

Original Research Article

Understanding the influence of individual level factors of Anganwadi workers on service delivery under the Integrated Child Development Service scheme

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ABSTRACT

Background: Anganwadi workers (AWW) of the Integrated Child Development Service (ICDS) Scheme are the agents of social change, mobilizing community support for better care and continuously addressing malnutrition among young children. The influence of individual background characteristics of AWWs on uptake of service delivery is rarely examined and forms the subject of inquiry.

Methods: Data used pertain to information on 349 Anganwadi centres (AWCs) in 11 Indian states collected for a study on ICDS during 2021-22. Multivariate statistical methods were employed to derive the findings using SPSS version 20.

Results: AWWs age, work experience, trainings received, residence in proximity to AWCs varies across districts under study. The mean number of services rendered of 11.9 out of the 14 types of services provided through AWCs indicate the overall competency of AWWs in rendering services. Sagar (MP), Solan (HP) and Dharwad (Karnataka) districts fall short of rendering complete services. Regression analysis indicate that presence of AWWs in their 50+ years in AWCs, greater experience of AWWs, increase in capacity building of AWWs and higher education levels strongly determine uptake of more services.

Conclusions: ICT intervention entails digital literacy to implement programmes and web-based monitoring for better nutritional outcomes require better competency for AWWs. To cater to the changing needs perhaps a review of the guidelines on educational level of AWWs for recruitment and revamping the training programmes by focussing on skill-based training for AWWs to unlock the full potential of ICDS scheme workforce may be attempted.

Keywords: AWW, Experience, ICDS, Individual, Services, Training

INTRODUCTION

Malnutrition among children has been a persistent public health challenge in India although there has been notable decline in prevalence of malnutrition over the years. Improvement in nutrition levels in India is reflected in the U5MR that declined from 114 to 32 per 1000 live births during 1990-2020.¹ The recent national level surveys reveals that in India, 35.5% of children below 5 years are stunted, 19% are wasted and 32% are underweight as per

NFHS V (2019-2020) which is a decline from 47.9%, 19.8% and 42.5% respectively.²⁻⁴ In this regard, the continuous effort from Integrated Child Development Services (ICDS) scheme in India for the past five decades in addressing the nutritional needs of children is noteworthy.^{5,6} ICDS provides a package of services to address the health and nutritional needs. Anganwadi workers, under the scheme act as the agents of social change, mobilizing community support for better care of young children, girls and women.

The basic requirement for person to serve under ICDS as an AWW is ten years of formal schooling. When the AWWs are recruited, trainings are imparted from time to time beginning with a refresher training. So, capacity building is a continuous process in order to improve service delivery. For PSE, the AWWs have been trained in modern methods of education developed by ICDS. Many new initiatives have been implemented over the period for both imparting a sound educational background and address the nutritional needs of the ICDS beneficiaries. During the COVID related lockdown period, the AWWs continued their responsibility of local level surveillance amid the restriction due to lockdown in different parts of the country by supporting breastfeeding mothers and feeding young children through distributing nutritious ration of rice and pulses at their door steps.

Majority of the recent initiatives on tackling malnutrition are also implemented at the grass root level where the AWWs play an important role. The National Nutrition Strategy with the vision - “Kuposhan Mukh Bharat”, the POSHAN Abhiyaan (Niti Aayog, 2018) focusing on improving the nutritional status of children from 0-6 years, adolescent girls, pregnant women and lactating mothers, increased budgetary allocations for provision of food, “fortification of rice and its distribution under public distribution system” and the Pradhan Mantri Mathru Vandana Yojana (PMMVY) providing maternity benefits of Rs. 5000/- through Anganwadi Services scheme of ICDS are the most recent programmatic efforts.⁷

The Ministry of Women and Child Department has been continuously making dedicated effort to strengthen the ICDS. Of particular mention is the introduction of web-based initiative to strengthen monitoring activities to achieve the desired goal of reducing malnutrition. Basic information on the Anganwadi wise coverage of services, the existing malnutrition levels and the availability of services under each AWC are captured through information and communication technology enabled real time monitoring system (ICT-RTM) introduced in 2016. In this newer initiative too, the AWWs played the major role in capturing and reporting data online.

Majority of the existing studies focus on the evaluation of ICDS services and the impact on health of children. The influence of background individual level factors of AWWs in uptake of services remain largely unexplored except for a few evaluation studies that partially dealt with such factors while analysing the knowledge of AWWs.⁸ Age, educational status and work experience of AWWs were found to be significantly associated with AWW's pre-test knowledge and knowledge of AWWs improved significantly after training.⁹ Recent study in south Indian setting contended that further improvement is needed for optimizing the outcome of services in spite of the observed good knowledge of AWWs about delivering different services under the ICDS scheme.¹⁰

ICDS services are common across the states and only the type of food and the AWC settings vary. A large body of literature point out the state wide differentials in performance of ICDS.^{11,12} Whether such differentials have any association with the AWW's capabilities or their background settings remains to be studied. So here we have analysed the individual level characteristics of AWWs in relation to the services rendered so as to assess how such factors determine the delivery of services. The study primarily aimed to assess the services rendered by the AWW under ICDS and understand the differentials among selected districts and to understand whether the Anganwadi worker's individual level characteristics influences service delivery.

METHODS

Data used pertain to the study carried by the Population Research Centres in India on ‘Nutritional and Health services provided to the young children through ICDS scheme: an assessment during the COVID-19 pandemic’ covering 32 AWCs each in 11 states during 2021-22. The study captured information on the ICDS services both in the AWW and Mother's perspective. The present study uses the consolidated data from 11 states covering 349 AWWs and attempts to assess the interplay of the individual level background factors in service delivery.

Univariate and multivariate statistical techniques were used to derive the findings. Multivariate logistic regression was employed to determine the factors at individual level of AWWs that explain the service delivery at the AWC. The mean age, education, number of children enrolled at AWC were compared between the 11 selected districts.

AWWs receive many trainings related to their duties apart from refresher training which is mandatory to perform duties. The trainings assessed in the study includes those on refresher training, preschool education (PSE), early childhood education and development, integrated management of neonatal and childhood illness (IMNCI), growth monitoring, infant and young child feeding (IYCF), MIS-rapid reporting system; ICDS health checkup, and online training for COVID-19 management. The data captured training received as No =0 and Yes =1. A total score for trainings was estimated by assigning weights to each training @ weight =3 for training directly related to AWW duties (on refresher training, preschool education (PSE), early childhood education and development; @ weight =2 for trainings on health components for which the health workers too support in rendering service along with AWW (growth monitoring, infant and young child feeding (IYCF), MIS-rapid reporting system; ICDS health checkup) and @ weight =1 for online training for COVID-19 management. The total score was estimated by adding the weighted responses.

Similarly overall scores are estimated for the services rendered that includes (weights assigned in brackets)

Supplementary nutrition to children (4), supplementary nutrition to pregnant and lactating mothers (4), preschool education (4), immunization (3), growth monitoring of children (4), screening of children for common ailments (3), deworming (2), vitamin A supplementation (2), anemia management (1), ARI management (1), diarrhoea management (3), health education (3) and health checkup for pregnant women (2). The total scores were estimated by adding the weighted responses. The service scores were further classified as low and high by the mean score, those below the mean score were classified as 'low' and mean value above as 'high'. This dichotomous service score was the dependent variable in the multivariate binary logistic regression. Age of AWW, marital status, education, years of service, place where AWW resides, use of mobile phone for keeping contact with beneficiaries and the overall trainings received (expressed as training scores) were the independent variables introduced in the logistic regression. All the independent variables except training score were categorical variables. The dependent variable here was dichotomous classified as 'low' and 'high' service score assigned values being '0' and '1' respectively based on the services rendered by the AWW at the AWCs. The model was significant at 1% level. Backward stepwise (Wald) method was used which eliminated the independent variables not significant at step 5. Study uses statistical software SPSS 20 version.

RESULTS

The AWCs were selected from each district from both rural and urban areas proportional to the distribution in the respective districts. In the selected sample of AWCs, 79.7 percent were rural and 20.3 percent were urban. Majority of the AWCs in Solan district of Himachal Pradesh and Nalbari district of Assam were in rural areas. Udaipur district in Rajasthan (37.5 percent) and Dharwad district in Karnataka have over one-third AWCs in urban areas (Table 1).

Table 1: Distribution of AWCs by location in rural/urban areas.

Location of AWC	Rural	Urban
Dharwad- Karnataka	65.6	34.4
Dindigul- Tamil Nadu	78.1	21.9
Fatehgarh Sahib- Haryana	87.5	12.5
Lucknow- Uttar Pradesh	75	25
Nalbari- Assam	93.8	6.2
Patna- Bihar	71.9	28.1
Sagar- Madhya Pradesh	86.2	13.8
Solan- Himachal Pradesh	96.9	3.1
Thiruvananthapuram- Kerala	78.1	21.9
Udaipur- Rajasthan	62.5	37.5
Vadodara- Gujarat	81.3	18.8
Total	79.7	20.3

The year of establishment was analysed in 3 phases based on the period of establishment of AWCs since the year 1975. Around 17 percent of the selected AWCs in the 11 selected districts were established before 1990. Around 40 percent AWCs started functioning during 2001-2010 and 2006-2020.

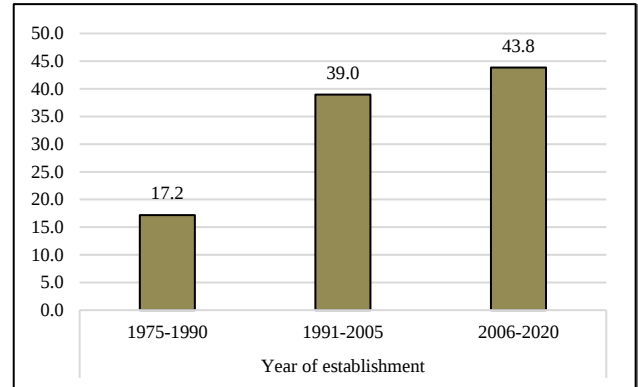


Figure 1: Year of establishment of selected Anganwadi centres.

Among the services rendered by the AWWs, growth charts were maintained to assess the nutritional levels, pregnant women and lactating mothers were constantly tracked to monitor their health and supplementary nutrition to children was provided by all the selected AWCs in all the districts under study except for a few AWCs in Patna district. Almost all the AWCs in all districts provide supplementary nutrition to pregnant women and lactating mothers with the exception of Patna and Sagar districts. Preschool education has been disrupted only in a few AWCs in Sagar district. Immunization activities were nearly complete in almost all districts other than in some AWCs in Sagar district and Solan district. Growth monitoring of children was nearly complete in all AWCs in all district.

However, districts like Patna, Sagar and to an extent Dindigul need to take up measures to see that all AWWs impart health education to children, pregnant women and lactating mothers. Among the health screening and management activities done in coordination with ANM/ASHA, Vadodara, Thiruvananthapuram and Nalbari districts report almost every AWW rendering services like health checkup for pregnant women, deworming, diarrhoea management, vitamin A supplementation, anemia management and screening of children for common ailments. Other districts need to lay stress on anemia management through ANM/ASHA coordination. Dharwad district falls short of its achievement compared to other districts in diarrhoea management, vitamin A supplementation and screening of children for common ailments. Patna district shows poor performance compared to other districts in almost all the health screening and management activities.

Table 2: Services delivered by AWWs in the selected districts.

Particulars	Dharwad	Dindigul	Fatehgarh Sahib	Lucknow	Nalbari	Patna	Sagar	Solan	Thiruvananthapuram	Udaipur	Vadodara
Services provided at the AWC											
Supplementary nutrition to children	100	100	100	100	100	93.8	100	100	100	100	100
Supplementary nutrition to pregnant and lactating mothers	100	100	100	100	100	81.3	89.7	100	100	100	100
Preschool education	100	100	100	100	99.4	100	79.3	100	100	100	93.8
Immunization	100	100	90.6	100	100	100	75.9	81.3	96.9	96.9	100
Growth monitoring of children	100	100	100	100	100	96.9	89.7	100	100	100	100
Health Education	96.9	75.0	87.5	100	100	53.1	72.4	84.4	100	100	100
Health checkup for pregnant women	96.9	65.6	87.5	84.4	96.9	68.8	79.3	81.3	100	100	100
Deworming	93.8	96.9	96.9	100	100	100	75.9	68.8	100	96.9	100
Diarrhoea management	37.5	93.8	84.4	87.5	100	84.4	44.8	56.3	100	71.9	100
Referral services	81.3	37.5	81.3	93.8	0	6.3	58.6	75.0	100	93.8	96.9
Vitamin A supplementation	56.3	96.9	87.5	100	100	100	82.8	62.5	100	96.9	100
Anemia Management	50.0	56.3	84.4	87.5	100	81.3	55.2	59.4	100	71.9	100
Screening of children for common ailments	18.8	75.0	84.4	71.9	78.1	96.9	48.3	78.1	100	96.9	87.5
ARI management	0	28.1	78.1	40.6	100	62.5	0	56.3	100	15.6	87.5
Total AWC/AWW	32	32	32	32	32	32	29	32	32	32	32

Table 3: Percentage distribution of AWWs by their background individual characteristics.

Age of AWW	≤35 years	36-50 years	>50 years
	19.8	56.7	23.5
Marital Status	Currently married	Never married/divorced/separated/widowed	
	79.4	20.6	
Education	Upto 10 th standard	11-12 standard	Graduation and above
	38.4	29.5	32.1
Years of service	≤15 years	16-30 years	>30 years
	60.2	31.5	8.3
AWW resides in same village	Yes	No	
	75.9	24.1	

Table 4: Mean Age, education, experience as AWW, trainings received, number of children enrolled in AWC and services delivered.

Districts	Mean age	Mean education	Mean years of service	Mean training score	Mean number of children enrolled at AWC	Mean service score
Dharwad	39.72	11.41	14.38	7.5	29.5	10.3
Dindigul	43.47	11.66	15.5	5.5	19.75	11.2
Fatehgarh Sahib	48.59	13.66	18.25	5.8	14.56	12.6
Lucknow	46.56	14.59	19.53	7.6	35.06	12.6
Nalbari	41.84	11.06	18.19	7.7	13.81	11.8
Patna	40.91	12.66	13.88	6.3	33.97	11.3
Sagar	40.62	11.45	15.66	5.8	45.69	9.5
Solan	42	12.47	14.72	8.8	14.03	10.9
Thiruvananthapuram	50.28	12.09	17.34	7.8	14.47	14
Udaipur	44.84	11.97	16.97	6.7	27.22	12.4
Vadodara	41.91	12.12	14.28	5.9	52.97	13.7

New initiatives are implemented under ICDS from time-to-time demanding better involvement of AWWs in service delivery. In this regard the background individual level characteristics of AWWs are examined here. Age of AWWs is an important variable that is likely to have association with service delivery at the AWCs. During the period of survey, in the selected AWCs, the mean age of AWW was 44 years (Table 3). About 57 percent were aged between 36-50 years and one in four were beyond 50 years.

Majority of the AWWs were currently married, have quite higher levels of education than stipulated levels and have longer years of experience as we find one-third of the AWWs have served the AWC for 16-30 year. Three fourths of the AWWs reside in the same village where the AWC is located making service delivery much easier.

Among the 11 districts under study the mean age of AWW is highest in Thiruvananthapuram district-Kerala (50.3 years) followed by Fatehgarh Sahib district of Punjab (Table 4). Education wise, Lucknow in UP is on top and Punjab too fares comparatively better with an edge over Patna and Solan. In rest of the districts, the mean education level hovers around 11 years of schooling.

The mean years of service of AWW varied between 14 in Patna and 20 years in Lucknow. Out of the 9 different trainings the AWWs have received, the mean training score was 6.86. AWWs of Solan district of HP fare better in this regard with mean number of trainings attended being 8.8 (Table 4). On the other end, Dindigul district of Tamil Nadu appear in the bottom line up. The deviations from the mean thus calculated expressed by the confidence intervals are depicted in Figure 2 which indicate the precision of values around the mean.

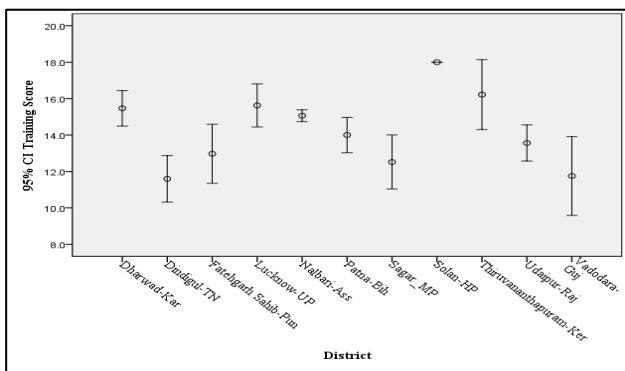


Figure 2: Mean training scores by districts.

Service wise, we considered 14 different services rendered by the AWCs as listed in the methodology section (Table 3). The mean number of services rendered are comparatively higher in Thiruvananthapuram district and Vadodara district of Gujarat. In Sagar, Solan and Dharwad districts the AWWs miss out on almost 4 services out of the 14 considered here. The error bars of the mean values thus calculated as expressed by the

confidence intervals indicate the reliability of the measure especially in districts of Thiruvananthapuram and to some extent in Nalbari and Dharwad.

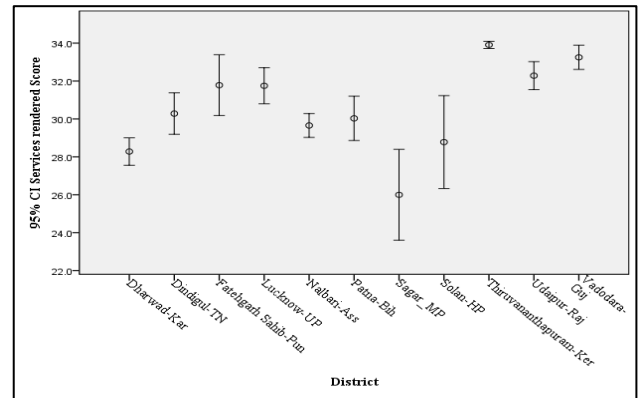


Figure 3: Mean service scores by districts.

Table 5 provides information on the individual level background characteristics of AWWs by districts. In all the districts under study the proportion of AWWs are higher in the age group 16-30 years except Thiruvananthapuram district. More than half of the AWWs in Dindigul and Nalbari districts have upto 10 years of schooling whereas AWWs in Lucknow district have higher proportion in the education level 'graduation or above'. The proportion of currently married women was higher in all the districts. Residing in the same village where the AWC was located was advantageous in proper delivery of services as it saves time on travel, expenditure on transportation and in being punctual. Here we find that in Patna and Fatehgarh Sahib districts all the AWWs reside within 1 km distance from the AWC. AWWs in Patna and Solan districts have lesser years of experience, whereas AWWs having ≥ 16 years of service was highest in Nalbari district among the district under study. Over 90 percent of the AWWs opined trainings received to be adequate in Nalbari and Fatehgarh Sahib districts. AWWs in Sagar, Dharwad and Solan districts have only nearly two fifths of the AWWs reporting the trainings to be inadequate. Information on frequency of coordination with ANM shows that in all the districts except Solan (16 percent) all other district have more than 70 percent reporting that AWWs always coordinate with ANM.

Table 6 provides information on the final model, the odds ratio and confidence interval. In the final model, age of AWW, education, AWW residing in the same village and trainings emerged as significant predictors of service delivery. AWWs aged more than 50 years are nearly 5 times more likely ($p < 0.01$) to take up more services or render better services than those aged 35 years and below. Higher education significantly predicts the service delivery. AWWs with higher secondary level education and also 'graduation or more' education have greater odds of delivering better services as indicated by 'high' services scores compared to 'low' services scores ($p < 0.01$).

Table 5: Percentage distribution of AWWs by individual level characteristics.

		Dharwad	Dindigul	Fategarh Sahib	Lucknow	Nalbari	Patna	Sagar	Solan	Thiruvananthapuram	Udaipur	Vadodara
Age (years)	≤35	37.5	21.9	9.4	3.1	15.6	21.9	27.6	25	9.4	15.6	31.3
	36-50	59.4	43.8	56.3	71.9	71.9	71.9	55.2	62.5	28.1	59.4	43.8
	>50	3.1	34.4	34.4	25	12.5	6.3	17.2	12.5	62.5	25	25
Education	Secondary	56.2	40.6	40.6	12.5	53.1	40.6	41.4	25	31.2	34.4	46.9
	Higher secondary	25	40.6	21.9	15.6	40.6	15.6	31	40.6	43.8	34.4	15.6
	Graduate and above	18.8	18.8	37.5	71.9	6.2	43.8	27.6	34.4	25	31.2	37.5
Marital status	Currently married	71.9	71.9	75	68.8	87.5	65.6	86.2	71.9	96.9	87.5	90.6
	NM/D/S/W	28.1	28.1	25	31.3	12.5	34.4	13.8	28.1	3.1	12.5	9.4
Residence	Within 1 km from AWC	59.4	50	100	78.1	68.8	100	82.8	78.1	53.1	78.1	87.5
Work experience (years)	<16	68.8	62.5	46.9	53.1	40.6	81.3	65.5	81.3	59.4	53.1	50
	≥16	31.3	25	37.5	21.9	53.1	12.5	31	18.8	28.1	40.6	46.9
Trainings received	Adequate	68.8	87.5	93.8	81.2	93.8	37.5	55.2	68.8	84.4	78.1	78.1
Frequency of ANM coordination	Always	78.1	62.5	75	71.9	75	50	86.2	15.6	96.9	78.1	93.8

N=349, NM/D/S/W- never married/divorced/separated/widowed

Table 6: Multivariate regression findings- AWWs individual level factors in determining service delivery at AWCs in 11 selected districts.

		B	Sig.	Exp(B)	95% CI for EXP(B)	
					Lower	Upper
Initial Model	Age of AWW Ref: ≤35 years					
	36-50 years	0.265	0.396	1.304	0.707	2.404
	>50 years	1.623	0.000	5.068	2.038	12.601
	Marital Status: Ref: currently married					
	Never married/divorced/separated/ widowed	-0.450	0.129	0.637	0.356	1.141
	Education: Ref: 10 th standard					
	Higher secondary	0.854	0.005	2.348	1.295	4.258
	Graduation & above	1.081	0.000	2.948	1.607	5.407
	Years of service: Ref: 15 years					
	16-30 years	0.323	0.280	1.382	0.769	2.484
	>30 years	-0.250	0.624	0.779	0.287	2.115
	AWW residing in same village: Ref: No					
	Yes	0.476	0.092	1.610	0.924	2.804
	Use of mobile phone for keeping contact with beneficiaries: Ref: Rarely/Never					
	Sometimes	0.153	0.706	1.165	0.526	2.578
	Often	0.369	0.350	1.447	0.667	3.137
	Training score	0.085	0.004	1.089	1.027	1.155
Final Model	Age of AWW Ref: ≤35 years					
	16-30 years	0.324	0.274	1.383	0.773	2.471
	>30 years	1.600	0.000	4.951	2.306	10.629
	Education: Ref: 10 th standard					
	Higher secondary	0.878	0.003	2.406	1.357	4.266
	Graduation and above	1.123	0.000	3.074	1.720	5.492
	AWW residing in same village: Ref: No					
	Yes	0.446	0.010	1.563	0.904	2.700
	Training score	0.091	0.002	1.095	1.035	1.159

AWWs residing in the same village where the AWC was located were 1.6 times ($p < 0.05$) at greater odds of having high services scores compared to those not residing in the same village. Capacity building among AWWs being an integral part in rendering services at AWCs, as one unit increase in trainings received increases service delivery 1.1 times ($p < 0.01$). So as more trainings are imparted more services will be rendered by the AWWs.

DISCUSSION

Anganwadi Workers, in their diverse roles have been rendering relentless service during the past five decades of implementation of ICDS. However, the background individual level characteristics of AWWs have rarely been studied although a great volume of research on ICDS exists. Our study analysed the association of such characteristics: age, education, residing in the same village where AWC is located and years of experience of AWWs to deliver services that are mandated to be rendered under ICDS. The AWWs in almost all selected districts are actively rendering services as per guidelines except those in Patna and Sagar districts who miss out on most of the health care related service delivery. The mean number of services rendered were comparatively higher in Thiruvananthapuram district of Kerala and Vadodara district of Gujarat. Patna district showed poor performance compared to other districts in almost all the health screening and management activities.

Among the individual level characteristics, AWWs in the older age cohorts are better placed in service delivery and experience of AWWs explains to a great extent the performance of AWCs. Also, more the years spent as AWW, the more equipped the AWW becomes. Higher levels of education strongly emerged as predictor of uptake of more services. So firstly, to cater to the changing needs perhaps a review of the guidelines of recruitment which specifies educational requirement to be 10th pass for an AWW could be attempted. Secondly AWWs in almost all the AWCs under study reported trainings received to be inadequate and they lack digital literacy that is required for web-based capturing of information. Regression analysis also support this need where improved trainings emerged as a strong determinant of uptake of more services.

The study findings are based on AWCs from 11 states across the different regions which is a representative sample of AWCs that ensures coverage of AWWs with different socio-demographic background. Such variability echoes the importance of the findings that age, education, experience of AWWs and residence in proximity to AWCs determine the service delivery to a great extent.

CONCLUSION

The study thus revealed the importance of individual level socio-demographic characteristics of AWWs in uptake of services at the AWCs which has not been

addressed adequately so far. Better investment in improving the competency of AWWs especially digital literacy requires priority to keep pace with technological development that augment programme's quality. The conversion of AWCs to Smart AWCs in the States for overall physical and mental development of children, geo-tagging AWCs in Gujarat to improve service delivery and the mobile application system ICDS-common application software (CAS) for efficient service delivery are a few important developments that demand improved competency or skilling of AWWs through trainings and recruitment of sufficiently skilled AWWs in the future. The study findings clearly elicit the fact that experience, competency in terms of higher educational achievements, trainings imparted translate into better service delivery. So, the study calls for revamping the training programmes by focussing on skill-based training for the huge workforce of AWWs to prepare them to perfectly fit into the changing needs thereby unlocking the full potential of ICDS scheme.

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Conflict of interest: None declared

Ethical approval: The present study uses the data collected as part of the larger study 'nutritional and health services provided to the young children through ICDS scheme: an assessment during the COVID-19 pandemic' carried out by Population Research Centres in India during 2021-22

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