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# THE INTERPLAY OF POVERTY, NUTRITION AND HEALTH: UNDERSTANDING CHILD HEALTH FLUCTUATION IN ATTAPPADY

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***Abstract***
*Attappady, a tribal region in Kerala, India, presents a paradox within the state's otherwise strong human development record. Despite Kerala's reputation for high literacy and advanced healthcare systems, the indigenous children of Attappady continue to suffer from persistent poverty, severe malnutrition, and recurrent health crises. This research article explores the interconnectedness of these factors—how economic deprivation, nutritional deficits, and poor health outcomes form a self-perpetuating cycle. Based on secondary data, government reports, and field studies, the paper highlights the structural causes behind the crisis and discusses policy implications for sustainable improvement.*

## Introduction

Kerala is often celebrated as a model state for its human development indicators; yet, within its borders lies Attappady, a stark reminder of internal inequality. Situated in the Palakkad district, Attappady is home to several tribal communities Irula, Muduga, and Kurumba whose children face disproportionately high levels of malnutrition and disease. Numerous reports of child deaths due to malnutrition over the past decade have drawn public attention, exposing deep-rooted issues of poverty, marginalization, and governance failure.This study examines the complex relationship between poverty, malnutrition, and health fluctuations among children in Attappady, identifying the socio-economic, cultural, and administrative dimensions of the crisis.

Once a self-sufficient agrarian community, Attappady underwent rapid ecological and economic transformation due to land alienation, deforestation, and migration of non-tribal settlers. Tribal populations were gradually dispossessed of fertile lands and pushed to less productive areas. The loss of traditional livelihoods led to unemployment, dependency on daily wages, and poverty.According to various socio-economic surveys, over 70% of households in Attappady live below the poverty line, with low literacy, poor housing, and limited access to sanitation. These conditions set the stage for food insecurity and chronic undernutrition, especially among children and women. Socioeconomic Context of Attappady

1. **Poverty:** According to past surveys, a very large proportion of tribal households in Attappady are below the poverty line. The Kerala Institute of Local Administration (KILA) report (2008) indicated that 48% of tribal households are poor. IISTE+2archives.sochara.org+2
2. **Land Alienation:** Many tribal families have lost traditional land to settlers, weakening their ability to practice subsistence agriculture. Down To Earth+1
3. **Livelihoods:** Main sources of income include daily-wage labor, forest produce collection, and employment via schemes like MGNREGP. PMC
4. **Basic Amenities:** According to media reports, nearly half of tribal homes in Attappady lack proper toilets, and many lack access to clean drinking water

## Malnutrition and Dietary Inadequacy

Malnutrition in Attappady is not merely a result of food shortage but also of dietary imbalance and cultural erosion. Traditionally, tribal diets consisted of millets, pulses, forest produce, and tubers

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nutrient-rich and diverse. However, the transition to cash-based economies and dependence on subsidized rice through the Public Distribution System (PDS) reduced dietary diversity.Children in Attappady often suffer from underweight, stunted growth, and micronutrient deficiencies such as anemia and vitamin deficiency. Maternal malnutrition, compounded by early marriage, repeated pregnancies, and poor prenatal care, leads to low birth weight infants who remain vulnerable to disease and developmental delays.

**Health Fluctuations and Disease Burden**

The health status of children in Attappady is characterized by frequent illness, poor immunity, and limited healthcare access. Common ailments include respiratory infections, diarrhea, parasitic infestations, an skin diseases. Seasonal variations significantly influence child health—during the monsoon, poor sanitation and contaminated water lead to outbreaks of diarrheal diseases.Despite the presence of primary health centers and mobile medical units, geographical isolation, cultural barriers, and mistrust of formal healthcare hinder effective service utilization. Tribal healers continue to play a role, but they often lack the resources to handle complex cases of malnutrition or chronic illness.

**The Vicious Cycle: Interdependence of Poverty, Malnutrition, and Health**

The three factors—poverty, malnutrition, and health—are intricately linked in a self-reinforcing cycle:

1. Poverty limits access to adequate food, healthcare, and education.
2. Malnutrition weakens immunity, making children more prone to illness.
3. Ill-health reduces household productivity and increases medical expenses, further deepening poverty.

In Attappady, this cycle is transmitted across generations. Children born into impoverished, malnourished households are less likely to achieve adequate growth and learning outcomes, perpetuating structural inequality

**Table-1: Population in Attappady-A Profile**

| Sl. No. | Gram Panchayat | Irula Oorus | Muduga Oorus | Kurumba Oorus | Total |
|---|---|---|---|---|---|
| 1 | Agali | 53 | 18 | 0 | 71 |
| 2 | Pudur | 45 | 5 | 24 | 86 |
| 3 | Sholayur | 46 | 4 | 0 | 50 |
| | Total | 144 | 27 | 19 | 192 |

Source (Census Report 2011)

**Critical Issue: Declining Tribal Population and the Health Crisis in Attappady**

The tribal population of Attappady has been witnessing a worrying decline over the years. A major contributing factor is the high mortality rate among infants and adults, many of which remain unregistered and therefore escape public scrutiny or policy response. The root causes of this demographic crisis are deeply intertwined with the marginalisation and impoverishment of the Adivasi communities, coupled with the lack of food and nutritional security, inadequate healthcare, and ineffective supplementary nutrition services.

According to Rajendra Prasad, President of Thampu—an organisation working among Kerala's tribal communities—"The present crisis in Attappady did not occur due to any sudden or isolated reason. It is the cumulative outcome of years of systematic governance failure, neglect, and corruption." Historical

evidence supports this assertion: as early as 1996 and 1999, Attappady recorded 25 and 32 starvation deaths respectively, indicating a long-standing pattern of deprivation.

**Prevalence of Malnutrition and Anaemia**

Malnutrition and anaemia remain widespread among the tribal population of Attappady. As observed by Dr. Prabhudas, a senior government medical officer with over two decades of experience in the region, almost all tribal women—including adolescent girls—are anaemic, with the condition being most acute among pregnant and lactating mothers. While a haemoglobin count below 10 g/dL is considered risky during pregnancy, most tribal women record levels between 5–8 g/dL, posing serious health risks to both mother and child.

Dr. Prabhudas further notes that the tribals suffer from both calorie and protein deficiencies. Following multiple reports of infant deaths, the state health department conducted a comprehensive health survey covering 23,597 individuals in Attappady. The survey identified 536 cases of malnutrition and anaemia—of which 69 were classified as severely malnourished and 463 as anaemic. Among these, children below six years, pregnant women, lactating mothers, and adolescent girls were the most affected groups.

A subsequent mega medical camp reinforced these findings, revealing that 536 out of 836 tribal participants suffered from malnutrition or anaemia, including 125 children below five years. Pregnant and lactating mothers were found to be chronically malnourished and anaemic, which has been directly linked to premature deliveries and low birth weight infants—the primary causes of infant mortality in the region.

**Determinants of Infant Deaths and Maternal Malnutrition**

An analysis of the factors contributing to low birth weight (LBW), intrauterine growth retardation (IUGR), and child malnutrition in Attappady reveals a complex interplay of biological, dietary, and socio-environmental determinants:

**1. Maternal Malnutrition**

Women in Attappady suffer from chronic undernutrition and fail to increase their dietary intake during pregnancy. Nutritional assessments reveal a monotonous diet consisting mainly of white rice consumed thrice daily, accompanied by a thin pulse-based curry (kuzhambu). Protein-rich foods such as vegetables, fish, and eggs are rarely included. Traditional beliefs further aggravate the problem, as many pregnant women deliberately restrict food intake to ensure an easier delivery of low birth weight babies.

**2. Anaemia**

Anaemia among tribal women has both genetic and nutritional roots. Although the region shows a high prevalence of sickle-cell anaemia, iron deficiency remains the predominant cause. Frequent pregnancies and abortions have depleted iron stores among women. Additionally, open defecation and walking barefoot increase exposure to hookworm infestation, further exacerbating anaemia.

Dietary transition has worsened the issue: the traditional staple, ragi (finger millet)—a rich source of iron- has been replaced by polished rice from ration shops, which offers minimal micronutrient value. The discontinuation of iron-folic acid (IFA) tablet distribution in sub-centres since 2009 due to government supply shortages has further undermined iron supplementation efforts. Many women with severe anaemia (haemoglobin <7 g/dL) require parenteral iron injections. However, due to their low

muscle mass, intramuscular injections (such as Imferon) cause pain and abscess formation, leading to treatment non-compliance and incomplete recovery.

**3. Pregnancy-Induced Hypertension (PIH)**

Medical records of mothers who delivered low-birth-weight or deceased infants indicate a significant prevalence of pregnancy-induced hypertension (PIH). Irregular antenatal check-ups result in late or missed detection of hypertensive disorders, heightening the risk of preterm births and fetal growth restriction.

**4. Indoor Air Pollution**

Lifestyle transitions have also contributed to deteriorating maternal health. Traditionally, tribal women cooked outdoors in open spaces. With the introduction of concrete housing, cooking is now done indoors, often in poorly ventilated kitchens without chimneys or smokeless stoves. The use of biomass fuels such as firewood, cow dung cakes, and dry grass leads to indoor air pollution, which is associated with intrauterine growth retardation (IUGR) and respiratory illnesses.

**5. Alcoholism**

While alcohol consumption among women is rare, male alcoholism is rampant in Attappady. The diversion of household income toward alcohol expenditure indirectly aggravates food insecurity, malnutrition, and neglect of maternal health.

**6. Malabsorption Disorders**

In certain cases, infants failed to respond to high-calorie therapeutic feeding. Medical officers at the Tribal Specialty Hospital reported that at least two infant deaths were linked to malabsorption syndromes, suggesting underlying gastrointestinal or metabolic disorders that remain undiagnosed due to limited diagnostic infrastructure.

**Haemoglobin Levels and Health Problems Among Tribal Mothers**

Anaemia represents a major public health challenge for tribal women in Attappady. It is defined as a condition in which the haemoglobin concentration falls below physiologically required levels, leading to reduced oxygen-carrying capacity of the blood. The majority of tribal women in Kerala exhibit low haemoglobin levels, often far below the national average. This chronic anaemia not only endangers maternal survival but also contributes directly to low birth weight, preterm delivery, and infant mortality.The following table summarizes common health problems observed among tribal mothers in Attappady:

| Health Problem | Observed Condition | Primary Cause/Contributing Factor |
|---|---|---|
| Anaemia | Hb levels 5–8 g/dL common; severe in pregnancy | Iron deficiency, repeated pregnancies, poor diet, hookworm infestation |
| Malnutrition | Chronic energy deficiency, underweight | Monotonous rice-based diet, protein deficiency |
| Pregnancy-Induced Hypertension | Common in mothers of low birth weight infants | Irregular antenatal care, undiagnosed hypertension |
| Low Birth Weight Infants | Frequent in tribal hamlets | Maternal malnutrition, anaemia, PIH |

| Health Problem | Observed Condition | Primary Cause/Contributing Factor |
|---|---|---|
| Premature Delivery | High occurrence rate | Chronic undernutrition and maternal ill-health |
| Respiratory Disorders | In pregnant women and infants | Indoor air pollution due to biomass fuel |
| Non-Compliance to Treatment | Failure to complete iron injection courses | Painful intramuscular administration, poor follow-up |

**Table 2: Health Problems of Tribal Mothers**

| Problems | Irula | Muduga | Kurumba |
|---|---|---|---|
| Hair sparse | 10(7) | 24(16) | 10(11) |
| Hair Discolored | 34(24) | 31(20) | 20(22) |
| Angular stomatisis | 24(17) | 30(20) | 10(11) |
| teeth mottled | 12 (9) | 21(14) | 19(20) |
| Teeth caries | 14(10) | 7(5) | 8(9) |
| Cheilosis | 18(13) | 9(10) | 6(6) |
| Keratomalacia | 2(0.1) | - | - |
| Emaciation | 5(3.5) | 8(5) | - |
| Bitos spots | 6(4) | 8(5) | 10(11) |
| Rickets | 6(4) | 2(1) | 2(2) |
| Gum Spongy&bleeding | 5(4) | 8(5) | 2(2) |
| Knick knees | 3(2) | 4(3) | 6(6) |
| Total | 139 | 152 | 93 |

Source: Survey Data

One of the most common causes of Anemia is inadequate in take of nutrients. Most of the women in Attappady are facing this issue. It is a major public health problem among tribal children also. It is a condition that develops when the blood lacks enough healthy red blood cells or Hemoglobin. Anemia is also one of the causes of premature births and increased neonatal deaths. The clinical results of iron deficiency anemia during the time of pregnancy include preterm delivery, prenatal mortality, and postpartum depression. Fetal and neonatal consequences include low birth weight and poor mental and psychomotor performance.

**Government and Policy Interventions**

Several interventions have been introduced to address these challenges:

1. Integrated Child Development Services (ICDS): Provides supplementary nutrition, health check-ups, and preschool education through Anganwadis. However, implementation gaps and irregular supplies persist.
2. Attappady Comprehensive Tribal Development and Particularly Vulnerable Tribal Groups (PVTG) Plan: Aims to improve nutrition, health, and livelihoods through community-based models.

3. Nutrition Rehabilitation Centers (NRCs): Offer treatment for severely malnourished children but face issues of limited reach and follow-up.
4. Women's self-help groups and Kudumbashree initiatives have empowered some mothers to engage in income-generating activities, improving household food security.
5. Despite these measures, fragmented program delivery and lack of interdepartmental coordination have limited the impact. The absence of culturally sensitive, participatory planning further weakens sustainability.

**Community Perspectives and Cultural Factors**

The tribal worldview of health is holistic, linking physical well-being to spiritual and ecological balance. However, development interventions often disregard these beliefs, leading to mistrust. Traditional foods, forest gathering, and local medical practices are disappearing due to external influence and market dependency.

Women's role in food preparation, childcare, and healthcare-seeking decisions is crucial; hence, empowering women through nutrition education and livelihood training is central to breaking the cycle of malnutrition.

**Conclusion**

The ongoing health crisis in Attappady is not a short-term emergency but the result of decades of structural neglect and policy failure. Chronic poverty, malnutrition, anaemia, inadequate healthcare delivery, and the erosion of traditional food systems have collectively contributed to the high rates of infant mortality and declining tribal population. Unless the intersecting issues of nutrition, maternal health, sanitation, and socio-economic empowerment are addressed holistically, the cycle of deprivation in Attappady will continue unabated. For the complete development of a child the Nutritional development is during the early years of life is very important. Many children are suffering from Under-nutrition as a major problem in India, which increases the morbidity and mortality of the children. Nutritional status of the children in Kerala is much better compared to that in the rest of the country at an aggregated level. However, the same is worse in certain pockets which are remote and have higher share of tribal population. That is the reason for Attappady has become a place of higher mortality of the children. The permanent solution to problems of tribal is to enable them to cultivate the land they own with their traditional crops. In order to achieve this, an approach which combine the plus points of their traditional method of cultivation and modern agricultural technique which is acceptable to the natives need to be adopted.

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