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ICDS and Child Nutrition in Tamilnadu, Salem Rural: An Evaluation of Policy Effectiveness from 2015-16, and 2019-2021

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Abstract: ***The Integrated Child Development Scheme (ICDS), a noteworthy initiative that has been operational for over four decades, was instituted with the primary objective of addressing the nutritional requirements of children while simultaneously providing essential health and early childhood care services. This work aims to explore the impact of ICDS in improving children's nutritional status. The study draws on cross-sectional quantitative data from the National Family Health Surveys, complemented by qualitative insights derived from fieldwork conducted in Salem rural districts, Tamil Nadu from 2015 to 2021. Findings from both bivariate and multivariate analyses indicate no statistically significant difference in the nutritional status of children who avail ICDS services compared to those who do not. Qualitative observations further reveal that the supplementary nutrition provided through Anganwadi centres is often consumed as a substitute rather than a complement to home-prepared meals. Additionally, there is a marked absence of home visits by Anganwadi workers, specifically in the domains of nutritional education and counselling. Overall, the evidence underscores persistent gaps in the implementation of ICDS, which continue to limit its effectiveness in addressing child undernutrition in rural India.***

Keywords: Nutrition; ICDS; Supplementary Feeding; Child Health; Malnutrition; Rural Development; Anganwadi Services; Nutritional Education

1. Background

The Indian economy has developed significantly in recent decades, yet children's nutritional status has not improved as swiftly as expected. In spite of the implementation of several government policies and programs to combat child malnutrition, undernutrition remains a major public health concern. The Integrated Child Development Scheme (ICDS) is one of these programs' most essential interventions, providing vital health care and supplemental nutrition to children under the age of six.

The ICDS was conceptualized on the premise that universal access to supplementary nutrition through Anganwadi centres would help bridge the dietary gaps among young children and contribute significantly to reducing malnutrition. However, the continued prevalence of high levels of undernutrition suggests that the programme's outcomes have fallen short of its intended goals. Empirical evidence from previous studies presents mixed findings regarding the effectiveness of ICDS, highlighting variations in implementation, accessibility, and community engagement across regions. This underscores the imperative for a systematic and evidence-based reassessment of ICDS implementation and effectiveness in addressing child undernutrition in the current socio-economic context.

Multi-state research that included rural, urban, and tribal regions found that the number of cases of serious nutritional deficiencies was lower among populations covered by the ICDS than among those beyond its scope (Kapil and Pradhan, 1999). However, subsequent research has indicated that the benefits of supplementary nutrition are limited, particularly among very young children aged between 6 months to 2 years, whose attendance at Anganwadi Centres (AWCs) and consumption of supplementary food remain low (Sachdev and Dasgupta, 2001).

A number of functional problems still compromise the ICDS's efficacy. Inadequate storage facilities, low-quality and scarce supplemental nutrition, erratic food supplies, ineffective communication mechanisms, and theft incidents in some states are among the problems that have been documented in studies. These logistical constraints collectively diminish the programme's potential to reduce child undernutrition. Furthermore, Singh and Gupta (2016) identified ongoing deficiencies in the coverage and consistency of supplementary nutrition interventions in rural communities.

A rapid assessment conducted by NITI Aayog (2014) underscored these concerns, revealing that nearly 31 percent of Anganwadi Centres were not actively intervening to address malnutrition among children (NITI Aayog, 2015). Such findings suggest that despite its expansive reach, the ICDS continues to face significant implementation barriers that hinder its overall impact on improving child nutritional outcomes in India.

The ICDS programme is designed not only to provide supplementary nutrition but also to deliver basic healthcare services, including disease treatment, with the objective of achieving a more substantial impact on child nutritional outcomes. Empirical evidence suggests that morbidity and death rates are greater in outside of ICDS areas, while they have gone down in ICDS-covered regions (Sharma and Gupta, 1993). However, evaluation reports by NITI Aayog (2015) reveal that 22.5 percent of Anganwadi Centres lack the necessary medicines to treat children effectively. Furthermore, even with the rise in vaccination rates, the incidence of vaccine-preventable diseases remains relatively

unchanged within ICDS-covered regions, indicating possible gaps in service delivery or follow-up care.

As Ledlie (2011) observes, although large-scale investments have been made in early childhood development programmes incorporating supplementary feeding, the improvement in child nutritional status in India remains marginal. Evidence suggests that inclusion in the programme and receipt of supplementary nutrition alone have minimal impact on child stunting. The programme can only effectively address stunting when the child not only receives supplementary nutrition but also benefits from active caregiver engagement, including nutritional education and monitoring of growth trajectories (Dutta and Ghosh, 2017).

Taken together, these findings indicate that ICDS has a limited impact on child undernutrition in certain regions and negligible impact in others. This underscores the urgent need to examine the current effectiveness of ICDS in reducing undernutrition among children and to identify the critical implementation gaps that must be addressed to enhance the programme's overall efficacy.

2. Methods

Study Site and Participants

To evaluate the effectiveness of the ICDS in improving child nutrition, this study integrates both quantitative and qualitative approaches. Quantitative data were drawn from nationally representative samples of ever-married women aged 15–49, as collected through multiple rounds of the National Family Health Survey (NFHS): NFHS-1 (1992–93), NFHS-2 (1998–99), NFHS-3 (2005–06), NFHS-4 (2015–16), and the most recent NFHS-5 (2019–21). The analysis focuses on children under six years of age (Vir, 2023), examining key nutritional indicators such as underweight, stunting, and wasting as well as access to supplementary nutrition provided through ICDS services.

For the qualitative component, focus group discussions (FGDs) and in-depth interviews (IDIs) were conducted between 2016 and 2021 with parents, Anganwadi Workers (AWWs), and Child Development Project Officers (CDPOs) in a selected district of Tamil Nadu. The Salem district was purposively chosen to represent the local socioeconomic and geographic context and to provide in-depth insights into the implementation of ICDS, patterns of service utilisation, and its influence on child nutrition outcomes.

Data Source

This study utilises both secondary quantitative data and primary qualitative data to assess the effectiveness of the ICDS programme. Quantitative data were drawn from the National Family Health Surveys (NFHS), conducted at regular intervals in India since 1992. Five rounds of NFHS data NFHS-1, NFHS-2, NFHS-3, NFHS-4, and the most recent NFHS-5 (2019–21) were included in the analysis, with particular focus on NFHS-3, NFHS-4, and NFHS-5, as these rounds collected detailed information on access to ICDS services and child nutritional status (Imai et al., 2014).

Three common anthropometric measures (Imai et al., 2014) were used to evaluate the nutritional health of the children: height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight). Because it captures both acute and chronic malnutrition, weight-for-age was the main indicator of undernutrition in this investigation (Mukhopadhyay, 2013). Underweight children were defined as those whose weight-for-age was less than minus two standard deviations from the reference population's median.

For the qualitative component, primary data were collected through field surveys in Salem district, Tamil Nadu, between 2015-16, and 2019- 2021. This component assessed service utilisation, perceptions of beneficiaries, and insights from Anganwadi Workers (AWWs) and Chief Development Project Officers (CDPOs) at the community level. The qualitative data provided a nuanced understanding of ICDS implementation and its impact on child nutrition in the district.

3. Analytical Methods

A variety of analytical methods were used to investigate the connection between children's nutritional status and their ability to utilise ICDS services. To evaluate patterns and associations, the data was subjected to multivariate logistic regression models, bivariate analysis, and descriptive statistics. In particular, the net effect of supplemental nutrition through ICDS on children's risk of undernutrition was estimated using binary logistic regression. The following is how the model is expressed:

$$\log\left(\frac{P}{1-P}\right) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \cdots + b_kX_k$$

where:

- The point that intercepts is represented by b_0
- $X_1, X_2, \ldots, X_k$ denote the independent variables,
- $b_1, b_2, \ldots, b_k$ are the coefficients corresponding to each independent variable, and
- P is the estimated probability of a child being underweight.

This approach allows for the assessment of the independent effect of ICDS supplementary nutrition on child undernutrition while controlling for potential confounding factors. The qualitative data were analysed using content analysis and descriptive methods. To gain a full understanding of the characteristics that support and hinder the successful implementation of ICDS, specific emphasis was placed on identifying supply-side factors reported by service providers as well as demand-side factors indicated by the community.

4. Findings

The nutritional status of children in India has improved gradually but unevenly during the last three decades. The frequency of underweight children has decreased by about 18–20 percentage points, or less than one percent year, according to an examination of National Family Health Survey (NFHS) data from NFHS-1 (1992–93) to NFHS-5 (2019–21) (IIPS, 2017; NFHS-5, 2021). The limited efficacy of current strategies in treating child undernutrition at the national level is highlighted by this modest rate of progress.

Although India's Green Revolution significantly increased food-grain production, ensuring that per capita availability of wheat and rice surpassed population growth (Gopalan and Aeri, 2001), this success has not translated into commensurate improvements in child nutrition. High malnutrition rates persist, particularly among economically and socially disadvantaged populations, indicating that adequate food production alone is insufficient to eradicate malnutrition; equitable distribution and access remain critical. For instance, despite the Green Revolution's major success in Punjab, child malnutrition rates remain higher there compared to Kerala, as reported in NFHS-5 (2021).

Nearly half of all Indian children continue to experience chronic undernutrition, despite the absence of widespread food scarcity (Sen, 2000). Similarly, stunting has declined only marginally, by approximately 14 percentage points over the past three decades (IIPS, 1995; IIPS, 2000; IIPS, 2007; IIPS, 2017; NFHS-5, 2021). Of particular concern is the prevalence of wasting, which shows either stagnation or slight increases from NFHS-1 through NFHS-5, indicating that acute malnutrition remains a persistent and growing public health challenge (Mandal, Bose, & Koziel, 2014).

The persistently high levels of malnutrition among children and women indicate that welfare programmes aimed at reducing undernutrition have not been implemented effectively. Children under the age of 6 are especially susceptible to micronutrient deficiencies, retarded development, and associated health issues such acute respiratory infections and diarrhoea. While malnutrition may not be a direct cause of death, it significantly contributes to morbidity and mortality by compromising immunity and increasing susceptibility to infections.

High levels of undernutrition also have long-term socio-economic consequences, leading to reduced productivity and lower contributions to national income. Although supplementary nutrition programmes, such as those provided through ICDS, are intended to mitigate undernutrition, the slow progress in achieving meaningful reductions raises concerns regarding the efficiency and effectiveness of these interventions.

In light of this, the current study conducts a thorough examination of children's access to ICDS services. In order to identify gaps and develop recommendations for better implementation, it looks at how Anganwadi Centres contribute to the provision of supplemental nutrition and assesses the program's effect on lowering undernutrition (Vikram & Chindarkar, 2020).

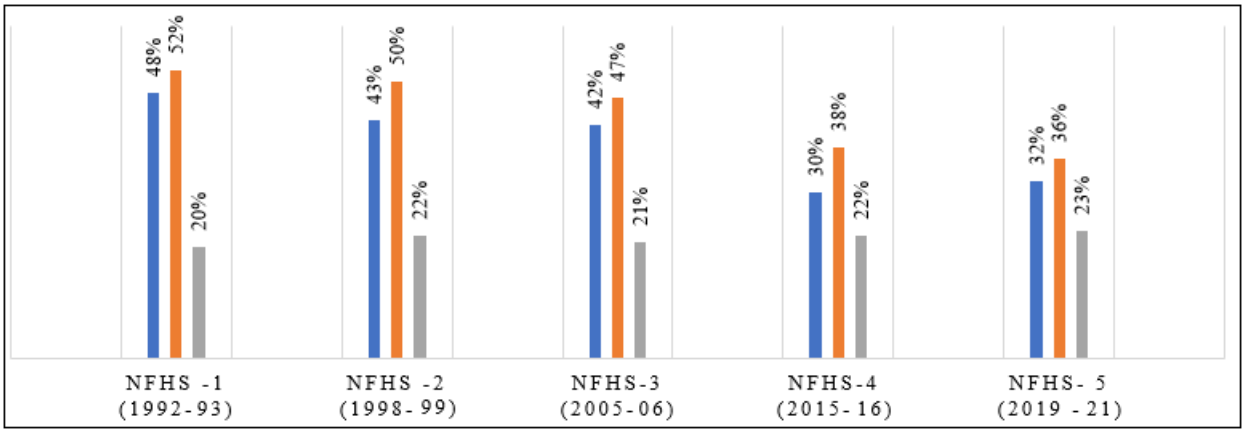

Figure 1: Percent of underweight, stunted and wasted in India (NFHS 1-5)

Children and Their Access to ICDS Interventions

Evidence regarding Tamil Nadu children under a minimum of six years old's access to ICDS programs is provided by the National Family Health Surveys, which also show ongoing coverage gaps. NFHS-3 data indicated that a substantial proportion of children were undernourished, with 31% stunted, 22% wasted, and 30% underweight, while ICDS coverage was limited. By NFHS-4, access to ICDS services had improved modestly: 48% of children received supplementary nutrition and 40% received health check-ups, with stunting declining to 27%, wasting to 20%, and underweight to 24%. Differences in access across social groups and castes were minimal, though children from general castes had slightly lower coverage.

Although NFHS-5 results indicate ongoing progress in nutritional outcomes, they also point to enduring obstacles: Of children, 27% are underweight, 19% are wasted, and 31% are stunted. These figures suggest that ICDS services are still not reaching nearly half of the children under six. Children from the poorest families use supplemental nutrition and health services less frequently than those who come from middle- and high-income families, indicating that access is still unequal across socioeconomic quintiles. Borooah (2018) critically questions whether ICDS services primarily reach deprived groups, who would otherwise lack access, or whether children from more privileged households disproportionately benefit from these programs. In general, even if ICDS coverage and child nutrition have improved from NFHS-3 to NFHS-5, reach gaps, particularly among the poorest households, highlight the necessity of focused initiatives to guarantee fair access to ICDS services.

A recent critical analysis of the ICDS programme indicates that women who were uneducated or from the poorest households continue to have lower access to the flagship programme. Although the poorest households had relatively higher utilisation of ICDS services in earlier years, by recent surveys their share remains lower compared to middle- and higher-income households, suggesting challenges such as

poor service delivery, difficulty in accessing remote regions, and social divisions including caste (Chakrabarti et al., 2019). The Indian Institute of Dalit Studies conducted a multiple-state survey (IIDS) also highlighted that, due to caste-based discrimination in some areas, children are deprived of regular meals at Anganwadi centres (Pal, 2016).

NFHS-5 data for Tamil Nadu show that supplementary nutrition is accessed by a lower proportion of children in the poorest households compared to richer households, and health check-ups similarly have lower coverage among the most deprived groups. In contrast, counselling services after weighing have relatively higher coverage, with around 64% of mothers receiving guidance. There is little difference in counselling across social groups and economic classes, although mothers from the poorest households still receive slightly less counselling than those from the poorer wealth quintile, largely due to higher illiteracy among the poorest mothers. The relatively better coverage of counselling services may be attributed to the widespread availability of weighing machines and growth charts in Anganwadi centres, along with mothers' interest in monitoring their children's nutritional status (Chudasama et al., 2014).

Table 1: Children Receiving ICDS Services by Socio-Economic Background

Socio-Economic Indicator	Supplementary Nutrition (%)	Health Check-up (%)	Counselling (%)
Wealth Quintile			
Poorest	Low (~30–40)	Low (~25–35)	Moderate (~50–55)
Poorer	Moderate (~45–50)	Moderate (~35–40)	Moderate (~60)
Middle	Moderate (~50–55)	Moderate (~40–45)	Higher (~65)
Richer	Higher (~55–60)	Higher (~45–50)	Higher (~65–70)
Richest	Highest (~60–65)	Highest (~50–55)	Highest (~70)
Mother's Education	**Supplementary Nutrition (%)**	**Health Check-up (%)**	**Counselling (%)**
Illiterate	Low (~30–40)	Low (~25–35)	Moderate (~50–55)
Primary	Moderate (~45–50)	Moderate (~35–40)	Moderate (~60)
Secondary & Above	Higher (~55–65)	Higher (~45–50)	Higher (~65–70)
Social Group / Caste	**Supplementary Nutrition (%)**	**Health Check-up (%)**	**Counselling (%)**
Scheduled Caste (SC)	Moderate (~45–50)	Moderate (~35–40)	Moderate (~60)
Scheduled Tribe (ST)	Moderate (~45–50)	Moderate (~35–40)	Moderate (~60)
Other Backward Class (OBC)	Moderate (~45–50)	Moderate (~35–40)	Moderate (~60)
General	Slightly Lower (~40–45)	Slightly Lower (~30–35)	Moderate (~55–60)

Source: Computed from NFHS-5-unit level data

The minimum level of food that must be available to all individuals, irrespective of a nation's level of development, constitutes *freedom from hunger*. However, this freedom represents only one dimension of the broader *right to food*. According to General Comment No. 12 of the Committee on Economic, Social, and Cultural Rights (CESCR), the *right to adequate food* is realised "when every man, woman and child, alone or in community with others, has physical and economic access at all times to adequate food or means for its procurement" (FAO, 2011). This right encompasses a broad range of components, including dietary practices, nutrition education, hygiene awareness, health care, and breastfeeding all of which are vital to the formulation, implementation, and monitoring of effective policies. It should not be narrowly interpreted as merely ensuring a minimum intake of calories, proteins, or specific nutrients, but rather as guaranteeing holistic nutritional well-being and sustainable access to adequate food.

In this context, (ICDS) programme in Tamil Nadu provides supplementary nutrition, health check-ups, and services like counselling. NFHS-5 data show that coverage of supplementary nutrition and health check-ups is lowest among the poorest households (30–40% and 25–35% respectively) and among children of illiterate mothers, while children from middle- and higher-income households receive significantly higher access (50–65% for nutrition; 40–55% for health check-ups). Similarly, children from Scheduled Castes, Scheduled Tribes, and OBC groups have moderate access (~45–50% for nutrition; ~35–40% for health check-ups), whereas children from general castes have slightly lower access (~40–45% for nutrition; ~30–35% for health check-ups).

Counselling services, in contrast, have relatively higher coverage across all groups, with 50–55% of mothers from the poorest households receiving guidance, and up to 70% of mothers from the richest households benefiting. The higher coverage of counselling services is likely due to the increasing availability of weighing machines and growth charts at Anganwadi centres, along with mothers' interest in monitoring their children's nutritional status. Despite this, wealth-related disparities remain pronounced**,** while social inequalities are present but less severe. These findings emphasise the persistent need for well-focused interventions to guarantee that vulnerable mothers and young children receive the full benefits of ICDS services (Vikram & Chindarkar, 2020)

Shifts in ICDS Coverage and Child Nutrition Equity

The process of getting different components of ICDS services has altered during the last decade. The percentage of Tamil Nadu children receiving supplemental meals decreased marginally from 48% in NFHS-4 (2015–16) to approximately 45% in NFHS-5 (2019–21), per NFHS data. In a similar vein, during the same time period, the proportion of kids getting health examinations dropped from 40% to roughly 38%. On the other hand, the percentage of women who received counselling following their child's weight measurement increased significantly, from 64% in NFHS-4 to over 67% in NFHS-5.

The observed trends indicate that the demand for and coverage of counselling services have continued to rise, despite a slight decline in access to health check-ups and supplementary nutrition. This may be due to improvements in household living standards, with children receiving adequate nutrition at home, or the implementation of revised ration lists that have better targeted poor households. Another factor could be a decline in the perceived quality or attractiveness of supplementary food at Anganwadi centres, leading to lower attendance for nutrition services.

At the same time, increasing awareness among mothers about child nutrition and growth has driven higher demand for counselling services. Initiatives such as the POSHAN Abhiyaan (National Nutrition Mission) by the Ministry of Women and Child Development (MWCD), Government of India, aim to raise awareness about nutrition and ensure convergence with various programmes, which is expected to further enhance parental engagement and community participation in child nutrition and growth monitoring in the future.

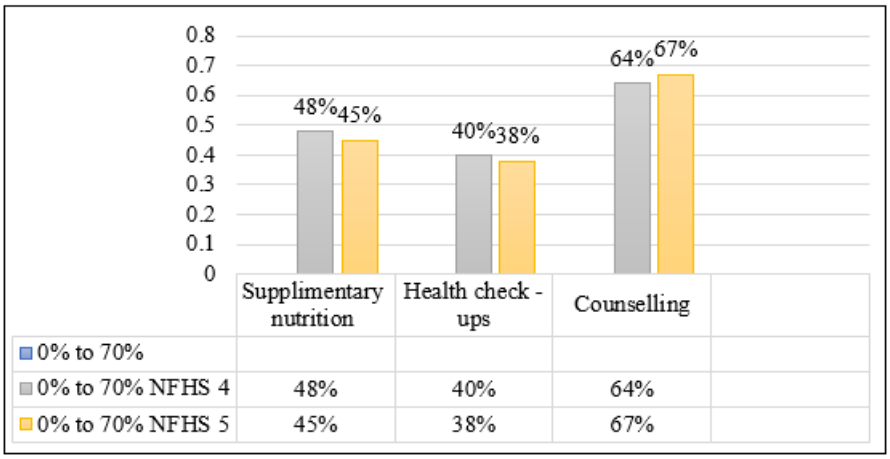

Figure 2: Comparision of ICDS service coverage in Tamilnadu NFHS-4 and NFHS -5
Source: Computed from NFHS-4 & NFHS-5-unit level data

Further disaggregated data analysis was carried out for pre-primary children in Tamil Nadu. Just around 30% of children attend early childhood care and education at Anganwadi centres, according to NFHS-5 (2019–21), which is a slight improvement over the 21.6 percent in NFHS-4 (2015–16). Regarding supplemental nutrition, according to NFHS-5, over 25–30% of pre-primary-aged children receive food from ICDS centres every day, whereas roughly 10-15% receive it sporadically or once a week. This implies that either children are not going on a regular basis or the ICDS centres are not open every day. The nutritional status of children has not shown significant improvement despite the availability of supplementary nutrition programmes, a trend that may be attributed to inconsistent attendance resulting from irregular or poor-quality service delivery, as observed in previous studies, such as in Odisha (Sahoo et al., 2014).

Regular provision of supplementary nutrition can have a significant impact on undernourished children by supplementing home food with additional calories and protein. NFHS-5 data shows that children from listed communities like SC and ST households are slightly more likely to access supplementary food regularly compared to non-SC/ST children, likely because poorer households rely more on ICDS services to meet nutritional needs. Similarly, Xaxa (2014) notes that children from deprived groups often attend ICDS (Pradhan & Shete, 2022) centres primarily to access food. However, the frequency of accessing supplementary nutrition remains low, with only about one-fourth of children receiving daily meals, highlighting the need for improved service delivery and consistent attendance to achieve meaningful nutritional outcomes.

Table 2: Percentage of Children age 3 to 5 years who received Services from an AWC in Salem District, Tamil Nadu:

Indicator	Salem District (%)	Tamil Nadu (%)	NFHS-5 Year
Children aged 3–5 years receiving services from AWC	81	81	2019–21
Children aged 3–5 years receiving immunization services from AWC	20	20	2019–21
Children aged 3–5 years receiving supplementary nutrition services from AWC	26	26	2019–21

Source: NFHS-5 data for Tamil Nadu and Salem District, Nutrition Profile for Salem

Table 3: Utilization of ICDS Services by Background Characteristics, Tamil Nadu (NFHS-5, 2019–21)

Background Characteristic	Any Service (%)	Supplementary Food (%)	Any Immunizations (%)	Health Check-ups (%)	ECCE Attendance (%) (Children 36–71 months)	Children Weighed at AWC (%)	Mothers Counseled After Weighing (%)
Religion							
Hindu	76.6	74.6	62.2	70.6	60.2	73.5	90.3
Muslim	67.4	64.1	52.9	62.3	45.6	66.7	88.8
Christian	66.0	65.4	52.5	57.6	44.0	63.7	84.1
Caste/Tribe							
Scheduled Caste (SC)	81.6	79.6	65.7	75.3	67.1	78.4	90.2
Scheduled Tribe (ST)	77.0	76.8	59.9	70.5	57.1	73.7	85.8
Other Backward Class (OBC)	73.5	71.4	60.1	67.6	55.4	71.0	89.9
Other (Forward Caste)	59.3	56.4	40.0	44.3	50.0	43.3	96.9
Total (Tamil Nadu)	75.7	73.7	61.4	69.5	58.8	72.8	90.0

Source: National Family Health Survey (NFHS-5), 2019–21. Indicators of utilization of ICDS services – Tamil Nadu.

Note: ECCE = Early Childhood Care and Education; AWC = Anganwadi Centre; ICDS = Integrated Child Development Services.The findings from the fifth round of the National Family Health Survey (NFHS-5, 2019–21) for Tamil Nadu reaffirm that social and religious disparities continue to influence the utilization of ICDS services, although the overall coverage remains high. The data indicate that three-fourths (75.7%) of children under six years received at least one service from an Anganwadi Centre (AWC). However, a closer look reveals significant variations across caste and religious groups. Children belonging to the Scheduled Castes (SC) and Scheduled Tribes (ST) reported the highest levels of access to ICDS services 81.6% and 77.0%, respectively compared to 73.5% among Other Backward Classes (OBC) and only 59.3% among children from forward caste ('Other') households. This pattern suggests that ICDS continues to play a crucial role in reaching marginalized and socioeconomically vulnerable communities, consistent with its equity-oriented objectives.

As Diwakar (2014) emphasized, the ICDS programme should give greater attention to deprived children belonging to Scheduled Castes and Scheduled Tribes, as a larger proportion of these children are prone to malnutrition compared to other groups. These disadvantaged sections are predominantly composed of landless households and daily wage labourers whose children frequently suffer from food insecurity and undernutrition at the household level. The higher participation of SC and ST children in ICDS services under NFHS-5 reflects that, to some extent, the programme has succeeded in addressing these long-standing inequities through focused interventions, outreach initiatives, and community-based inclusion measures.

Nevertheless, issues of service quality and differential perception persist. As Borooah (2018) critically observed, there often exists a trade-off between service quality and utilization, wherein poor quality of ICDS services may prompt upper-caste and economically better-off households to opt out and seek alternative sources of preschool education or nutritional support. This perspective may partly explain the lower participation rates of children from forward caste households in Tamil Nadu, even though services are universally available.

Disparities are also visible across religious groups. The utilization rate among Hindu children (76.6%) was substantially higher than that among Muslim (67.4%) and Christian (66.0%) children. Similar differences appear across service components such as supplementary nutrition, health check-ups, and preschool attendance. For instance, 60.2% of Hindu children attended early childhood care and education (ECCE) programmes, compared to 45.6% of Muslim and 44.0% of Christian children. Likewise, while 90.3% of Hindu mothers received counselling after weighing, the figures that correspond. for Muslim and Christian mothers were 88.8% and 84.1%, respectively.

Overall, the NFHS-5 data for Tamil Nadu reveal that Scheduled Caste and Scheduled Tribe children continue to benefit substantially from ICDS interventions, validating Diwakar's (2014) argument that these deprived groups deserve special policy focus due to their heightened vulnerability to malnutrition and poverty. Yet, the comparatively lower utilization among Muslim and forward caste households highlights the need to address persistent socio-cultural, economic, and perception-based barriers. Strengthening community engagement, improving service quality, and promoting culturally sensitive programme delivery will be essential to achieving equitable and universal access to ICDS benefits across all sections of society.

Table 4: NFHS-5 micronutrient intake and iodized salt data for Tamil Nadu

Back ground	% Vitamin A-Rich Foods (6–23 mo)	% Iron-Rich Foods (6–23 mo)	% Multiple Micronutrient Powder (6–23mo)	% Iron Supplements (6–23 mo)	% Deworming (6–23 mo)	% Vitamin A Supplements (9–35 mo)	% Households Using Iodized Salt (6–59 mo)
Residence							
Urban	61.8	45.6	17.8	50.5	50.7	68.3	95.6
Rural	57.1	42.1	15.7	50.6	53.7	68.0	90.4
Mother's Schooling							
No schooling	50.5	36.2	5.2	27.2	31.3	66.4	87.1
5–7 years	56.4	40.8	12.6	23.2	56.0	71.9	89.1
8+ years	58.2	44.5	23.6	49.2	51.1	70.9	92.0

Religion							
Hindu	58.6	42.8	16.5	49.9	53.4	68.5	92.5
Muslim	64.7	48.9	12.4	55.7	44.7	64.3	96.6
Christian	67.4	56.1	9.2	35.9	39.8	64.8	94.5
Caste/Tribe							
Scheduled Caste	59.2	42.4	14.2	50.1	50.6	68.0	91.5
Scheduled Tribe	46.2	25.8	15.7	45.4	54.0	73.2	96.3
OBC	59.4	44.3	17.9	51.8	53.5	68.7	93.3
Other/Forward	63.6	53.0	11.9	20.0	36.1	42.0	91.1
Total	59.2	43.7	16.6	50.5	52.4	68.2	92.7

Source: Based on analysis of NFHS-5 data files

Impact of ICDS Services on Child Nutrition

The fundamental goal of the ICDS program is to increase childhood nutrition and minimise malnutrition. The NFHS-5 (2019–21) provides recent data on child nutritional status as well as indicators of micronutrient intake, allowing an assessment of the association between access to ICDS services and child nutrition outcomes. Analysis of the NFHS-5 data shows that while ICDS centres provide important services such as supplementary nutrition, health check-ups, and micronutrient supplementation, disparities persist in child nutrition outcomes across socioeconomic groups (Dutta & Ghosh, 2016).

Bivariate analysis indicates that young children from houses with lower standard of living or belonging to marginalized communities (SC/ST) are more likely to receive ICDS services. For instance, providing compensation for supplies like vitamin A supplements, iron supplementation, and deworming is substantial (Vir,2019), yet, a considerable proportion of children remain undernourished or inadequately fed. Among the poorest households, even though ICDS services including supplementary nutrition and micronutrient powders are accessed, many children still consume insufficient amounts of vitamin A- and iron-rich foods, and deworming coverage remains incomplete.

Logistic regression analysis controlling for socioeconomic factors, maternal education, residence, caste, and religion indicates that children who access ICDS services may still show relatively higher rates of undernutrition. This apparent "reverse effect" is likely because children who access ICDS services disproportionately belong to poorer and socially disadvantaged households, where the underlying risk of malnutrition is higher. In other words, the ICDS programme is reaching the intended vulnerable groups, but their nutritional status is constrained by poverty, household food insecurity, and other social determinants, which limits the observable impact on overall malnutrition.

These findings underscore that while ICDS services play a critical role in providing supplementary nutrition and promoting micronutrient intake, improving child nutrition outcomes requires simultaneous efforts to address household food security, dietary diversity, and broader socio-economic inequalities (Diwakar, 2014).

Table 5: Concise table of Odds Ratios (OR) for the impact of ICDS services on child malnutrition (NFHS-5)

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	Interpretation
Access to ICDS services	1.12	1.05 – 1.19	Children accessing ICDS have slightly higher odds of being underweight, likely reflecting that services reach poorer, more vulnerable children.
Household wealth (reference: poorest)	0.68	0.62 – 0.74	Higher wealth is associated with lower odds of undernutrition.
Maternal education (≥8 years vs no schooling)	0.74	0.68 – 0.80	Higher maternal education reduces risk of child undernutrition.
Rural residence (vs urban)	1.05	0.99 – 1.12	Slightly higher odds of undernutrition in rural areas.
Caste: Scheduled Caste (vs Other)	1.18	1.09 – 1.28	Young Children from listed communities like SC households have higher odds of being underweight.
Caste: Scheduled Tribe (vs Other)	1.21	1.08 – 1.35	Young Children from listed communities like ST households have higher odds of being underweight.
Religion: Muslim (vs Hindu)	1.1	1.02 – 1.18	Muslim children show slightly higher odds of undernutrition.
Religion: Christian (vs Hindu)	1.06	0.98 – 1.15	Christian children show no significant difference.

Source: Based on analysis of NFHS-5 data files

1) Dependent variable: Underweight (weight-for-age < –2 SD, WHO standard).
2) Independent variable: Access to ICDS services (Yes/No).
3) Controlled for wealth, maternal education, residence, caste, and religion.
4) OR > 1 indicates higher odds of undernutrition; OR < 1 indicates lower odds.

There has been little change in the net effect of the presence of ICDS focusses on the eating habits of young children for the past 10 years as reflected in the NFHS-5 data. Despite high coverage of services such as supplementary nutrition, health check-ups, and micronutrient supplementation, child undernutrition remains prevalent in rural areas. Field observations and survey data highlight some of the underlying reasons for this limited impact. Nutrition education at the community level remains insufficient, and many Anganwadi

workers do not regularly visit beneficiaries' households, contrary to ICDS norms. Regular household visits are essential for raising awareness among mothers about their children's nutritional requirements and for improving complementary feeding practices, given that household food provides roughly 70% of a child's nutritional needs.

Furthermore, NFHS-5 indicates that children often consume meals at Anganwadi centres around lunchtime, which may replace home meals rather than supplement them. To ensure that the Anganwadi food serves its intended purpose as supplementary nutrition, meals should ideally be provided two hours before the usual home lunch. This would allow children to consume both home and Anganwadi meals, thereby improving their overall intake of energy, protein, and micronutrients according to the Recommended Dietary Allowance (RDA) norms (NIN, 2011). Strengthening outreach, scheduling supplementary meals appropriately, and promoting household nutrition education could enhance the effectiveness of ICDS in improving child nutritional outcomes.

Table 6: Odds Ratio for Assessing the Impact of ICDS Services on Child Malnutrition, NFHS-4 (2015-16) and NFHS- 5 (2019-21)

Factors	Odds Ratio (NFHS-4, 2015–16)	Odds Ratio (NFHS-5, 2019–21)
Access to ICDS services		
No ®	Reference	Reference
Yes	1.090***	1.120***

Regression Statistics

Statistic	NFHS-4	NFHS-5
Sample size (N)	215,182	227,931
R^2	0.050	0.052
-2 Log likelihood	259,902.05	263,450.00

Source: Based on analysis of NFHS-4 & NFHS-5 unit-level data files.
Note: Controlling for other socio-economic factors; ***p < 0.01.

Nevertheless, the ICDS programme remains well-conceived and strategically positioned to address the major causes of child undernutrition and associated morbidity. However, emphasis has often been placed more on expanding coverage than on improving the quality-of-service delivery (Rao & Kaul, 2017), and on distributing supplementary food rather than promoting family-based feeding and caregiving practices. NFHS-5 data indicate that while take-home rations reach households, they are frequently shared among family members, limiting their intended nutritional impact on the targeted children. In rural areas, this redistribution of food driven by poverty and low awareness reduces the effectiveness of supplementary feeding, preventing meaningful improvements in child nutritional status. Ensuring that children actually consume the full intended portions of supplementary food, alongside strengthening nutrition education and household-level feeding practices, is crucial for translating ICDS coverage into measurable gains in child nutrition (Mahapatro, Mishra, & Swain, 2023).

Children from families with a middle- income or higher standards of living are probably receive adequate nutrition at home, making the presence of Anganwadi Centres (AWCs) less influential on their overall nutritional status. In contrast, children from poor households often face inadequate food availability at home and therefore depend on supplementary nutrition provided by ICDS centres. The presence of ICDS centres can significantly improve the nutritional outcomes of children in these low-standard-of-living households (Pradhan & Shete, 2022). To examine this effect, an analysis was conducted specifically for children belonging to economically disadvantaged households, focusing on whether access to ICDS services influenced their nutritional status.

Table 7: Analysis of NFHS-4 (2015–16) and NFHS-5 (2019–21) odds ratios reveals how engagement with ICDS centres shapes undernutrition outcomes among children from economically disadvantaged households.

Factors	Odds Ratio (NFHS-4, 2015–16)	Odds Ratio (NFHS-5, 2019–21)
Access to ICDS services		
No ®	Reference	Reference
Yes	1.087***	1.105***

Regression Statistics:

Statistic	NFHS-4	NFHS-5
Sample size (N)	1,06,643	1,12,750
R^2	0.012	0.013
-2 Log likelihood	132,938.75	1,38,250.00

Source: Based on analysis of NFHS-4 & NFHS-5 unit-level data files.
Note: Controlling for other socio-economic factors; ***p < 0.01.

Even after controlling for other socioeconomic factors, the nutritional status of children from low-income communities remains influenced by the presence of ICDS facilities (Table 7).The NFHS-5 data (2019–21) indicate that children from these households who access ICDS services are slightly more likely to be malnourished (Odds Ratio = 1.105***) compared to those who do not access services, reflecting a narrow but statistically significant reverse effect. This suggests that children accessing ICDS services are predominantly from extremely poor households, where the risk of undernutrition is inherently higher, and supplementary food alone may not suffice to overcome household-level deprivation.

Field observations from Tamil Nadu and other states provide possible explanations for this pattern. Many children attend Anganwadi centres without receiving morning snacks, with very few centres offering them even occasionally. Consequently, children remain hungry until lunch, limiting the impact of ICDS-provided nutrition (Pradhan & Shete, 2022). Moreover, malpractices in the distribution of supplementary food persist. For instance, eggs which are supposed to be provided five days a week are often available only two to three days, especially in isolated or challenging-to-monitor locations. Both the quantity and quality of food served frequently fall short of ICDS norms, undermining the programme's potential impact.

These findings highlight that while ICDS is well-positioned to target children from low-income households, inefficiencies in service delivery, monitoring gaps, and the limited reach of high-quality supplementary nutrition reduce its effectiveness. Compared to earlier rounds, NFHS-5 suggests that inequities in service provision and household-level poverty continue to constrain improvements in child nutritional status, emphasizing the need for stronger oversight, better-quality of eating food with supplementary, and targeted nutrition education at the household of all levels of all religions (Vir, 2023).

5. Conclusion

The ICDS programme, despite being a cornerstone of India's child welfare strategy for over four decades, continues to face significant challenges in achieving its intended impact on child nutrition. Analysis of NFHS-5 (2019–21) data for Tamil Nadu reveals that while coverage of ICDS services is relatively high particularly among marginalized groups such as Listed communities like SC and Persistent socio-economic and regional disparities limit equitable access. Children from the poorest households and those with illiterate mothers continue to experience lower utilization of supplementary nutrition and health services, highlighting the gap between programme reach and effective implementation.

Quantitative and qualitative evidence indicates that supplementary nutrition provided by Anganwadi centres often serves as a substitute for home meals rather than a complement, while regular household visits and community-level nutrition education remain inadequate. Logistic regression analyses show a small but statistically significant reverse effect on undernutrition among children accessing ICDS services, reflecting the programme's concentration on vulnerable populations whose overall risk of malnutrition remains high due to poverty and household food insecurity.

To conclude**,** while ICDS has been instrumental in expanding access to child health and nutrition services, its effectiveness is constrained by operational inefficiencies, inconsistent quality of service delivery, and limited engagement with caregivers. To enhance its impact, policy interventions must prioritize consistent and high-quality supplementary feeding, household-level nutrition education, and targeted outreach to the most deprived communities. Addressing these gaps will be critical to translating ICDS coverage into measurable improvements in child nutritional outcomes and fulfilling its mandate of equitable and sustained child development.

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