



Impact of Nutritional Services of Anganwadi Workers in Improving Nutritional Status of Infants in Delhi: A Study by Mixed Method Technique

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ABSTRACT

Background: Despite the presence of integrated child development services (ICDS) program in rural area of Delhi, the real impact of nutritional services of ICDS program on nutritional status of infants is not very clear, therefore, studying this area may provide new insights in this field.

Materials and methods: This study was carried out from 1st January 2015 to 31st March 2015 (3 months). All children up to 1 year of age (in AWC 1 and 2 area of a one rural ICDS block) were examined for their nutritional status by weight for age criteria. The registered infants of both these Anganwadi centers (AWCs) and their mothers were simultaneously observed for all kind of nutritional services they received from Anganwadi workers (AWWs) by way of key informants interviews and this was further confirmed by applying secret customer technique.

Results: The prevalence of mild to moderate malnutrition among infants in both the AWC area (AWC 1 area—6 months to 1 year category—52.9%, AWC 2 area (from 0–6 months and 6 months–1 year—69.3%) was higher. The key feeding factors identified for such scenario were: Improper colostrums feeding, wrong age of initiation of semisolid feeding, exclusive breast-feeding not done for 6 months, etc. [especially for AWC 2 area ($p < 0.05$) and AWC 1 area ($p > 0.05$)] among the AWCs. These factors were further confirmed by poor efforts of both AWWs in providing nutritional services toward mother and infants.

Conclusion: Anganwadi workers need to focus on quality of nutritional services provided toward mothers of infants and this area needs regular monitoring and supervision from ICDS and health system meticulously.

Keywords: Anganwadi center, Anganwadi worker, Impact, Infant, Integrated child development services, Mixed methods, Nutrition.

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INTRODUCTION

It has been found that undernourished rural pregnant women can be benefited by nutrition supplement in integrated child development service (ICDS) blocks,¹ but does this ICDS effort percolate down the generation in terms of augmented nutritional infants is a questionable issue. As per the recent UNICEF report (2015) in India, 25% newborns are underweight, 33% are exclusively breastfed for the first 6 months and nearly 50% children under 5 years of age suffer from moderate or severe malnutrition.² Against this gap, the Government of India efforts are also significant, in terms of improving the life chances of children by way of ICDS program.² Integrated Child Development Services in India is the world's largest integrated early childhood program, with over 40,000 centers nationwide.² The purpose of ICDS is to improve the health, nutrition and development of children. The program offers package of nutrition services, such as: (a) health, nutrition and hygiene education to mothers, (b) supplementary feeding for all children and pregnant and nursing mothers, (c) growth monitoring and promotion.² The changes in the ICDS program are also improving its impact. Greater emphasis is now placed on children less than 3 years of age and the percentage of severely malnourished children have declined due to these services.² Over the last two and a half decades, ICDS has also demonstrated its effectiveness in providing nutritional services.²

Although the ICDS program, is well-conceived and well-placed to address the major causes of child under nutrition in India. But issues, such as: (a) increasing

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coverage than to improving the quality of service delivery and (b) to distributing food rather than changing family-based feeding and caring behavior has resulted in limited impact in area of nutritional services have also been enumerated by World Bank (2015).³

Many problems in ICDS programs nutritional services have been cited in literature, such as: (a) Enough attention is not given to improving infants nutrition, and (b) on educating parents how to improve nutrition using the family food budget, (c) older children (between 3 and 6 years) participate much more than younger ones (0–3 years) and (d) children from wealthier households participate much more than poorer ones.³ In Infant feeding practices, which have been found to have a significant effect on children nutritional status, in which role of women literacy in child feeding practices and Anganwadi workers (AWWs) role in imparting nutrition and health education to mothers for managing nutrition of infants can also be a significant issue.⁴ The role of father have⁵ also been cited in the literature apart from other factors such sociocultural and economic factors of mothers and perceptions of community level stake holders and ICDS—health functionaries in nutritional status of under 5 years rural children of Delhi.^{5–7} So, the real focus is poor on root of tackling undernourishment from birth till infancy, when the targets are most vulnerable.

For this above scenario, many reasons may exist, such as AWWs are overburdened due to few factors, e.g. they are expected to provide preschool education to 4 to 6 years old as well as nutrition services to all children under 6, with the consequence that most children under 3—the group that suffers most from malnutrition—do not get micronutrient supplements, and most of their parents are not reached with counseling on better feeding and childcare practices. Moreover, more reliance on AWW in National Rural Health Mission (NRHM) program had also caused AWWs to pay little attention to nutritional services toward infants.³ Although AWWs are active in rendering their services to the beneficiaries but the ever increasing responsibilities of AWWs these days, moreover, they have also certain prescribed responsibilities other than the above mentioned services in the Anganwadi because of which focus of nutrition services toward infants are also getting affected.⁸

Anganwadi workers have a key role in growth monitoring and promotion of use of mother child protection card (MCPC) and all eligible infants (0–1 years) on monthly basis are supposed to be weighed at the Anganwadi center (AWC).⁹ Reasons for faltering also needs to be identified and appropriate role delineation for frontline workers, convergence of health and ICDS

guidance and counseling needs to be given to care givers.⁹ But, this work of AWWs are also not up to that quality, which can give a sustained positive impact on infants. In view of the above uncertain scenario in this field, this study was, therefore, planned to found out the impact of nutritional services of AWWs on nutritional status of infants in rural area of Delhi, as literature lacks specific studies exploring the role and importance of ICDS functionaries specifically toward infants. That is why authors selected this research area.

MATERIALS AND METHODS

Research Question

What are the impacts of nutritional services given by AWWs on nutritional status of infants in rural area of Delhi?

Ethical Approval

First approval of Ethical Committee of the Institution was sought, followed by ICDS department's approval and consent for participation of their AWWs and mothers consent as well was taken for their participation in this study.

Duration of Study

1st January 2015 to 31st March 2015 (3 months).

Sampling Technique

Study Area Selection

Total 28 ICDS projects are running in nine districts of Delhi. From which one rural ICDS project was selected randomly from 28 ICDS projects. The study was done in the area of two AWCs of a one rural ICDS project in the community development block of Delhi. The Anganwadi (1) and Anganwadi (2) were selected randomly from this.

Study Unit Selection

Area of two AWCs in a Rural ICDS block as follows:

- AWC 1
- AWC 2

Selection of Beneficiaries (Mothers and Infants)

All the eligible children between the age group 0 to 1 years (infants) and mothers of these infants, who attended the AWCs in the survey register of each AWC at the time of data collection were included in the study. This constituted the survey of all infants in area of two AWCs. All the infants and their mothers from registered category of infants from both AWC 1 and AWC 2 each were studied



for nutritional services from AWWs by key informants interview and secret customer technique.

Selection of the Infants for Nutritional Status in Anganwadi's Area

All children under 1 year of age (in AWC 1 and 2 area) respectively were examined for their nutritional status by weight for age criteria. The registered children of both AWCs were also observed for the nutritional services they received from AWWs at both the AWCs. The mothers were observed by secret customer technique for nutrition and health education services they received from AWW.

Calculation of Prevalence of Malnutrition in Infants

The infants were classified into malnutrition grades by weight for age criteria used under ICDS scheme was employed to find their nutritional grades. For calculating the prevalence of malnutrition of each AWC area, the infant found malnourished by weight for age criteria were taken. The total population of infants of both the AWCs was used in calculation of prevalence. The prevalence of malnutrition in area of both AWCs was then compared.

Study Design

The present study involved collection of information pertaining to all the nutritional services rendered under ICDS scheme via key informant—interview of stake holders, such as AWWs and mothers who were directly or indirectly involved in malnutrition prevention and management among infants in a rural ICDS block of Delhi. This was followed by use of secret customer techniques used by authors for evaluating nutritional

services given under ICDS scheme. Therefore, the study design was descriptive-mixed analytical study.

Data Collection Tools and Technique

Both primary and secondary data were collected as per the objectives of the study. Primary data were collected by the interview schedules and checklist after visiting the two AWCs. Secondary data were collected through study of records and reports maintained at AWC level in the ICDS scheme.

Data Analysis

As per the objectives of the study, the collected data were analyzed with using appropriate statistical package—Epi-info and ATLAS.Ti software.

RESULTS

Age, Sex and Birth Order of Infants in AWCs Area

There were 36 infants in the AWC 1 area and 65 infants in the AWC 2 area (total 101 infants in the study area) (Table 1).

In the infants subcategories of 6 months, 1 year population were 47.3% in AWC 1 and 60% in AWC 2. The sexes of children were evenly distributed, though boys were slightly higher than girls (52.7 and 52.3% males *vs* 47.3 and 47.7% females in AWC 1 and AWC 2 areas respectively). The majority of infants were first order births (36.1% in AWC 1 and 38.4% in AWC 2 area) (Table 1).

Distribution of Age Groups as per Nutritional Status of Infants

Normal nutritional status infants were higher among children in 0 to 6 month's age category in both AWC 1 and AWC 2 (52.7 *vs* 42.3%). The malnourished children in mild

Table 1: Distribution of infants according to age, sex and birth orders

Variables	Anganwadi 1		Anganwadi 2		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
Age						
0–6 months	19	52.7	26	40	45	44.6
6 months–1 year	17	47.3	39	60	56	55.4
Total	36	100	65	100	101	100
Sex						
Male	19	52.7	34	52.3	53	52.4
Female	17	47.3	31	47.7	48	47.6
Total	36	100	65	100	101	100
Birth order						
First	13	36.1	25	38.4	38	47.5
Second	9	25	20	30.8	29	28.8
Third	8	22.2	17	26.1	25	24.8
Fourth	6	16.7	3	4.7	9	8.9
Total	36	100	65	100	101	100

to moderate category (grades 1 and 2) were present in 6 months 1 year age category in both AWC areas (AWC 1 52.9%, AWC 2 79.5%) with majority of infants in grade 1 undernourishment AWC 1 36.1% and AWC 2 41.5% in total. The severe malnourishment was not found in AWC 1 area (Table 2).

The severe malnutrition (grade 3) was present in infants in both below and above 6 months to 1 years of age in AWC 2 (3.9 vs 2.6%—total 3.1%). No infant was found in grade 4 undernourishment (Table 2).

Distribution of Sex as Per Nutritional Status of Infants

Although male infants of AWC 2 were more malnourished (67.7%) as compared to female infants of AWC 2 (64.5%) but the difference in malnourishment rate among AWC 1 and AWC 2 were not significant ($p > 0.05$) when males and females infants were individually seen (Table 3).

Distribution of Colostrum Feeding as Per Nutritional Status of Infants

All the children who had received the colostrums feeding were normal in nutritional status in both the AWCs (52.7% in AWC 1 and 42.3% in AWC 2) (Table 4).

The infants who did not receive colostrums feeding had higher % of malnourished children as seen in AWC 2 area (82.1%) as compared to AWC 1 area (52.9%). The colostrums feeding was significantly associated with nutritional status of children in the AWC 2 area ($p < 0.05$) but not in AWC 1 area (Table 4).

Distribution of Exclusive Breastfeeding for 6 Months

The majority of infants (52.6% in AWC 1 and 42.3% in AWC 2) who had received exclusive breastfeeding for 6 months were in normal nutritional status (Table 5).

The majority of infants who were malnourished (52.9% in AWC 1 and 82.1% in AWC 2) were found among those who did not received exclusive breastfeeding for 6 months. The exclusive breastfeeding for 6 months was significantly associated with the nutritional status of children in AWC 2 ($p < 0.05$) but not in AWC 1 area (Table 5).

Age of Initiation of Semisolid Feeding at 6 Months

The majority of children in whom semi-solid feeding was initiated at 6 months were normal (52.7% in AWC 1 and 42.3% in AWC 2). But those children who received semisolid feed after 6 month, onward were

Table 2: Distribution of infants according to age groups in AWC 1 and 2

Nutritional status of infants	Age groups					
	0–6 months		6 months–1 year		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
AWC 1 area						
Normal	10	52.7	8	47.1	18	50
Grade I	7	36.8	6	35.3	13	36.1
Grade II	2	10.5	3	17.6	5	13.9
Grade III	0	0	0	0	0	0
Grade IV	0	0	0	0	0	0
Total	19	100	17	100	36	100
AWC 2 area						
Normal	11	42.3	7	17.9	18	27.7
Grade I	8	30.7	17	43.6	25	41.5
Grade II	6	23.1	14	35.9	20	30.7
Grade III	1	3.9	1	2.6	2	3.1
Grade IV	0	0	0	0	0	0
Total	26	100	39	100	65	100

Table 3: Sex-wise distribution of nutritional status of infants in area of 2 AWCs

	AWC 1		AWC 2		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
Male						
Normal	10	52.7	11	32.3	21	39.6
Malnourished	9	47.3	23	67.7	32	61.4
Total	19	100	34	100	53	100
Chi-square test = 2.0, df = 1, $p > 0.05$						
Female						
Normal	10	58.8	11	35.4	21	43.7
Malnourished	7	41.2	20	64.5	27	57.3
Total	17	100	31	100	48	47.6
Chi-square test = 2.4, df = 1, $p > 0.05$						



more malnourished more in AWC 2 area (82.1 vs 57.7%) (Table 6).

The age of initiation of semisolid feeding at 6 months was significantly associated with nutritional status of children in the AWC 2 ($p < 0.05$) but not in AWC 1 area (Table 6).

Distribution of Infants identified from Key Informants Interview and Secret Customer Technique who received Nutritional Services, from AWWs

Total 32.6% of mothers of infants received nutrition and health education (NHE) for nutritional care of infants in both AWCs combined and only 14.8% of mothers of infants received information on avoiding ceremonial feeding from AWWs. In both AWC areas—the 'colostrum feeding' was emphasized most to mothers of infants in 0 to 6 months category AWC 1 (68.4%) and AWC 2 (73.1%) by AWWs, whereas maximum mothers of infants in 6 months to 1 year category—received NHE for nutritional care of infants (41.1% in AWC 1 and AWC 2 (48.8%). But, all these differences were not statistically significant ($p > 0.05$) (Table 7).

Key Qualitative Findings after using Secret Customer Technique and Key Informants' Interviews

- AWW-2 was not approaching mothers for proper enrolment for nutritional counseling sessions.
- Nutrition and health education was not in main focus of both AWWs.
- Concept of avoiding ceremonial feeding was even not well understood by both AWWs.
- Main focus of AWW-2 was only to give supplementary nutrition to beneficiaries above 1 year.
- Both AWWs did not feel the real importance of starting of weaning at 6 months/exclusive breastfeeding (EBF) at least till 6 months.
- Mothers of infants had little idea about concept of avoiding ceremonial feeding.
- Concept of benefits of colostrums feeding was not popular in both AWCs area.
- All the mothers in AWC 1 area ($n = 36$, i.e. 100%) felt that AWW-1 was taking few efforts for better nutritional care of their infants.

Table 4: Distribution of infants according to start of colostrum feeding in area of AWC 1 and 2

Nutritional status of infants	Colostrum feeding					
	Yes		No		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
AWC 1 area						
Normal	10	52.7	8	47.1	18	50
Malnourished	9	47.3	9	52.9	18	50
Total	19	100	17	100	36	100
Chi-square test = 0.11, df = 1, $p > 0.05$						
AWC 2 area						
Normal	11	42.3	7	17.9	18	27.7
Malnourished	15	57.7	32	82.1	47	72.3
Total	26	100	39	100	65	100
Chi-square test = 4.62, df = 1, $p < 0.05$						

Table 5: Distribution of infants according to exclusive breastfeeding received for 6 months in area of AWC 1 and 2

Nutritional status	Exclusive breastfeeding received for 6 months					
	Yes		No		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
AWC 1						
Normal	10	52.6	8	47.1	18	50
Malnourished	9	47.4	9	52.9	18	50
Total	19	100	17	100	36	100
Chi-square test = 0.11, df = 1, $p > 0.05$						
AWC 2						
Normal	11	42.3	7	17.9	18	27.7
Malnourished	15	57.7	32	82.1	47	72.3
Total	26	100	39	100	65	100
Chi-square test = 4.62, df = 1, $p < 0.05$						

Table 6: Distribution of infants according to age of initiation of semisolid feeding (SSF) in area of AWC 1 and 2

Nutritional status of infants	Age of initiation of SSF					
	At 6 months		Between 6 months and 1 year		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
AWC 1 area						
Normal	10	52.7	8	47.1	18	50
Malnourished	9	47.3	9	52.9	18	50
Total	19	100	17	100	36	100
Chi-square test = 0.11, df = 1, p > 0.05						
AWC 2 area						
Normal	11	42.3	7	17.9	18	27.7
Malnourished	15	57.7	32	82.1	47	72.3
Total	26	100	39	100	65	100
Chi-square test = 4.62, df = 1, p < 0.05						

Table 7: Distribution of infants identified from key informants interview and secret customer technique who received nutritional services from AWWs

Variables	Anganwadi center						
	AWC 1 (n = 36)			AWC 2 (n = 65)			Total (n = 101)
	0–6 months	6 months–1 year	Total	0–6 months	6 months–1 year	Total	
NHE received-by mothers on complete nutritional care of infants	3 (15.8%)	7 (41.1%)	10 (27.7%)	4 (15.4%)	19 (48.8%)	23 (35.3%)	33 (32.6%)
Chi-square test = 0.12, df = 1, p > 0.05							
Avoid ceremonial feeding	1 (5.3%)	6 (35.3%)	7 (19.4%)	1 (3.8%)	7 (17.9%)	8 (12.3%)	15 (14.8%)
Chi-square test = 0.43, df = 1, p > 0.05							
Provide colostrum feeding	13 (68.4%)	0	13 (36.1%)	19 (73.1%)	0	19 (29.2%)	32 (31.7%)
Chi-square test = 0.11, df = 1, p > 0.05							
On starting of weaning at 6 months/EBF at least till 6 months	2 (10.5%)	4 (23.6%)	6 (16.7%)	2 (7.7%)	13 (33.3%)	15 (23.2%)	21 (20.8%)
Total	19 (100%)	17 (100%)	36 (100%)	26 (100%)	39 (100%)	65 (100%)	101 (100%)
Chi-square test = 0.19, df = 1, p > 0.05							

- Majority of mothers in AWC 2 area (n = 35/65, i.e. >50%) felt that AWW-2 was not taking sufficient steps for better nutritional care of their infants.
- Nutritional and health education sessions were conducted only once in 3 months in AWC 2 area, whereas AWW-1 was doing it at least on monthly basis.

DISCUSSION

In India and average infant gets a poor start in their life by provision of poor nutritional efforts from all angles. According to Delhi Government data (2013), where 3.2 lac births take place in state of Delhi, with the birthrate figure of 21.07 and IMR of Delhi as 22.37, an area of a AWC with a population coverage of 1000, is expected to have live infants up to 83/AWC hence, for 2 AWCs it comes around 166 for both. However, when compared with our present study, total 101 infants were found in our study area, which indicates both AWWs might have missed some of the infants for enrolment for nutritional services. The higher proportion of infants (65) in AWC 2

also suggests that the AWW-2 had enumerated all the infants but perhaps she may have missed out some older children during the survey and whereas AWW-1 might have missed the number of infants in her survey area. Both of these issues imply that quality of AWWs survey for enrolment in nutritional services may not be adequate in the rural ICDS block of Delhi.

In our present study, the malnourished children in mild to moderate category (grades 1 and 2) were present in greater than 52% of infants 6 months 1 year age category in both AWC areas and also the majority of infants were in grade 1 undernourishment. The higher % of infants in grade 1 undernourishment in our study suggests that, although the work of AWW-1 is on track as compared to AWW-2, but the Intergenerational effect of malnutrition might be existing from years, for which AWWs are less sensitized and their efforts were not of desired standard.

Our study findings are, therefore, in line with study by Tandon et al (1981)¹⁰ on under 3 years children in which grade 1 nutritional status got increased from



61.3%, whereas severe malnutrition got declined due to ICDS Services which was found also in study by Avsm et al¹¹ and Kapil et al.¹² Study of Pandey et al¹³ also indicate that the mean weight of ICDS beneficiaries in general is more than that of non ICDS utilizers; but despite the ICDS Scheme being attractive but beneficiaries do not realize its actual importance, which is probably responsible for a higher figure of undernourishment among infants in Delhi, as found also in our study. The higher prevalence of malnutrition till 3rd year even among ICDS beneficiaries was also reported by Swami et al¹⁴ as similar to findings of our present study. The study of Gupta et al¹⁵ had also reported that weight for age was significantly higher in ICDS group males aged 6 months to 3 years and female children aged 2 to 4 years, as similar to our study findings. The lack of coordination might also be responsible for higher prevalence of under nutrition in our study; as literature also reveals inadequate, ineffective and defective perceptions and uncoordinated efforts of PRIs, ICDS, and Health department reducing undernourishment in rural area of Delhi by Davey et al.⁶

Weight recording, plotting and identification of growth faltering of infants are a crucial activity of AWWs. Care of infants who are underweight is their one of the key job responsibilities. Anganwadi workers normally weigh all infants and they are responsible for follow-up of all children who have rehabilitated at nutritional rehabilitation centers. Anganwadi worker also assigns special days prior to village health nutrition day (VHND) for growth monitoring and promotion; those unable to come for weighment at the AW center are followed up and weighed during home visit by the AWW. Anganwadi workers normally also focus on caregivers of children with growth faltering which require attention and counseling. All of these activities, however, were not done properly and seriously by both AWWs (although AWW-2 was more poor in her efforts) in our study area as mothers were also less sensitized on importance of growth monitoring by AWWs as per our observations by secret customer technique. Our these findings are in consonance with study by Prinja et al (2007)¹⁶ which had also enumerated the problem of under-nutrition persistence with low involvement of mother and Nutritional counseling of mothers of children aged 0 to 1 year is found to be an effective tool in positive behavioral modification and should be actively incorporated and emphasized. This aspect of AWWs services was also found a weaker aspect in our study area as only 32.6% of total mothers of infants received NHE for nutritional care of infants in both AWCs. Moreover, the key feeding factors, such as colostrum feeding, exclusive breastfeeding and introduction of semisolid feeding at

6 months of age; all of them were significantly associated with nutritional status of children in the AWC 2 area ($p < 0.05$) but not in AWC 1 area. The infants who did not receive colostrum feeding, who did not receive exclusive breastfeeding for 6 months as well as those who were not given semisolid feeding at the age of 6 months had higher % of malnourished children as seen in AWC 2 area as compared to AWC 1 area. This finding indicates that the impact of nutritional counseling AWW-2 on mothers might not be significant in augmenting nutritional literacy of mothers for nutritional care of their infants. This aspect has been emphasized in many studies by Taksande et al¹⁷ Bhasin et al¹⁸ and Kapil et al.¹⁹

Many reasons for this aspect have been found in our study as also found from previous studies in literature; such as the role of AWWs and in imparting breast-feeding and complementary feeding messages to family members (e.g. mother), which may also be responsible for poor nutritional services of ICDS scheme Taksande et al.¹⁷ Bhasin et al¹⁸ in their ICDS project study in Alipur area of the north Delhi on 83 AWWs found that 98.7% AWWs knew that breastfeeding should be begun immediately after birth; 92.7% knew that new borne should receive colostrums and only 56.6% knew that top milk should not be diluted. On child feeding—the incomplete knowledge of AWWs in child feeding and diseases was also found among AWWs by Kapil et al.¹⁹

It also appeared from our study that both AWWs had incomplete knowledge, poor nutritional education practices and their perceptions to improve this weak area was also not so positive and this finding is similar to study in Gujarat, India, by Parikh et al²⁰ where it was also found that the AWWs perceptions and knowledge with regard to the rationale for appropriate recommended child feeding practices promotion was also found to be poor.

However, study by Joshi et al²¹ found that knowledge of urban AWWs to be significantly higher than their mothers and also in other groups of AWWs, this was in contrast to our present study. Although previous studies also reveal ineffectiveness and inefficiency of AWC services as similar to findings of our study, but some study, however, show a statistically significant, positive association between those receiving supplementary nutrition from AWCs and infant survival rate and there is variable effectiveness of AWCs nutritional services on infant survival in India, in contrast to our study.²²

In urban ICDS blocks of Delhi, the similar kind of issue was also identified in study by Davey et al²³ and these authors; in their another study also suggested to focus on repeated practical reorientation training to strengthen the correct knowledge of the AWWs, which can increase their capabilities to take corrective and preven-

tive action at appropriate time for optimum development of nutritional status of the children.²⁴ So, AWWs need constant upgradation of their knowledge in nutritional care of infants in their area for a better positive impact.

LIMITATIONS OF STUDY

In our study, we carried out only survey on two AWCs area on small sample of infants (101) for nutritional services they received, so this may not be a complete and true picture for generalization of findings to the whole population due to constraints for set up in this study.

CONCLUSION

The widespread poor feeding practices and ignored aspect of nutrition education to mothers in India, especially in the 1000-day window of opportunity from conception until the child's second birthday needs urgent attention from ICDS program. Anganwadi workers needs to provide quality health and nutritional educational services toward mothers of infants on at least monthly basis; in which focus on types, quantity and quality of feeding of infants needs more focus, and this area also needs regular attention from healthcare system and ICDS properly. Older children up to 6 years can be studied further in future in detail on this aspect by mixed methods for better elucidation of this picture.

REFERENCES

1. Agarwal KN, Agarwal DK, Agarwal A, Rai S, Prasad R, Agarwal S, Singh TB. Impact of the integrated child development services on maternal nutrition and birth weight in rural Varanasi. *Ind Pediatr* 2000;37:1321-1327.
2. UNICEF. India—Integrated Child Development Services. 2015. Available at: http://www.unicef.org/earlychildhood/files/india_icds.pdf. [Last updated on 2015 May 08 and Last cited on 2015 May 08].
3. The Integrated Child Development Services Program—Are Results Meeting Expectations? Chapter 2. (Internet@2015]. Available at: siteresources.worldbank.org/SOUTHASIAEXT/Resources/2235461147272668285/undernourished_chapter_2.pdf.1-33. [Last updated 2015 May 17 and Last cited 2015 May 17].
4. Davey S, Davey A. Women Literacy and Infant Feeding Practices in Rural ICDS Block of Delhi. *Natl J Community Med* 2012;3(3):385-390.
5. Davey S, Davey A, Adhish SV, Bagga R. Study of impact of Sociocultural and economic factors of mothers on the nutritional status of their malnourished children in a rural area of Delhi, India. *Int J Med Sci Public Health* 2015;4(2):1-6.
6. Davey S, Davey A, Adhish SV, Bagga R. Impact of perceptions of key stakeholders in combating undernourishment among rural children in Delhi. *J Health Res Rev* 2015;2(1):1-8. (Ahead of Print).
7. Davey S, Davey A, Adhish SV, Bagga R. Factors influencing status of undernutrition among children (0–5 years) in a rural area of Delhi: a cross-sectional study. *Int J Community Med Public Health* 2014;1:12-17.
8. Sandhyarani MC, Rao UC. Role and responsibilities of Anganwadi workers, with special reference to MYSORE District. *Int J Sci Environ Technol* 2013;2(6):1277-1296.
9. GOI. MOHFW. Role Clarity and Delineation of roles for frontline workers. [Internet@2015]. Available at: http://wcd.nic.in/order20122013/Role_Delination_for_ICDS_and_Health_Frontline_FunctionariesFinal.pdf. [Last updated 2013 Dec 24 and Last cited 2015 May 08].
10. Tandon BN. A coordinated approach to children's health in India. 1981 Mar 21;1(8221):650-653.
11. Avsm YS, Gandhi N, Tandon BN, Krishnamurthy KS. Integrated Child Development Services Scheme and nutritional status of Indian children. *J Trop Pediatr* 1995 Apr;41(2):123-128.
12. Kapil U, Pradhan R. Integrated Child Development Services scheme and its impact on nutritional status of children in India and recent initiatives. *Ind J Public Health* 1999 Jan-Mar;43(1):21-25.
13. Pandey V, Awasthi S, Srivastava VK, Nigam AK, Srivastava PK. Study of nutritional status of children attending ICDS services in Lucknow. *Ind J Prev Soc Med* 2011;42(2).
14. Swami HM, Thakur JS, Bhatia SP, Bhatia V. Nutritional status of pre-school children in an integrated child development service block of Chandigarh. *J Ind Med Assoc* 2001 Oct;10:554-556.
15. Gupta SB, Srivastava BC, Bhushan V, Sharma P. Impact of the Integrated Child Development Services in Uttar Pradesh. *Ind J Med Res* 1984 Mar;79:363-372.
16. Prinja S, Verma R, Lal S. Role of ICDS program in delivery of nutritional services and functional integration between Anganwadi and health worker in north India. *Int J Nutrit Wellness* 2007;5(2).
17. Taksande A, Tiwari S, Kuthe A. Knowledge and Attitudes of Anganwadi Supervisor Workers About Infant (Breast feeding and Complementary) Feeding in Gondia District. *Ind J Community Med* 2009;34(3):249-251.
18. Bhasin SK. Knowledge and attitude of AWW on infant feeding in Delhi. *Ind Pediatr* 1995 Jan;32(3):346-350.
19. Kapil U. Nutritional beliefs amongst Anganwadi workers. *Ind Pediatr* 1992;29(1-6):67-71.
20. Parikh P, Sharma K. Knowledge and perceptions of ICDS Anganwadi workers with reference to promotion of community based complementary feeding practices in semi tribal Gujarat. *National J Community Med* 2011;2(3):457-464.
21. Joshi A, Hussain M, Inamdar M. KAP of Rural, Urban and Tribal AWWs and Beneficiary Mother Nutrition in lactation. *Ind J Community Med* 2004;29(4):198-199.
22. Yatsu M. The Impact of Anganwadi Centers' Services on Infant Survival in India. Available at: https://www.american.edu/spa/publicpurpose/upload/Yatsu_12.pdf. [Last updated on 2013 Dec 24 and last cited on 2015 May 08].
23. Davey A, Davey S, Dutta U. Perceptions regarding Quality of Services in Urban ICDS Blocks in Delhi. *Ind J Pub Health* 2008;52(3):156-158.
24. Davey A, Davey S, Dutta U. Role of reorientation training in enhancement of the knowledge regarding growth monitoring activities by Anganwadi workers in urban slums of Delhi. *Ind J Community Med* 2008;33(1):47-49.

