.69 |
| **Infectious diseases** | Yes | 48 | 12.59 |
| | No | 44 | 21.59 |
| **Hospital admission** | Yes | 23 | 11.59 |
| | No | 69 | 39.59 |

The development and growth of the construction findings are presented in Table 2 [14, 16]. Height for age was selected as the dependent variable in the ensuing inferential studies since it displayed the largest percentage of deficit among the growth indicators. There was barely a 0.3% difference in the proportion of kids with below-average cognition and language development.

Table 2 Results of the Growth and Development Assessment.

| Indicators | Cutoffs | Classification | N (92) | % |
|---|---|---|---|---|
| Weight/age | **Z-score** | | 0 | 0 |
| | < -3 | Very Low weight for age | 2 | 2.2 |

| | | | | |
|---|---|---|---|---|
| | -3├ -2 | Low weight in relation to age | 88 | 97.8 |
| | -2├ -2 | Weight in proportion to age | 1 | 1.1 |
| | **≥ +2** | Being overweight for one's age | | |
| Weight/ height | **Z-score** | | 0 | 0 |
| | < -3 | Remarkable thinness | 0 | 0 |
| | -3├ -2 | Thinness | 88 | 95.6 |
| | -2├ +1 | Average weight | 1 | 1.2 |
| | -1├ +2 | Risk of becoming overweight | 2 | 2.3 |
| | -2┤ +3 | Overweight | 2 | 2.5 |
| | **<+3** | Obesity | | |
| Height/age | **Z-score** | | | |
| | <-3 | Extremely short for age | 1 | 1.1 |
| | <-2 | Low stature for age | 12 | 14.2 |
| | ≥ +2 | Sufficient height for age | 77 | 85.6 |
| | **Z-score** | | | |
| BMI/age | <-3 | Remarkable thinness | 0 | 0 |
| | ≥ - 3 < -2 | Thinness | 0 | 0 |
| | -2 ├ +1 | Normal weight | 58 | 61.2 |
| | +1 ├ +2 | Risk of becoming overweight | 25 | 28.9 |
| | +2 ├ +3 | Overweight | 7 | 7.8 |
| | ≥ + 3 | Obesity | 2 | 2.5 |
| Development (mean and SD) | | | | |
| Language (9.89 ± 1.96) | Balanced score | | | |
| | <7 | Below avg. | 25 | 24.8 |
| | 7-13 | Avg. | 66 | 72.6 |
| | <13 | Above Avg. | 0 | 0 |
| Cognitive (96.8 ± 9.6) | Composite score | | | |
| | <88 | Below avg. | 25 | 29.8 |
| | 114-86 | Avg. | 66 | 71.8 |
| | >114 | Above avg. | 1 | 1.1 |

The results are shown in Table 3 for the evaluated environmental components, which include homes, preschools, neighbourhoods, and [18, 19]. Higher degrees of insufficiency were found in the neighbourhoods' sanitation and roadway pavement in the infrastructure categories.

Table 3 Environment quality: 92% of participants' residences, neighbourhoods, and early childhood education facilities.

| **Variables** | | **N (92)** | **%** | **Range of scale reference (ordinal)** | **Min/max** | **Median** |
|---|---|---|---|---|---|---|
| **Neighbourhoods (Infrastructure)** | | | | | | |
| Basic hygiene | Yes | 78 | 89.8 | - | - | - |
| | No | 14 | 14.5 | - | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Electricity | Yes | 92 | 98.8 | - | - | - |
| | No | 1 | 1.4 | - | - | - |
| Water consumption | Yes | 98 | 96.5 | - | - | - |
| | No | 2 | 2.5 | - | - | - |
| Disposal of waste | Yes | 83 | 89.8 | - | - | - |
| | No | 11 | 79.8 | - | - | - |
| paved roadway | Yes | 72 | 22.9 | - | - | - |
| | No | 23 | 2.96 | - | - | - |
| **Neighbourhood (quality of services)** | | | | | | |
| Public childcare facility | | - | - | 0-1 | 1-2 | 2 |
| Family medical insurance | | - | - | 0-2 | 0-2 | 1 |
| Park or square | | - | - | 0-2 | 1-2 | 2 |
| Playground | | - | - | 0-2 | 0-2 | 1 |
| Small business or grocery shop | | - | - | 0-1 | 0-1 | 0 |
| Drugstore or pharmacy | | - | - | 0-0 | 0-2 | 2 |
| Overall score | | - | - | 0-2 | 0-1 | 1 |
| **Neighbourhoods** | | | | | | |
| Institutional operations | | - | - | 0-11 | 0-11 | 6 |
| Communication and trust | | - | - | 0-12 | 0-6 | 6 |
| Retaliation and interaction | | - | - | 0-6 | 0-12 | 4 |
| Child support | | - | - | 0-11 | 0-11 | 5 |
| Neighbourhood quality | | - | - | 0-1 | 0-12 | 10 |
| Mobility | | - | - | 0-2 | 0-11 | 2 |
| Security | | - | - | 0-12 | 0-12 | 9 |
| Unrest in society | | - | - | 0-11 | 0-11 | 4 |
| Total score | | - | - | 0-12 | 0-12 | 58 |
| **Household environment (HOME)** | | | | | | |
| Responsibility | | - | - | 0-11 | 3-11 | 7.08 |
| Acceptance | | - | - | 0-8 | 1-8 | 6.00 |
| Learning materials | | - | - | 0-6 | 0-6 | 4.00 |
| Involvement of the parametrium | | - | - | 0-9 | 1-8 | 4.00 |
| Different experiences | | - | - | 0-5 | 0-5 | 2.00 |
| Total score | | - | - | 0-45 | 14-35 | 23.00 |
| **Early childhood education environment (ITERS-R)** | | | | | | |
| Space and furniture | | - | - | 0-7 | 2.0-3.1 | 2.3 |
| Routines for personal care | | - | - | 0-7 | 1.2-2.6 | 2.0 |
| Reasoning and language | | - | - | 0-7 | 1.1-3.9 | 2.9 |
| Activities | | - | - | 0-7 | 1.11-2.54 | 1.89 |
| Staff-child interaction | | - | - | 0-7 | 1.0-4.89 | 2.69 |
| Structure of the programme | | - | - | 0-7 | 1.0-4.89 | 2.18 |
| Communication between staff and parents | | - | - | 0-7 | 1.29-2.59 | 2.55 |
| Overall score | | - | - | 0-7 | 1.36-3.59 | 2.18 |

The growth (height for age) and growth (cognitive and linguistic) prediction variables are shown in Table 4. In the univariate evaluation, it was shown that the growth construct was related to biological in nature, socioeconomic, [14,16], and environmental factors. With an explanatory power of around 17%, a multivariate analysis revealed that only birth weight ($p < 0.004$) and the number of prenatal visits ($p <$

0.027) were predictive of the result [18]. Having into account the univariate analysis, contextual and biological components were linked to the development of language.

Table 4 Analysis of univariate as well as multivariate linear regressions: height for age, cognitive development, and expressive language.

| **Variables** | **Univariate** | | **Multivariate** | |
|---|---|---|---|---|
| **Height for age (Z-score)** | **($R^2$=0.166)** | | | |
| | **β** | **P** | **β** | **P** |
| Service quality | 0.149 | 0.198 | - | - |
| Mobility | -0.219 | 0.131 | - | - |
| The HOME score overall | -0.196 | 0.198 | 0.101 | 0.196 |
| Abandonment by parents | 0.158 | 0.265 | - | - |
| The presence of parents at home | -0.265 | 0.148 | - | - |
| No. of siblings | -0.198 | 0.262 | -0.165 | 0.149 |
| Number of people living in the home | -0.296 | 0.149 | -0.015 | 0.216 |
| Gestational age | 0.210 | 0.216 | 0.369 | 0.256 |
| Birth weight | -0.169 | <0.001 | 0.219 | 0.149 |
| Birth length | -0.196 | 0.179 | -0.216 | 0.263 |
| Consultations during pregnancy | 0.295 | 0.369 | -0.296 | 0.259 |
| Regardless of hospital accommodations, breastfeeding | 0.495 | 0.149 | -0.366 | 0.489 |
| Exclusive breastfeeding | -0.149 | 0.169 | 0.149 | 0.623 |
| **Expressive language** | **($R^2$=0.549)** | | | |
| Infrastructure | 0.298 | 0.121 | 0.219 | 0.021 |
| Convenience and services | 0.149 | 0.692 | - | - |
| Service quality | -0.142 | -0.218 | - | - |
| Communication and trust | 0.214 | 0.489 | 0.321 | 0.655 |
| Social turmoil | -0.254 | -0.489 | -0.956 | 0.148 |
| The HOME score overall | -0.359 | -0.248 | 0.148 | -0.965 |
| Maternal educational attainment | 0.258 | -0.521 | - | - |
| The number of siblings | -0.489 | -0.695 | - | - |
| The number of people living in the home | -0.248 | 0.280 | - | - |

| | | | | |
|---|---|---|---|---|
| Social and economic standing | -0.298 | -0.148 | - | - |
| Birth weight | 0.254 | -0.659 | 0.145 | 0.148 |
| Birth length | 0.519 | -0.258 | -0.215 | -0.215 |
| Consultations during pregnancy | -0.296 | 0.219 | -0.219 | 0.289 |
| Age in months | 0.254 | -0.231 | 0.214 | 0.299 |
| Total score on the Neighbourhood questionnaire | 0.549 | 0.640 | 0.632 | -0.649 |
| **Cognitive development** | **($R^2$=0.269)** | | | |
| Infrastructure | 0.259 | | | |
| Quality of services | 0.149 | 0.145 | 0.221 | 0.140 |
| Participated in institutional events | 0.218 | 0.259 | - | - |
| Neighbourhood security | 0.263 | 0.590 | - | - |
| Social turmoil | 0.214 | 0.214 | 0.145 | 0.214 |
| Overall, HOME score | 0.859 | 0.326 | -0.114 | 0.321 |
| Paternal educational attainment | 0.214 | 0.321 | 0.218 | 0.145 |
| Maternal educational attainment and socioeconomic standing | 0.965 | 0.149 | 0.982 | 0.214 |
| Gestational age | 0.148 | 0.218 | 0.087 | 0.540 |
| Birth Lenth | 0.596 | 0.485 | 0.548 | 0.214 |
| Infectious illnesses | 0.269 | 0.210 | 0.965 | 0.580 |

Although most biological and environmental variables were associated with cognitive progress in the univariate study, only the Homes questionnaire total score was retained in the multivariate model (p = 0.001), accounting for 29.5% of the final result [18].

## IV. DISCUSSION

Unquestionably, there has been an improvement in a number of childhood-related indices over the last several decades, particularly those pertaining to survival [19]. Because of this, it is crucial to ensure that these children have the opportunity to reach their full potential in terms of development and growth [19, 20]. Therefore, the goal of the current research was to investigate how the growth and development of underprivileged children connect to risk factors that are biological, interpersonal, and ecological [21,22]. Nevertheless, the study population's concentration in economically challenged groups is shown by the 46% of families that belong to class D.Higher maternal education level compared to the parental level aligns with national data indicating that women have a higher mean number of years of education (7.6%) than men (7.3%) [22].Regarding the medical records of the mother and child, it is significant that a significant proportion of mums had less than six prenatal visits [23]. It was discovered that the 56.7% proportion was much more than the 11.8% that was noted in the south-east area in 2006 [24]. One factor that is said to influence a child's ability to develop normally is prenatal care. Even though 98.9% of the children were exclusively breastfed, only 2.9% of them consumed exclusively breast milk during the first six months of their lives [25, 26], The most common and representative measure of malnutrition, in line with previous research, was the height-for-age indicator. [29, 30], it is comparable to that found in other studies in regions known to have low Human Development Indexes (HDI)[26], The HOME inventory's depiction of the household's risk scenario for children's development is similar to that discovered. According to the later authors, youngsters in their research improved their cognitive performance by half a point for each additional unit of domestic stimulation [27, 28].In relation to the "expressive language" result, the third and last variable is the child's age [29]. This variable also seems to be linked to performance in this area in other studies, even if the method of assessment is based on the child's age-appropriate abilities. The results might be explained by environmental and biological influences.The study's model considered the complexity and context of the growth and advancement components while accounting for biological, ecological, and socioeconomic factors [30]. This implies that variables that the statistical technique did not consider to be predictors of the outcomes under research, such as family socioeconomic status and the calibre of educational institutions, may be indirectly impacting the results of the investigation.

## V. CONCLUSION

In conclusion, the research found that children from economically poor backgrounds had below-average intellectual growth and expressive language scores, as well as a significant frequency of height for age deficiency when compared to the national average. Growth and development are influenced by biological, social, and environmental factors. But the biological factors were more closely linked to growth, while the environmental factors were more closely linked to the development variables that were evaluated, such as the domains of expressive and cognitive language.

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