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AN ANALYSIS ON THE LEVEL OF AWARENESS AND USAGE OF SELECTED NATIONAL PUBLIC HEALTH PROGRAMMES IN THE STATE OF TAMILNADU: WITH SPECIAL REFERENCE TO COIMBATORE DISTRICT

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ABSTRACT

Maternal and child health remains a critical concern in India despite the long-standing implementation of the Integrated Child Development Services (ICDS) programme. The success of ICDS largely depends on beneficiaries' awareness of its services and their subsequent utilisation. The present study examines the level of awareness and utilisation of ICDS services and analyses the impact of socio-economic factors on awareness and its influence on utilisation. Primary data were collected from 300 women beneficiaries selected from Anganwadi centres in Coimbatore district, Tamil Nadu. Awareness and utilisation were measured using multidimensional latent constructs covering supplementary nutrition, immunisation, health check-ups, referral services, pre-school education, nutrition and health education, and availability of health personnel. Exploratory and confirmatory factor analyses were employed to validate the constructs, followed by structural equation modelling to examine causal relationships. The results indicate that awareness of ICDS services is high for supplementary nutrition and immunisation but relatively low for referral and educational services. Socio-economic factors such as age, income, occupation, family type, religion, and community significantly influence awareness. Awareness, in turn, has a strong and statistically significant impact on utilisation of ICDS services. The study concludes that improving awareness is crucial for enhancing utilisation and strengthening the overall effectiveness of ICDS in India.

Keywords: ICDS; Awareness; Utilisation; Maternal and Child Health; Socio-economic Factors; Structural Equation Modelling; Anganwadi Services; Tamil Nadu

INTRODUCTION : Maternal and child health (MCH) is a critical indicator of a nation's health system, impacting survival rates and overall productivity (WHO, 2014; UNICEF, 2019). In India, high child malnutrition rates, driven by various factors including maternal health, socio-economic conditions, and access to healthcare, persist despite policy efforts (Riddhi Gupta et al., 2016; UNICEF, 2019). Issues such as maternal mortality and anemia contribute to adverse birth outcomes, with rural-urban disparities and income inequality affecting MCH outcomes (Ministry of Health and Family Welfare, 2021; Murmu et al., 2022). The Integrated Child Development Scheme (ICDS), launched in 1975, aims to enhance the health of children under six and pregnant women. A study focused on Coimbatore district seeks to assess women's awareness and use of ICDS services to address the high malnutrition rates among mothers and children.

THE ICDS : WOMEN AND CHILDREN: The Integrated Child Development Services (ICDS) scheme is India's primary health service initiative for enhancing health, nutrition, and early education for children under six, and also supports pregnant and lactating women. Launched in 1975 and briefly suspended in 1978, it has expanded to cover rural, tribal, and urban poor populations through Anganwadi Centres (AWCs). Policy adjustments in Five-Year Plans have linked it with maternal health and nutrition programs, integrating efforts from the National Nutrition Policy of 1993 and the Poshan Abhiyaan of 2018. Currently, it provides supplementary nutrition, preschool education, health assessments, immunizations, and referrals, reflecting the government's commitment to maternal and child welfare amid ongoing challenges.

AWARENESS AND UTLISATION OF ICDS SERVICES – THE REVIEW FINDINGS : In various studies regarding the Integrated Child Development Services (ICDS), women play a vital role in child health, yet gaps in awareness and service utilization persist. Research indicates significant regional and socio-economic disparities in women's awareness of ICDS services, which include supplementary nutrition, immunization, and health education. Most women reported awareness of supplementary nutrition, but perceptions of service quality often fell short. Factors such as time constraints and lack of community involvement hindered service utilization, emphasizing the need for improvements in training, infrastructure, and support for anganwadi workers. A study in central Kerala highlighted that while awareness of services like supplementary nutrition was high, mothers' perceptions and actual service use were often lower than expected, indicating potential areas for enhancement. Overall, there is a call for universalization of ICDS that extends beyond quantity of services to address quality, training, and comprehensive early childhood care.

THE PROBLEM FOCUS : Research on the ICDS programme reveals that despite its nearly 50 years of existence, awareness among eligible women remains inadequate, with utilization rates only around 50-60%. While many women are aware of key services like supplementary nutrition and immunisation, knowledge of other services such as referral assistance and health education is significantly lower. Moreover, the gap between awareness and actual service utilization indicates barriers beyond information access. In districts like Coimbatore, understanding the socio-economic factors influencing both awareness and utilization is crucial for improving programme effectiveness and addressing persistent low utilization in nutritionally vulnerable states.

MATERIALS AND METHODS: The study examines female beneficiaries' opinions on pre and postnatal care and child care in Anganwadis. It involved selecting a sample from 371 Anganwadis based on the availability of women who accessed maternal and child care services, ultimately resulting in a sample of 300 women. A pre-tested questionnaire was utilized, covering 35 measurement variables across seven constructs related to services provided by Anganwadi centers. Unlike previous research focusing solely on infrastructure, this study also identifies factors influencing service utilization, enhancing understanding of their impact on service effectiveness. Methodologically, the study is notable for implementing Structural Equation Modeling (SEM) to analyze awareness and utilization, alongside the use of Exploratory and Confirmatory Factor Analysis. It assesses the influence of socio-economic factors on awareness, which mediates the utilization of services, marking a significant contribution to existing knowledge on ICDS services in India.

RESULTS AND DISCUSSIONS: As outlined in the document, the socio-economic profile of women respondents utilizing the ICDS programme reveals that the majority (31.67%) fall within the age group of 35-45 years, with a significant portion having secondary-level education (51.67%). Employment is fairly balanced, with 52.67% engaged in non-agricultural activities. The income distribution shows that 33.00% earn between Rs. 15,000-20,000, indicating a prevalence of middle-income households. A majority of respondents (54.33%) belong to joint families. In terms of religion, 62.33% practice Hinduism, and 59.33% are from the Most Backward Community (MBC). The respondents are predominantly rural (75.67%), suggesting that ICDS services are more accessible and utilized by rural women.

TABLE:1 DISTRIBUTION OF SAMPLE WOMEN RESPONDENTS BY SOCIO ECONOMIC STATUS

Sl.No.	Variable	No. of Respondents	Percentage
I.	**Age (in years)**		
1	Less than 25	69	23.00
2	25-35	85	28.33
3	35-45	95	31.67
4	45 above	51	17.00
	Total	**300**	**100.00**
	Education		
1	Illiterate	15	5.00
2	Primary	0	0.00
3	middle	20	6.67
4	Secondary	155	51.67
5	HSC.	110	36.67
	Total	300	100.00
	Occupation		
1	Agricultural	142	47.33
2	Non agriculture	158	52.67
	Total	300	100.00
	Monthly Income (in Rs.)		
1	Less than 10000	46	15.33
2	10000-15000	69	23.00
3	15000-20000	99	33.00
4	20000-25000	86	28.67
	Total	300	100.00

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	Type of Family		
1	Nuclear	137	45.67
2	Joint	163	54.33
	Total	300	100.00
	Religion		
1	Hindu	187	62.33
2	Christian	58	19.33
3	Muslims	55	18.33
	Total	300	100.00
	Community		
1	Sc/st	90	30.00
2	Mbc	178	59.33
3	Bc	32	10.67
	Total	300	100.00
	Place of Residence		
1	Rural	227	75.67
2	Urban	73	24.33

DETERMINANTS OF AWARENESS: The overall Cronbach's alpha value for the 35 awareness-related items is 0.835, indicating that the items measuring awareness of ICDS services are reliable and internally consistent. The KMO value is 0.702, confirming adequate sampling adequacy for factor analysis. Bartlett's Test of Sphericity is significant (chi-square = 15824.593, df = 595, $p < 0.001$), justifying the use of factor analysis. Six factors were extracted, explaining 86.628% of the total variance, suggesting that these factors effectively represent the awareness dimensions concerning ICDS services among the respondents.

RELIABILITY AND CONVERGENT VALIDITY OF AWARENESS CONSTRUCTS: Table 2 presents the reliability and convergent validity results for the individual Table 2 highlights the reliability and convergent validity of awareness constructs related to ICDS services. The high internal consistency is evident with Cronbach's alpha values ranging from acceptable to excellent. All dimensions of awareness—such as supplementary nutrition, immunisation, health check-ups, referral services, pre-school education, nutrition and health education, and health personnel availability—show composite reliability values exceeding the recommended threshold. Average variance extracted values confirm satisfactory convergent validity, and high factor loadings indicate a strong representation of constructs. Overall, the findings affirm that awareness of ICDS services is a reliable and valid multidimensional construct, serving as a solid basis for analyzing utilization behavior in the study.

TABLE 2 RELIABILITY AND CONVERGENCE VALIDITY

Constructs	**Cronbach's alpha value**
Supplementary Nutrition Services	0.97
Immunization Services	0.976
. Health Check-up Services	0.943
Referral Services	0.974
Pre-School Education Services	0.97
Nutrition and Health Education	0.954
Availability of Health Personnel	0.875

TABLE:3 REGRESSION RESULTS OF THE FACTORS DETERMINING AWARENESS ON ICDS

Observed Variables	Latent Variables	Estimate	S.E.	C.R.	P
Supplementary	Awareness	0.99	0.024	40.655	***
Preschool	Awareness	0.925	0.032	29.273	***
Immunisation	Awareness	0.992	0.023	43.728	***
Referral	Awareness	0.698	0.039	17.79	***
Health	Awareness	0.975	0.029	33.832	***
education	Awareness	0.987	0.029	34.414	***
AVH	Awareness	1			
Follow-up is done after referral to health institutions.	Referral	1			
Referred health facilities are accessible from my locality.	Referral	1.106	0.069	16.144	***
Clear guidance is provided for availing referral services.	Referral	0.892	0.064	13.828	***
Beneficiaries are referred to health facilities on time when required.	Referral	1.016	0.066	15.295	***
Anganwadi workers are able to identify nutrition problems of children effectively.	REFERRAL	0.956	0.065	14.682	***
Anganwadi workers are able to identify health problems of women effectively.	REFERRAL	1.08	0.068	15.761	***
Referral services are provided under ICDS when required.	REFERRAL	1.024	0.064	16.043	***
all types of referral services provided under ICDS	REFERRAL	1			
Health personnel are available during immunization sessions.	IMMUNISATION	0.983	0.025	38.882	***
Vaccines are available on scheduled immunization days.	IMMUNISATION	1.004	0.019	52.221	***
Immunization sessions are conducted regularly at the Anganwadi.	IMMUNISATION	1			
all types of vaccines provided under the ICDS programme.	IMMUNISATION	0.979	0.023	42.31	***
immunization services provided through ICDS regulalry	IMMUNISATION	1			
Sufficient time is allotted for pre-school activities.	PRESCHOOL	0.972	0.039	25.155	***
Pre-school education prepares the children for primary schooling	PRESCHOOL	0.997	0.043	23.446	***
Pre-school activities are helpful for child development	PRESCHOOL	0.993	0.038	26.311	***
Children attend pre-school education regularly	PRESCHOOL	1.006	0.035	28.59	***
pre-school education is provided at the Anganwadi.	PRESCHOOL	1			
Supplementary nutrition is distributed on time without delay.	SUPPLEMENTARY	1	0.02	51.255	***
The quality of supplementary food provided is satisfactory.	SUPPLEMENTARY	1.031	0.019	53.814	***
The quantity of food provided is adequate	SUPPLEMENTARY	**1.006**	**0.017**	**58.21**	***
the supplementary nutrition is provided through the Anganwadi.	SUPPLEMENTARY	1			
nutrition and health education programmes are taken up regularly by ICDS	HEALTH	1			
memebrs gain knowledge on helath and child nutrition through these programmes	HEALTH	1.002	0.032	31.538	***
memebrs gain knowledge about maternal health practices.	HEALTH	0.981	0.029	33.342	***
Nutrition and health education helps to follow hygiene practices at home	HEALTH	0.982	0.03	32.803	***
Information provided during sessions is clear and understandable	HEALTH	0.995	0.033	29.844	***
Health check-ups are conducted regularly at the Anganwadi.	education	1.032	0.03	34.559	***
Qualified health personnel are available during health check-ups.	education	1			
Child growth (weight and height) is monitored regularly.	education	0.998	0.028	35.228	***
Health check-ups are provided for pregnant and lactating mothers.	education	1.007	0.027	37.621	***
Anganwadi worker is available during working hours.	AVH	1			
Anganwadi helper is available to assist beneficiaries.	AVH	**1.003**	**0.024**	**41.528**	***
ANM is available during immunization and health check-up days.	AVH	**0.988**	**0.031**	**31.962**	***
Medical officer visits the Anganwadi as scheduled.	AVH	**0.965**	**0.027**	**35.334**	***

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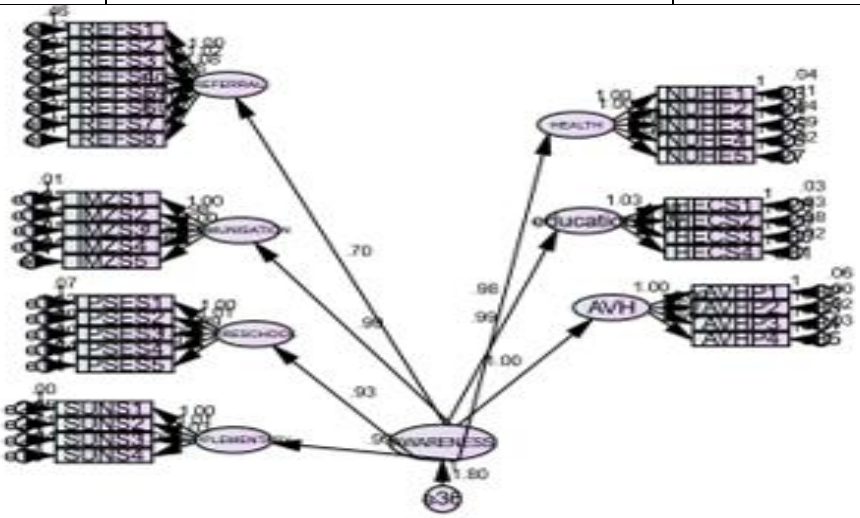
The confirmatory factor analysis results demonstrate a strong relationship between Overall Awareness of ICDS and its dimensions, with Supplementary Nutrition Services (0.99), Immunisation Services (0.992), and Pre-school Education Services (0.925) showing significant contributions to this awareness. Health Check-up Services (0.975) and Nutrition and Health Education Services (0.987) are also strongly related, while Referral Services (0.698) contribute less strongly, though still significantly. The observed indicators confirm that referral services are well-defined, as respondents associate various aspects with them. Additionally, Immunisation and Pre-school Education Services show high awareness levels regarding their respective components. The goodness-of-fit indices confirm the robustness of the measurement model, with significant chi-square values, GFI (0.973), AGFI (0.923), NFI (0.988), NNFI/TLI (0.958), CFI (0.913), RMSEA (0.064), and SRMR (0.0324) indicating good fit. Overall, the results affirm that awareness of ICDS is a well-structured, multidimensional construct, appropriate for further structural analysis.

TABLE:4 SUMMARY RESULTS OF MODEL FITNESS OF CONFIRMATORY FACTOR ANALYSIS

Measure	NAME	Description	Cut off for good fit	Index value	Decision
X^2	Model Chi Square	Assess overall fit and the discrepancy between the sample and fitted covariance matrices. Sensitive to sample size.H0: The model fits perfectly.	p-value less than 0.05	0.000 (DF -165)	Fit
(A)GFI	(Adjusted) Goodness of Fit	GFI is the proportion of variance accounted for by the estimated population covariance. Analogous to R^2. AGFI favors parsimony.	GFI > 0.95 AGFI >0.90	GFI – 0.973 AGFI – 0.923	Fit
(N)NFI TLI	(Non) Normed- Fit Index Tucker Lewis index	An NFI of .95, indicates the model of interest improves the fit by 95% relative to the null model. NNFI is preferable for smaller samples. Sometimes the NNFI is called the Tucker Lewis index (TLI)	NFI > 0.95 NNFI > 0.95	NFI - 0.988 NNFI - 0.958	Fit
CFI	Comparative Fit Index	A revised form of NFI. Not very sensitive to sample size. Compares the fit of a target model to the fit of an independent, or null, model.	CFI >.90	0.913	Fit
RMSEA	Root Mean Square Error of Approximation	A parsimony-adjusted index. Values closer to 0 represent a good fit.	RMSEA < 0.08	0.064	Fit
(S)RMR	(Standardized) Root Mean Square Residual	The square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model. If items vary in range (i.e. some items are 1-5, others 1-7) then RMR is hard to interpret, better to use SRMR.	SRMR <0.08	0.0324	Fit



DETERMINANTS OF UTILISATION : Overall, the study examines the factors influencing the utilization of ICDS services, showing a reliable measurement model through a Cronbach's alpha of 0.701 and a KMO value of 0.813, which supports factor analysis. Six utilization factors explaining 67.951% of variance were identified, with individual components like immunization and supplementary nutrition showing high reliability and significant regression estimates, indicating their strong influence on overall utilization. The goodness-of-fit indices (GFI=0.966, AGFI=0.901) suggest an acceptable model fit, confirming that the utilization of ICDS services is a valid, multidimensional construct, though with noted variations in service utilization levels.

TABLE 5. RELIABILITY AND CONVERGENCE VALIDITY

Constructs	Cronbach's alpha value
Utilisation of Supplementary Nutrition Services	0.941
Utilisation of Immunization Services	0.887
Utilisation of Health Check-up Services	0.872
Utilisation of Referral Services	0.749
Utilisation of Pre-School Education Services	0.784
Utilisation of Nutrition & Health Education Services	0.957

TABLE:6 REGRESSION RESULTS OF FACTOR UNDER UTILISATION OF ICDS

Observed Variables	Latent Variables	Estimate	S.E.	C.R.	P
U_PRE_SCHOOL	UTILISATION	1			
U_REFERAL	UTILISATION	0.95	0.038	24.858	***
U_HEALTH_CHECKUP	UTILISATION	0.716	0.051	14.018	***
U_IMMUNISATION	UTILISATION	1.067	0.037	28.968	***
U_NUTRTION	UTILISATION	1.022	0.033	30.543	***
U_NHEDUCATION	UTILISATION	1.04	0.029	36.009	***
Supplementary nutrition is actually received by me/my child from the Anganwadi.	U_NHEDUCATION	1			
Supplementary food received is regularly consumed by the intended beneficiary.	U_NHEDUCATION	1.028	0.025	40.807	***
Supplementary nutrition is availed without long interruptions.	U_NHEDUCATION	0.998	0.031	31.733	***
I depend on the Anganwadi for supplementary nutrition support.	U_NHEDUCATION	0.989	0.028	34.919	***
Supplementary nutrition is utilised as an important food support for my household.	U_NHEDUCATION	0.993	0.03	32.666	***
ICDS health check-ups are used as a routine preventive service.	U_HEALTH_CHECKUP	1			
Health advice given during check-ups is followed.	U_HEALTH_CHECKUP	0.989	0.086	11.449	***
Pregnant and lactating mothers in my household utilise ICDS health check-ups.	U_HEALTH_CHECKUP	1.099	0.081	13.604	***
Child growth monitoring services are regularly utilised.	U_HEALTH_CHECKUP	1.017	0.079	12.937	***
Health check-ups provided through ICDS are actually availed by me/my child.	U_HEALTH_CHECKUP	0.97	0.075	12.875	***
ICDS referral support influences my decision to seek treatment.	U_REFERAL	1			

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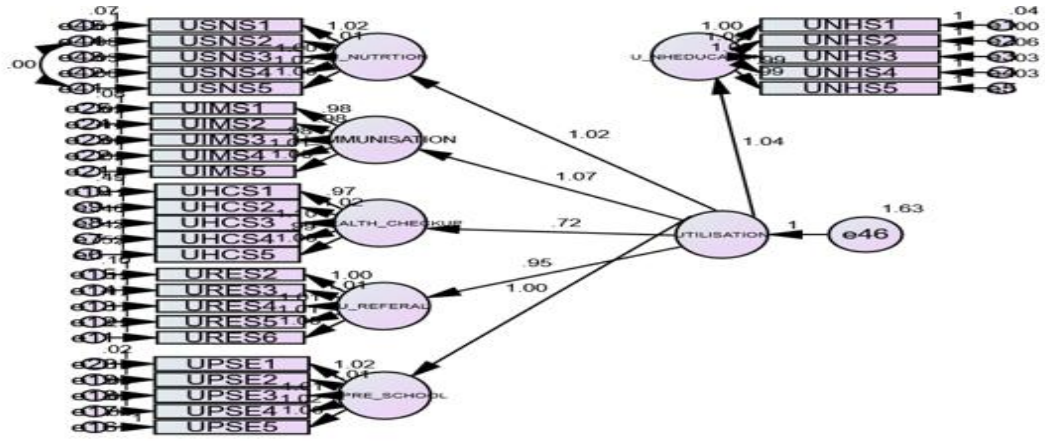
Follow-up visits are made after referral treatment.	U_REFERAL	1.009	0.04	24.95	***
Referral advice is followed without delay.	U_REFERAL	1.006	0.043	23.354	***
Referred health facilities are actually visited when advised.	U_REFERAL	1.014	0.041	24.622	***
Referral services suggested by the Anganwadi worker are acted upon.	U_REFERAL	1.003	0.04	24.819	***
Pre-school education services are continuously used until school entry.	U_PRE_SCHOOL	1			
I rely on Anganwadi pre-school education for my child's early learning.	U_PRE_SCHOOL	1.019	0.037	27.74	***
My child actively participates in Anganwadi pre-school activities.	U_PRE_SCHOOL	1.008	0.029	34.551	***
Pre-school education services are used on most working days.	U_PRE_SCHOOL	1.006	0.031	32.134	***
My child attends pre-school education at the Anganwadi regularly.	U_PRE_SCHOOL	1.021	0.035	29.47	***
I continue immunization services through ICDS until completion.	U_IMMUNISATION	1			
ICDS is the primary source for my child's immunization.	U_IMMUNISATION	1.012	0.02	51.676	***
All recommended immunization doses are completed through ICDS services.	U_IMMUNISATION	0.978	0.029	33.927	***
Immunization sessions are attended whenever they are scheduled.	U_IMMUNISATION	0.982	0.03	32.923	***
My child receives immunization services through ICDS/Anganwadi.	U_IMMUNISATION	0.976	0.031	31.836	***
Supplementary nutrition is utilised as an important food support for my household.	U_NUTRTION	1			
I depend on the Anganwadi for supplementary nutrition support.	U_NUTRTION	1.02	0.029	34.796	***
Supplementary nutrition is availed without long interruptions.	U_NUTRTION	1.004	0.029	35.027	***
Supplementary food received is regularly consumed by the intended beneficiary.	U_NUTRTION	1.014	0.027	38.045	***
Supplementary nutrition is actually received by me/my child from the Anganwadi.	U_NUTRTION	1.016	0.034	30.048	***

TABLE:7 SUMMARY RESULTS OF MODEL FITNESS OF CONFIRMATORY FACTOR ANALYSIS

Measure	NAME	Description	Cut off for good fit	Index value	Decision
X^2	Model Chi Square	Assess overall fit and the discrepancy between the sample and fitted covariance matrices. Sensitive to sample size. H0: The model fits perfectly.	p-value less than 0.05	0.000 (DF -404)	Fit
(A)GFI	(Adjusted) Goodness of Fit	GFI is the proportion of variance accounted for by the estimated population covariance. Analogous to R^2. AGFI favors parsimony.	GFI > 0.95 AGFI >0.90	GFI – 0.966 AGFI – 0.901	Fit
(N)NFI TLI	(Non) Normed- Fit Index Tucker Lewis index	An NFI of .95, indicates the model of interest improves the fit by 95% relative to the null model. NNFI is preferable for smaller samples. Sometimes the NNFI is called the Tucker Lewis index (TLI)	NFI > 0.95 NNFI > 0.95	NFI - 0.991 NNFI - 0.959	Fit
CFI	Comparative Fit Index	A revised form of NFI. Not very sensitive to sample size. Compares the fit of a target model to the fit of an independent, or null, model.	CFI >.90	0.910	Fit
RMSEA	Root Mean Square Error of Approximation	A parsimony-adjusted index. Values closer to 0 represent a good fit.	RMSEA < 0.08	0.072	Fit
(S)RMR	(Standardized) Root Mean Square Residual	The square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model. If items vary in range (i.e. some items are 1-5, others 1-7) then RMR is hard to interpret, better to use SRMR.	SRMR <0.08	0.0376	Fit



IMPACT OF SOCIO-ECONOMIC FACTORS ON THE UTILISATION AND AWARENESS

The final part of the analysis examines the influence of socio-economic factors on awareness of ICDS services and, in turn, the effect of awareness on utilisation. The regression results presented in Table 8 show that several socio-economic variables have a statistically significant impact on awareness, confirming that awareness of ICDS services in the Indian context is not uniform but shaped by background characteristics.

Age has a positive and statistically significant effect on awareness, indicating that awareness of ICDS services increases with age. This suggests that older women, possibly due to repeated exposure to Anganwadi services over time, possess higher levels of awareness compared to younger women. Education, however, does not show a statistically significant relationship with awareness, indicating that formal educational attainment alone does not necessarily translate into higher awareness of ICDS services. This finding highlights the role of programme outreach and community-level engagement over individual educational background.

Occupation shows a positive and significant effect on awareness, suggesting that women's work status influences their exposure to and interaction with ICDS services. Income also has a strong positive and statistically significant impact on awareness, indicating that households with higher income levels tend to exhibit greater awareness of ICDS services. Family type emerges as an important determinant, with women from joint families showing significantly higher awareness levels, possibly due to shared information and collective experience within the household.

Religion shows a negative and statistically significant relationship with awareness, indicating variation in awareness levels across religious groups. This finding reflects the influence of social and cultural contexts on programme awareness rather than any uniform pattern of access. Community has a strong positive and statistically significant effect on awareness, suggesting that social group affiliation plays a crucial role in shaping exposure to ICDS services, particularly among socially and economically disadvantaged groups. Place of residence, although positive, does not exert a strong influence on awareness, indicating that awareness levels do not differ substantially between rural and urban respondents once other socio-economic factors are taken into account.

The second stage of the model examines the impact of awareness on utilisation of ICDS services. The regression estimates shows that awareness has a positive and statistically significant effect on utilisation, with a relatively strong coefficient value. This confirms that higher awareness of ICDS services leads to higher levels of utilisation among beneficiaries. The result empirically validates the central premise of the study that awareness acts as a key mediating variable through which socio-economic factors influence utilisation behaviour.

The overall adequacy of the proposed structural model is supported by the goodness-of-fit indices reported in Table 9. The model chi-square value is statistically significant, which is expected given the sensitivity of this statistic to sample size. The Goodness of Fit Index and Adjusted Goodness of Fit Index

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exceed the recommended threshold values, indicating a good fit between the proposed model and the observed data. The Normed Fit Index and Tucker–Lewis Index also exceed the cut-off values, suggesting that the specified model represents a substantial improvement over the null model.

Further, the Comparative Fit Index value indicates excellent model fit, confirming that the hypothesised relationships among socio-economic factors, awareness, and utilisation are well supported by the data. The Root Mean Square Error of Approximation value falls well below the recommended upper limit, indicating a close fit of the model to the population covariance matrix. The Standardised Root Mean Square Residual value is also within acceptable limits, further confirming the adequacy of the model fit.

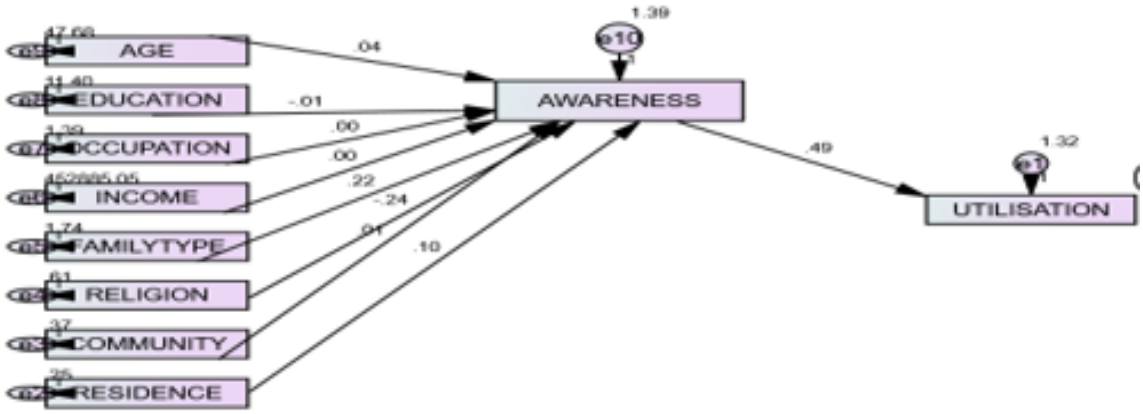
Taken together, the results demonstrate that socio-economic factors significantly shape awareness of ICDS services, and awareness, in turn, plays a decisive role in determining utilization. The findings confirm that utilization of ICDS services is not merely a function of service availability but is strongly mediated by beneficiaries' awareness, which itself is influenced by age, income, occupation, family structure, religion, and community background. The proposed path model is statistically sound and provides a comprehensive explanation of how socio-economic characteristics influence utilization through awareness in the Indian ICDS context.

TABLE:8
REGRESSIONS ON THE IMPACT OF SOCIOE CONOMIC STATUS ON THE AWARENESS AND UTILISATION

Sl.No.	Observed Variables	Direction	Latent Variables	Estimate	S.E.	C.R.	P
	Awareness	<---	Age	0.038	0.010	3.800	***
	Awareness	<---	Education	-0.009	0.020	-0.450	0.652
	Awareness	<---	Occupation	0.001	0.000	2.083	***
	Awareness	<---	Income	0.001	0.000	12.000	***
	Awareness	<---	Family type	0.218	0.052	4.192	***
	Awareness	<---	Religion	-0.236	0.065	-3.631	***
	Awareness	<---	Community	0.015	0.001	13.393	***
	Awareness	<---	Residence	0.102	0.136	0.750	***
	Utilisation	<---	Awareness	0.493	0.052	9.481	***

TABLE:9 SUMMARY RESULTS OF MODEL FITNESS OF CONFIRMATORY FACTOR ANALYSIS

Measure	NAME	Description	Cut off for good fit	Index value	Decision
X^2	Model Chi Square	Assess overall fit and the discrepancy between the sample and fitted covariance matrices. Sensitive to sample size. H0: The model fits perfectly.	p-value less than 0.05	0.000 (DF -15)	Fit
(A)GFI	(Adjusted) Goodness of Fit	GFI is the proportion of variance accounted for by the estimated population covariance. Analogous to R^2. AGFI favors parsimony.	GFI > 0.95 AGFI >0.90	GFI – 0.963 AGFI – 0.926	Fit
(N)NFI TLI	(Non) Normed- Fit Index Tucker Lewis index	An NFI of .95, indicates the model of interest improves the fit by 95% relative to the null model. NNFI is preferable for smaller samples. Sometimes the NNFI is called the Tucker Lewis index (TLI)	NFI > 0.95 NNFI > 0.95	NFI - 0.972 NNFI - 0.963	Fit
CFI	Comparative Fit Index	A revised form of NFI. Not very sensitive to sample size. Compares the fit of a target model to the fit of an independent, or null, model.	CFI >.90	0.969	Fit
RMSEA	Root Mean Square Error of Approximation	A parsimony-adjusted index. Values closer to 0 represent a good fit.	RMSEA < 0.08	0.048	Fit
(S)RMR	(Standardized) Root Mean Square Residual	The square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model. If items vary in range (i.e. some items are 1-5, others 1-7) then RMR is hard to interpret, better to use SRMR.	SRMR <0.08	0.0363	Fit



SUMMARY, FINDINGS AND SUGGESTIONS

The study provides a comprehensive examination of awareness and utilisation of ICDS services among women beneficiaries in Coimbatore district. Using a robust methodological framework that combines exploratory factor analysis, confirmatory factor analysis, and structural equation modelling, the study moves beyond simple descriptive assessments and captures awareness and utilisation as multidimensional latent constructs. The findings reveal that while ICDS has achieved substantial visibility in terms of supplementary nutrition and immunisation services, other critical components such as referral services, nutrition and health education, and health check-ups receive relatively less attention from beneficiaries. The analysis further establishes that socio-economic factors significantly shape awareness levels, and awareness acts as a key mediating variable influencing utilisation. Overall, the study demonstrates that utilisation of ICDS services is not automatic and depends strongly on beneficiaries' awareness, which is socially and economically conditioned.

One of the major findings of the study is that awareness of ICDS services is uneven across service components, with high awareness of supplementary nutrition and immunisation but comparatively lower awareness of referral services, health education, and pre-school education. This suggests that ICDS has been perceived largely as a food and immunisation programme rather than a comprehensive child development intervention. To address this, policy efforts should focus on strengthening information, education, and communication activities at the Anganwadi level, with specific emphasis on referral services and nutrition and health education.

Another important finding is that socio-economic factors such as age, income, occupation, family type, religion, and community significantly influence awareness, while formal education does not show a significant effect. This indicates that awareness generation is driven more by social exposure and programme

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outreach than by individual educational attainment. Therefore, ICDS implementation should adopt community-specific outreach strategies, involving local leaders, self-help groups, and peer networks, to improve awareness among socially disadvantaged and marginalised groups.

The study also finds that awareness has a strong and statistically significant impact on utilisation of ICDS services, confirming that awareness acts as a crucial mediating factor between socio-economic characteristics and utilisation behaviour. This implies that merely expanding infrastructure or service availability is insufficient to improve utilisation. Policymakers should prioritise awareness-building measures, regular counselling, and beneficiary engagement as core components of ICDS delivery to ensure that available services are actually utilised.

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