

Original Article

# Exploring Utilization Patterns and Barriers to Maternal and Child Health Services at Anganwadi Centers in Rural Tamil Nadu

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**Abstract** - Anganwadi centers under India's Integrated Child Development Services (ICDS) scheme are crucial for maternal and child health interventions, yet their service utilization beyond nutritional supplementation remains low. This study quantitatively examines the utilization, perceptions, and barriers of Anganwadi services among postpartum mothers in rural Tamil Nadu. A cross-sectional survey was conducted from May to July 2024 across nine centers, enrolling 102 postpartum mothers using purposive sampling. Structured questionnaires collected data on demographics, service use, perceived helpfulness, and obstacles. Descriptive statistics summarized utilization patterns, while chi-square and Fisher's exact tests assessed associations. Results showed full uptake of Take-Home Ration (100%) but low engagement with postnatal visits (17.2%), immunization support (21.8%), and newborn care advice (20.7%). Newborn care advice was significantly linked with visit frequency ( $\chi^2 = 5, p = .025$ ), and perceived helpfulness decreased significantly when poor staff behavior was reported ( $\chi^2 = 10.78, p = .001$ ). Primary barriers reported were long waiting times (46%), socio-cultural restrictions (45%), and distance to centers (43%). The findings reflect common challenges related to infrastructural deficits, inconsistent delivery, and socio-cultural factors that limit service effectiveness, while also indicating that consistent, respectful community-based care can foster trust despite resource constraints. This study highlights the imperative for ICDS reforms focusing not just on service coverage but on enhancing postnatal and pediatric care, tailoring centers to local needs, and promoting respectful, culturally sensitive interactions by frontline workers. Strengthening these aspects is essential for Anganwadi centers to effectively provide comprehensive maternal and child health support.

**Keywords** - Anganwadi services, Maternal health, Child health, Service utilization, Barriers.

## 1. Introduction

Malnutrition and anaemia represent critical public health challenges in India, with every second child in India experiencing malnutrition, and every third woman experiencing anaemia. These numbers reflect a significant systemic failure. According to the National Family Health Survey-5 (NFHS), 35.5% of children under five were stunted, 32.1% were underweight, and 57% of women were anaemic from 2019 to 2021. Such statistics reflect not only the scale of the crisis but also the disconnect between policy intent and service outcomes [1].

The Integrated Child Development Service (ICDS) currently supports over 158 million beneficiaries across more than 1.36 million Anganwadi Centres (AWCs) [2]. It aims to provide a comprehensive set of services, which includes supplementary nutrition, immunization referrals, health checkups, pre-school education, and health education for mothers [3].

Yet the impact falls short of expectations. Only 53.3% of children under 6 years of age used AWC services in the past year (NFHS-5). There are still significant regional differences, with states like Uttar Pradesh and Bihar showing much lower usage rates than those in the southern region.

Furthermore, awareness of benefits remains limited. According to 2020 research conducted by Kadam and Kulkarni, only 24.2% of mothers recognized ICDS benefits, while less than 40% understood the adolescent girl programs [4].

Anganwadi Centres aim to deliver a standardized package of services under ICDS, targeting women and children through eight key interventions, which include: Take-Home-Ration (THR), growth monitoring, immunization support, nutrition advice, Antenatal Checkups (ANC), postnatal visits, newborn care advice, and pre-school education [5].



These services were designed to operate synergistically.

However, empirical data show uneven delivery. For instance, in Sangli, an urban area in Maharashtra, 100% of women received ANC registration, yet only 58.6% accessed maternity benefits and 47.1% received postnatal support. Such variation suggests that while infrastructure exists, service utilization remains fragmented, i.e., often skewed toward supply-driven functions like THR, while underperforming in trust or behaviour-dependent components.

Despite its size, ICDS continues to face ongoing gaps in service utilization. Access varies across geography and service type. For example, in rural Telangana, over 85% of pregnant women received supplementary nutrition and immunization services, while less than half used referral services [6]. Similarly, in urban Wardha, working women were significantly less likely to visit AWCs due to inconvenient hours and limited flexibility [7].

These differences in service usage often result from structural and perceptual barriers, including distance, food quality, lack of time, and inconsistent worker engagement. Studies also show that Anganwadi workers' (AWW) performance can vary based on caste, training, and available resources. Services like growth monitoring and home visits are often delivered inconsistently.

Even in better-performing districts, overall efficiency remains low. In Kerala, only 5% of AWCs met high-efficiency standards due to gaps in infrastructure and coordination between sectors. These findings highlight a central problem, i.e, high coverage does not automatically translate into equitable or effective use of services, underlining the need for closer service-level examination [8].

The utilization of Anganwadi services is influenced by a variety of factors, including demographics, practical benefits, and accessibility. Factors like age, income level, and maternal education often impact participation, but they are also shaped by contextual factors like household responsibilities, gender expectations, and support from spouses.

Barriers often extend beyond physical distance. They include timing issues, staff absenteeism, and low perceived benefits, especially for informational services like nutrition counselling and postnatal advice. In several regions, beneficiaries identified a lack of trust in Anganwadi Workers, poor communication, and inconsistent follow-ups as major obstacles [9].

While product-based services like THR and immunization benefited from institutional support and visibility, behaviour-driven services such as growth monitoring or newborn care advice were more likely to suffer due to service gaps. Convenience and familiarity were

important facilitators, but their availability varies across different centres [5].

In this context, Social Cognitive Theory (SCT) offers valuable insight by highlighting how self-efficacy, observational learning, and community norms shape Anganwadi Sevika's practices. It is central to understanding behaviour change in maternal and child health.

Additionally, the Consolidated Framework for Implementation Research (CFIR) helps unpack barriers and facilitators across settings. It brings attention to standardization gaps, staffing, supervision, and resource flows, offering a structured lens to strengthen ICDS delivery [10].

Building on this theoretical perspective, the Andersen Behavioural Model is a framework that explains healthcare utilization patterns. The model consists of three main components:

- Predisposing factors, which are the demographic and social traits that affect behavior;
- Enabling factors, which are the logistical and financial resources that help or block access, and
- Need factors are the health conditions that drive people to seek services.

This model is commonly used in health services research. It also offers a structured way to examine how personal and contextual factors cumulatively influence healthcare-seeking behaviour [11]. A key limitation of the current research on Anganwadi service utilization is the heavy reliance on aggregated data and generalized outcomes. This approach undermines the differences in service delivery and individual participant factors [12].

While several studies highlight underutilization, few disaggregate findings by service category or user profile; this complicates identifying gaps. The current evidence is predominantly qualitative, relying on perceptions without quantifying the scale of specific barriers. Consequently, there is limited clarity on how individual-level factors such as demographics, perceptions of helpfulness, or logistical challenges shape the use of specific Anganwadi services [13, 14].

To design targeted and effective interventions, there is a pressing need for granular, participant-level data that captures not only whether services were accessed, but also which ones, by whom, how frequently, and under what conditions. Such data would allow comparative service analysis, reveal hidden inequities, and support evidence-based reforms within the ICDS framework.

The main goal of this study is to conduct a quantitative analysis of Anganwadi usage among eligible women,

focusing on maternal and child health under the ICDS framework. Specifically, this study aims to:

- Measure usage patterns for individual services like THR, immunization, ANC, postnatal visits, and growth monitoring.
- Evaluate relationships between usage and important factors such as maternal demographics, visit frequency, perceived convenience, and service helpfulness.
- Identify and examine barriers like structural, perceptual, and socio-cultural factors that prevent consistent utilization of services.

Despite the wide reach of the Integrated Child Development Services (ICDS) program in India, there remains a significant gap in understanding how postpartum women utilize Anganwadi services during the crucial postnatal period. Existing studies have largely emphasized program coverage and child nutrition outcomes, often treating pregnant women, lactating mothers, and children as a single group, thereby overlooking the specific health and nutritional needs of postpartum women. This group faces unique challenges, which include cultural restrictions after childbirth, mobility limitations, and the dual demand of maternal recovery and infant care that directly influence their ability to access and engage with services.

While nutritional provisions such as Take-Home Rations are well documented, there is limited evidence on the utilization of more comprehensive maternal and child health services, such as postnatal checkups, counselling, and paediatric care. Moreover, little is known about how structural barriers, including accessibility issues, inconsistent supplies, and staff constraints, interact with socio-cultural dynamics to shape service uptake. This lack of evidence presents a critical research gap that this paper seeks to address in order to strengthen Anganwadi centres as effective platforms for maternal and child health and to inform policies ensuring timely and equitable service access for postpartum women.

These findings will offer robust, evidence-based recommendations to inform ICDS programming, especially regarding tailoring service delivery to meet local needs. Moreover, this research is directly relevant to policy, as it can help inform targeted interventions to improve the health of mothers and children by:

- Increasing accessibility and equity in services
- Addressing gaps in quality and trust
- Facilitating evidence-based planning for ICDS reforms at the national or state level

## 2. Literature Review

Recent evidence indicates that utilization of Anganwadi services under the ICDS program remains inconsistent, particularly for maternal health interventions. A key concern identified across studies is the heavy workload of Anganwadi Workers (AWWs).

In Vadodara, Desai et al. (2010) surveyed 30 Anganwadi centres and found that 33% of workers reported compromised delivery of core ICDS services because of additional duties such as election work and immunization campaigns. Workers maintained over ten registers and engaged in multiple community activities, leaving limited time for counselling or follow-up with mothers [15]. Similarly, Sandhyarani and Rao (2014), in their study of 122 AWWs across seven taluks of Mysore district, observed that while all workers implemented core schemes like nutrition supplementation and immunization, only 81% conducted regular weight checks for pregnant women. Such findings underscore that maternal health monitoring is often inconsistent due to task overload and variable adherence to program guidelines [16].

Infrastructure and service quality also strongly influence outcomes. Chudasama et al. (2013), in a cross-sectional evaluation of 60 AWCs across 12 districts in Gujarat, found that while 66.7% of centers operated from government buildings, only 30% regularly provided health checkups, 10% delivered immunization support, and just 8.3% facilitated referrals. These service gaps persisted despite the majority of workers having more than 10 years of experience [17].

Systemic inequity also plays an important role. Gopalakrishnan et al. (2018) analyzed the performance of Anganwadi Workers in rural India, reporting coverage rates of 52% for take-home rations, 47% for growth monitoring, 37% for home visits, and 45% for Infant and Young Child Feeding (IYCF) counseling. Product-oriented services such as take-home rations were more consistently delivered, whereas information-oriented services like home visits and counseling suffered from irregularity and socio-cultural barriers [18].

Socio-cultural dynamics further shape utilization. A large survey in Ernakulam, Kerala (2019), involving 553 women, found that 90.5% of mothers with children under five used AWC services, while only 48.7% of pregnant women and 27.2% of lactating mothers did so. Reported barriers included lack of time (60%), poor communication by workers (45%), and stigma, with 10% perceiving Anganwadi services as “only for the poor”. In Mangaluru, a descriptive survey of 100 mothers with children aged 0–6 years revealed that while 61.3% reported high utilization of services, half of the respondents held only moderate perceptions of service quality, indicating that convenience and accessibility often outweighed satisfaction in determining usage [19].

Patterns of selective utilization are also evident in studies focusing on child beneficiaries. In coastal Karnataka, Sivanesan et al. (2016) found that while supplementary nutrition reached almost all registered children, participation in nutrition and health education sessions was less than half. Regular attendance was inconsistent, with many families

prioritizing private schools over Anganwadi services. This reflects how competing options and parental preferences dilute the uptake of behavior-driven interventions [20].

More recent studies suggest urban-rural differences further complicate service delivery. Tabassum et al. (2025) found that among 150 women in South-East Delhi, 55.3% utilized Anganwadi services, while knowledge of basic antenatal care was high at 93.3%. Higher maternal education and socioeconomic status were significantly associated with greater use of these services [21].

These studies collectively demonstrate persistent gaps in maternal health service delivery via Anganwadi Centers, highlighting the need for targeted interventions to improve awareness, access, and consistency of antenatal care and related support services.

### 3. Materials and Methods

#### 3.1. Study Design

This study employed a cross-sectional survey design to examine Anganwadi service utilization patterns among postpartum women in rural Tamil Nadu. Primary data collection was conducted from May to July 2024 across 9 Anganwadi centres in rural regions of Tamil Nadu, South India. The objective was to examine the utilization of Anganwadi services by postnatal lactating mothers and to identify the barriers that influence service uptake.

#### 3.2. Population and Study Setting

The study was conducted in rural Tamil Nadu, which was selected for its diverse socio-economic profile and established ICDS infrastructure. Tamil Nadu represents an ideal setting due to its relatively well-developed Anganwadi network and documented variations in service utilization patterns across different districts.

#### 3.3. Sampling

The analytical sample comprised 102 respondents, all postpartum mothers who had delivered within the preceding 12 months. Sample size was determined through power analysis using G\*Power 3.1.9.7, targeting a medium effect size (Cohen's  $w = 0.3$ ) with 80% power and  $\alpha = 0.05$  for chi-square analyses. This calculation indicated a minimum required sample of 88 participants; the final sample of 102 provided adequate power while accounting for potential non-response. Respondents' ages ranged from 19 to 37 years, with a mean age of 26.93 years. Parity also varied, with the mean number of children per mother at 1.72, reflecting a mix of first-time and multiparous mothers.

Sampling followed a purposive non-probability approach. While this sampling method limits generalizability, it was selected to ensure adequate representation of key demographic subgroups and service

exposure patterns. Beneficiary lists maintained at each Anganwadi centre served as the unit-level sampling frames. From these, eligible lactating mothers were selected according to the following inclusion criteria:

- Postnatal status,
- Residence within 5 km of the Anganwadi service area,
- Willingness to participate.
- Ability to communicate in Tamil or Hindi
- No cognitive impairments affecting survey participation

The sampling strategy aimed to capture diversity in socio-demographic characteristics and service exposure.

#### 3.4. Data Collection

The data collection process involved trained female enumerators who utilized structured questionnaires in the local languages of Tamil and Hindi. All participants provided verbal informed consent prior to participation, following an explanation of the study objectives, data confidentiality, and the voluntary nature of involvement. Responses were initially recorded on paper forms, then transferred into a digital format for further processing.

#### 3.5. Design of Survey

The questionnaire was structured to capture three categories of variables:

- Demographic Characteristics: Age, number of children, education level, age of youngest child.
- Engagement with Anganwadi services: Frequency of visit and helpfulness of service.
- Service Utilization Variables: Utilization of nutritional supplementation, health checkups, immunization support, health education sessions, and referral services.
- Barrier Variables: Reported obstacles include lack of awareness, distance from the Anganwadi center, cultural or family restrictions, poor quality of services, and negative attitudes of Anganwadi workers.

#### 3.6. Data Management

Microsoft Excel spreadsheets were used to perform decoding, organization, and descriptive calculations. To enhance analytical rigor, DataTab software was employed to cross-verify measures and create charts for means, frequencies, and percentages, as well as do statistical testing. This dual-platform approach minimized error and reinforced the reliability of results.

#### 3.7. Statistical Analysis

Analysis was conducted in three stages:

- Descriptive Statistics: Means, medians, modes, standard deviations, frequencies, and percentages were calculated to describe demographic profiles, service utilization, and barriers.
- Categorical Analysis: Service utilization variables were summarized into frequency tables to present the proportion of respondents who accessed each service.

Barrier variables were similarly organized to show the most frequently reported obstacles to utilization.

- Inferential Analysis: Chi-square and Fisher's exact tests (significance level  $p < 0.05$ ) were applied to examine associations between socio-demographic characteristics and Anganwadi service utilization.

### 3.8. Informed Consent

All participants provided verbal informed consent. They were informed of the study objectives, confidentiality measures, and the voluntary nature of participation. No personal identifiers were collected; all responses were anonymized.

## 4. Results

### 4.1. Demographic Profile of Respondents

A majority of mothers (83.91%) visited Anganwadi centres on a monthly basis, while 16.09% reported visiting rarely. The mean age was 26.93 years ( $SD = 3.78$ ), with ages ranging from 19 to 37 years. The median was 27 years, and the most frequent age reported was 29 years. Nearly half of the respondents (48.3%) had two children, 40.2% had one child, and a smaller proportion had three (10.3%) or four children (1.1%). The largest group of respondents (43.7%) reported their youngest child as one year old, followed by 24.1% with a two-year-old, and 12.6% with infants below one year.

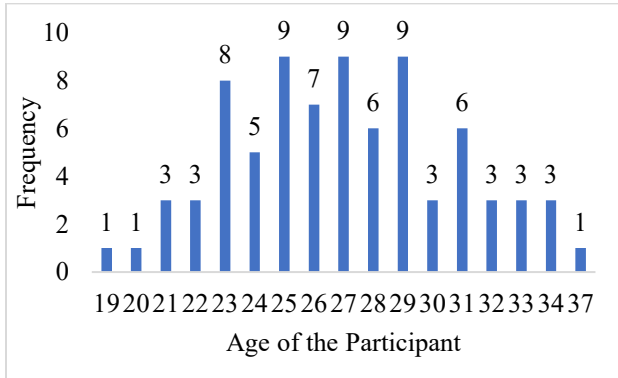


Fig. 1 Age Distribution of Participants

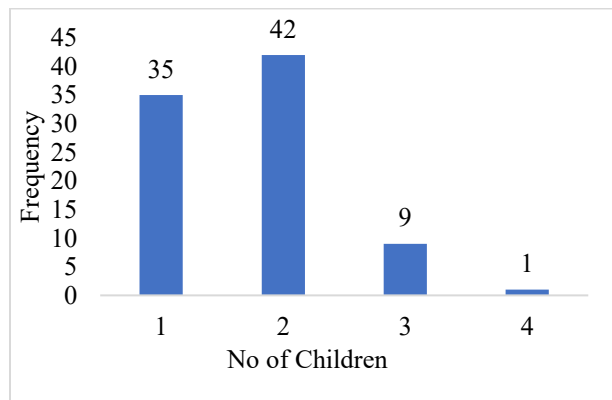


Fig. 2 Number of children

### 4.2. Frequency of Distribution

A majority of respondents (83.9%) reported visiting the Anganwadi centre on a monthly basis, while 16.1% reported visiting rarely. This shows that most mothers maintain regular contact with Anganwadi services, though a smaller proportion attend infrequently.

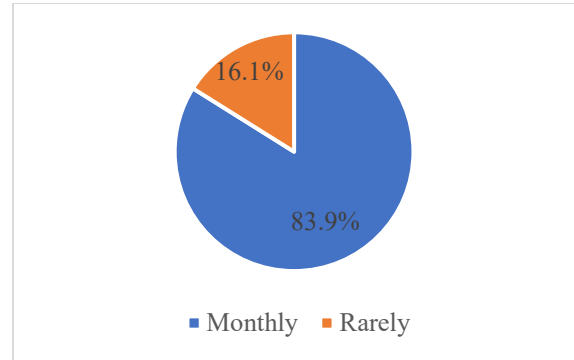


Fig. 3 Frequency of Anganwadi Visits

### 4.3. Utilization of Anganwadi Services

All respondents (100%) reported availing THR. Utilization was lower for other services, including antenatal checkups (49.4%), growth monitoring (47.1%), immunization support (21.8%), nutrition advice (21.8%), newborn care advice (20.7%), and postnatal visits (17.2%).

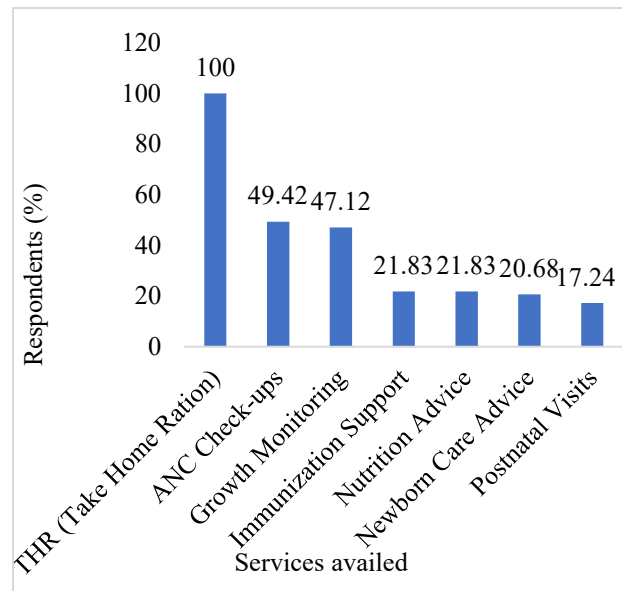


Fig. 4. Service Utilization Patterns

### 4.4. Perceived Helpfulness and Accessibility of Services

Most respondents (75.9%) felt services were "somewhat helpful," while 24.1% reported them as "helpful." A majority (63.2%) reported that the location or timings were inconvenient. Over half (57.5%) reported not receiving postnatal care, 24.1% rated it as "somewhat" available, and 18.4% reported receiving it. Only 21.8% reported receiving

follow-up maternal care, while 78.2% did not. 74.7% reported no paediatric care availability at the centres, 13.8% reported availability, and 11.5% were unsure.

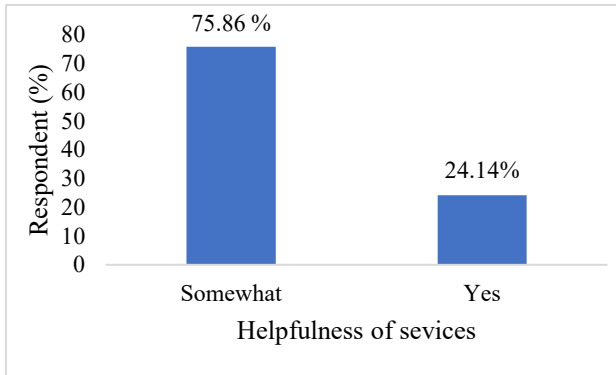


Fig. 5 Perceived Helpfulness of Services

#### 4.5. Reported Barriers to Service Utilization

Respondents identified long waiting times (45.97%), social/cultural barriers (44.82%), and distance issues (42.52%) as the main obstacles to service use. Lack of medicines/supplies (35.63%) and poor staff behaviour (21.83%) were less frequently reported. Overall, accessibility and operational challenges were the primary concerns.

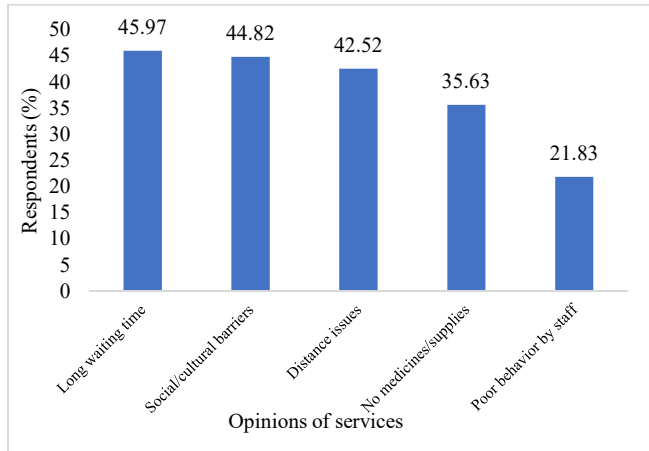


Fig. 6 Barriers to utilization

#### 4.6. Chi-Square Test Analysis and Fisher's Exact Tests

##### 4.6.1. Frequency of Visit vs Services Availed

Chi-square tests were conducted to examine associations between frequency of visits and the utilization of various maternal and child health services. Most associations, including Immunization Support ( $\chi^2 = 0.56$ ,  $p = .455$ ), Nutrition Advice ( $\chi^2 = 2.11$ ,  $p = .146$ ), Growth Monitoring ( $\chi^2 = 0.12$ ,  $p = .727$ ), ANC Checkups ( $\chi^2 = 1.47$ ,  $p = .225$ ), Postnatal Visits ( $\chi^2 = 0.10$ ,  $p = .749$ ), and THR ( $\chi^2 = 0$ ,  $p = 1$ ), were not statistically significant, indicating no strong relationship between visit frequency and these services.

However, a significant association was observed between Frequency of Visit and Newborn Care Advice ( $\chi^2 =$

5,  $p = .025$ , Cramér's  $V = 0.33$ ), suggesting that participants who visited monthly were more likely to receive newborn care advice compared to those who visited rarely.

Table 1. Association between Frequency of visit and Utilization of Newborn Care Advice services

| Variable                                 | Chi-square value | Degrees of Freedom (df) | p-value |
|------------------------------------------|------------------|-------------------------|---------|
| Frequency of visit – Newborn Care Advice | 5                | 1                       | 0.025   |

##### 4.6.2. Frequency of Visit vs Reported Barriers to Service Utilization

Chi-square tests were conducted to examine associations between frequency of visits and reported barriers to service utilization. Most associations, including Poor Behaviour by Staff ( $\chi^2 = 1.88$ ,  $p = .17$ ), Distance Issues ( $\chi^2 = 0$ ,  $p = .978$ ), Lack of Medicines/Supplies ( $\chi^2 = 0.38$ ,  $p = .538$ ), and Long Waiting Time ( $\chi^2 = 0.11$ ,  $p = .742$ ), were not statistically significant, indicating no strong relationship between visit frequency and these barriers.

However, a significant association was observed between Frequency of Visit and Social/Cultural Barriers ( $\chi^2 = 6.29$ ,  $p = .012$ , Cramér's  $V = 0.27$ ), suggesting that participants who visited services monthly were less likely to experience social or cultural barriers compared to those who visited rarely.

Table 2. Association between Frequency of Visit and Social/Cultural Barriers

| Variable                                      | Chi-square value | Degrees of Freedom (df) | p-value |
|-----------------------------------------------|------------------|-------------------------|---------|
| Frequency of visit – Social/Cultural Barriers | 6.29             | 1                       | 0.012   |

##### 4.6.3. Perceived Helpfulness of Services and Reported Barriers to Service Utilization

Chi-square tests were conducted to examine associations between perceived helpfulness of services and reported barriers to service utilization. Most associations, including No Medicines/Supplies ( $\chi^2 = 0.07$ ,  $p = .787$ ), Long Waiting Time ( $\chi^2 = 2.83$ ,  $p = .093$ ), Social/Cultural Barriers ( $\chi^2 = 2.96$ ,  $p = .085$ ), and Distance Issues ( $\chi^2 = 0.96$ ,  $p = .328$ ), were not statistically significant, indicating no strong relationship between service helpfulness and these barriers.

However, a significant association was observed between Helpfulness of Services and Poor Behaviour by Staff ( $\chi^2 = 10.78$ ,  $p = .001$ , Cramér's  $V = 0.35$ ), suggesting that participants who perceived services as helpful were less

likely to report experiencing poor behaviour from staff. Fisher's exact test confirmed this significance ( $p = .002$ ), highlighting the impact of staff behaviour on clients' perception of service effectiveness.

**Table 3. Association between Helpfulness of Services and Poor Behavior by Staff**

| Variable                                         | Chi-square value | Degrees of Freedom (df) | p-value |
|--------------------------------------------------|------------------|-------------------------|---------|
| Helpfulness of Services - Poor Behavior by Staff | 10.78            | 1                       | 0.001   |

#### 4.6.4. Perceived Helpfulness of Services and Services Availed

Chi-square tests were conducted to examine associations between perceived helpfulness of services and utilization of various maternal and child health services. None of the associations, including Immunization Support ( $\chi^2 = 2.46$ ,  $p = .117$ ), THR (Take Home Ration) ( $\chi^2 = 0$ ,  $p = 1$ ), Nutrition Advice ( $\chi^2 = 0.74$ ,  $p = .391$ ), Growth Monitoring ( $\chi^2 = 0.91$ ,  $p = .341$ ), ANC Checkups ( $\chi^2 = 0.48$ ,  $p = .489$ ), Postnatal Visits ( $\chi^2 = 0.17$ ,  $p = .681$ ), and Newborn Care Advice ( $\chi^2 = 2.7$ ,  $p = .101$ ), were statistically significant, indicating no strong relationship between service helpfulness and these specific health services.

These results suggest that participants' perceptions of helpfulness were generally independent of whether they received these services. Although p-values were above the defined significance level of 5%, the observed Pearson contingency coefficients indicate a small to moderate association in some cases (C values ranging from 0.06 to 0.25), suggesting potential trends that could be explored further in larger studies.

## 5. Discussion

### 5.1. Summary of Key Findings

Take-Home Rations (THR) were universally available, suggesting that nutrition-focused interventions are functioning effectively [22, 23]. However, uptake of other services such as antenatal checkups, growth monitoring, immunization support, and counselling was markedly lower. The average maternal age of participants was 26.9 years, with nearly half caring for two children, indicating significant demand for maternal and child health services in the early reproductive period.

Despite this demand, only 17.2% reported receiving postnatal visits, and nearly 75% reported the absence of paediatric services, pointing to serious discontinuities in care. Perceived helpfulness was strongly associated with staff behaviour, but not with actual utilization, suggesting that structural and operational barriers outweighed interpersonal factors.

These results can be understood through established theoretical frameworks. Andersen's Behavioural Model of Health Service Utilization highlights the role of enabling factors: while predisposing (maternal age, parity) and need factors (child health demands) were present, enabling resources, such as consistent availability of paediatric care, were limited [24]. This explains why THR, supported by predictable supply chains, had full uptake, whereas other services lagged. From an implementation science perspective, the Consolidated Framework for Implementation Research (CFIR) reveals barriers at multiple levels: poor standardization of postnatal protocols (intervention characteristics), staffing and prioritization constraints (inner setting), supply-chain variability (outer setting), and weak supervision (process) [25]. Social Cognitive Theory further explains the findings: supportive staff behaviour improved perceptions through verbal encouragement and observational learning, but without structural support, these perceptions did not translate into higher utilization [26].

Service perception was moderate, with 75.9% of mothers rating Anganwadi services as "somewhat helpful." The strong association between perceived helpfulness and staff behaviour underscores the critical role of provider-client interactions in shaping satisfaction. Mothers who reported respectful and supportive behaviour from staff were significantly more likely to perceive services as helpful. This is consistent with evidence from other studies, which emphasize that the quality of interpersonal interactions is a key determinant of service acceptability. In contrast, no significant correlations were found between perceived helpfulness and the actual use of the majority of health services, indicating that structural obstacles are more significant factors affecting access.

These findings hold considerable implications for both policy formulation and practical implementation. The strengthening of postnatal and paediatric care within Anganwadi centres emerges as a priority to address persisting service gaps. This requires the provision of essential maternal and child health services, such as immunization, nutritional supplementation, and developmental monitoring, and the establishment of structured referral pathways to higher levels of care when necessary. Operational obstacles need to be systematically tackled to improve the effectiveness of service provision. Enhanced scheduling techniques, decreased waiting periods via more effective workflow management, and fair distribution of resources, such as personnel and medical supplies, are vital for enhancing accessibility and continuity of care. Beyond technical competencies, emphasis should be placed on communication skills, cultural competence, and community engagement, as these dimensions significantly shape the acceptability and perceived trustworthiness of services. Embedding such reforms within broader health system strategies would

strengthen the role of Anganwadi centres and contribute to long-term improvements in maternal and child health outcomes.

A parallel analogy can be drawn from Ethiopia's Health Extension Program, where health extension workers received standardized training and followed defined home-visit protocols, leading to significant improvements in maternal and child health outcomes in underserved regions [27, 28]. Incorporating elements of this model, including structured postnatal visits and supervised skill development for frontline workers, could enhance the responsiveness and credibility of the Anganwadi system.

## 5.2. Limitations of the Study

This study is not without limitations. The modest sample size restricts generalizability, and participant selection may have introduced bias by favouring mothers already engaged with Anganwadi centres. Reliance on self-reported data may have led to recall or social desirability bias, particularly regarding service utilization. The cross-sectional design prevents causal inference, limiting conclusions about whether provider behaviour directly drives utilization. Finally, the geographic focus narrows applicability to regions with similar demographic and programmatic conditions.

## 6. Conclusion

This study set out to analyse service-level utilization of Anganwadi Centres (AWCs) within the ICDS framework, with a focus on maternal and child health. The aim was to quantify uptake across individual services, identify demographic and perceptual predictors of engagement, and examine barriers that shape utilization. The findings reinforce the paradox at ICDS, i.e., scale does not equal impact. Despite nationwide coverage of 158 million beneficiaries through 1.36 million centres, outcomes remain poor. Thirty-five-point five percent of children under five are stunted, 32.1 percent underweight, and 57 percent of women anaemic according to NFHS-5.

Within this study, service utilization was heavily skewed toward supply-driven interventions such as Take-Home Rations (100%), while behaviour-dependent components like postnatal visits (17.2%), newborn care advice (20.7%), and growth monitoring (47.1%) lagged. Chi-square analyses further revealed that the frequency of visits influenced access to newborn care advice, while social and cultural barriers were more pronounced among rare users. Perceptions of staff behaviour also significantly shaped whether services were deemed helpful.

These findings illustrate that utilization disparities are not merely logistical but are deeply tied to trust, staff engagement, and social context. The purpose of this work was not only to map gaps but to emphasize that equitable maternal and child health requires more than infrastructure. For policymakers and practitioners, strengthening staff training, addressing cultural barriers, and improving participant-level monitoring are essential to make AWCs not just distribution points but effective maternal and child health platforms.

Unlike much of the existing literature that reports aggregated outcomes or relies primarily on qualitative perceptions, this study provides a disaggregated, service-level analysis of maternal and child health utilization at Anganwadi Centres, with a specific focus on postpartum women who have often been overlooked in earlier research. By quantifying uptake across individual services and linking these patterns to demographic, perceptual, and cultural predictors, the study moves beyond merely documenting underutilization and explains why certain services, particularly those that are behaviour dependent, continue to lag. This level of granularity, supported by statistical testing, offers more actionable insights than prior broad evaluations and demonstrates that barriers to effective ICDS delivery arise not only from infrastructure gaps but also from issues of trust, staff engagement, and socio-cultural dynamics.

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