Original Research Article

Skill up; gradation of anganwadi workers pertaining to growth chart plotting and interpretation in rural areas of Varanasi district, India

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ABSTRACT

Background: The task of using the growth chart by Anganwadi Workers (AWWs) for growth monitoring requires technical skill. It was hypothesized that skill up-gradation can make a difference in the performance of AWWs in regard with growth monitoring. The aim of the study was to evaluate the effect of intervention in improving skill of AWWs regarding growth chart plotting and interpretation.
Methods: It was a field based interventional study, which was conducted in rural areas of Varanasi district, India. A total of 66 AWWs each from Chiraigaon (intervention) and Cholapur (control) community development blocks of Varanasi district was selected for the study. Each AWW was provided 3 weight readings of different ages for plotting and 4 filled growth charts for interpretation. Chi square test has been applied to assess the significant difference.
Results: Only around 10% of AWWs could correctly plot all 3 growth charts and similar proportion of AWWs could also correctly interpret all 4 filled growth charts. The planned intervention could significantly improve their skill of growth chart plotting and interpretation and during end line survey 41% and 77% of AWWs could correctly plot all 3 growth charts and interpret all the four growth charts, respectively.
Conclusions: The developed hypothesis is proved, and intervention was found effective in significantly improving the skills of AWWs in regard with growth monitoring.

Keywords: Anganwadi worker, Growth chart, Growth monitoring, Intervention study, Skill up-gradation

INTRODUCTION

Growth assessment is the single most useful tool for defining health and nutritional status at both the individual and population level. This is because disturbances in health and nutrition, regardless of their etiology, almost always affect growth.[1] The WHO defines Growth Monitoring Promotion (GMP) as nutrition interventions that not only measure and chart the weight of children, but use this information on physical growth to counsel parents in order to motivate actions that improve growth.[2] Ensuring growth monitoring and sharing the results with appropriate stakeholders can decrease undernutrition status in the community.[3] The growth chart is meant to detect growth faltering in a child before any observable sign or symptom of malnutrition becomes evident. Making the condition apparent to both, the health worker and the mother, the first can advise on early corrective measures that have to be implemented by the later.[4-6] In GMP, early growth faltering is detected by regularly measuring and charting children's weight against reference curves.[7,8]

Growth monitoring and promotion of children from birth to five years is one of the important components of the ICDS program and one of the important activities of Anganwadi Workers (AWW) in Anganwadi Centre (AWC). Weight for age is used as an indicator for detecting early growth faltering, assessing nutritional status of children and taking appropriate measures on the first signs showing inadequate growth or no weight gain or loss of weight, for preventing and reducing the under nutrition. The anganwadi worker being the most important functionary of the ICDS scheme plays a crucial role in promoting child growth and development along with the other components of the services provided by the ICDS. She plays an agent of social changes, mobilizing the needs of their children and women.[9] The task of growth monitoring by them requires technical skill for proper weighing, plotting weight on growth charts, interpreting growth curve and finally using the card as a tool for imparting education to mothers to promote child growth.[10] With this background, it was hypothesized that skill up-gradation can make a difference in the performance of AWWs in regard with growth monitoring. So, this study was planned with the objective to evaluate the effect of intervention (skill up gradation) in improving skill of AWWs regarding growth chart plotting and interpretation.

METHODS

This was a field based Intervention study, which was conducted in Varanasi district of Uttar Pradesh state, India. The study was conducted for a period of 5 years (October 2010 to September 2015). Available pertinent literature was searched on the subject for determination of sample size. It was found that majority of the studies undertaken related to skill of AWW are cross sectional, which only helps to assess the current status of skill of AWWs about growth monitoring. Not much of Interventional based study has been undertaken in India since the introduction of New WHO Growth Chart 2006 and its implementation by ICDS. So, a pilot study was conducted on 40 Anganwadi Workers in Chiraigaon Community Development Block of Varanasi district, which showed a prevalence rate of 8.5% of correct skill for plotting and interpretation of growth charts among Anganwadi Workers.

An improvement of 20% in the skill was assumed post intervention. Considering this, the sample size for this study was calculated using the formula: $n= 2(Z\alpha+Z\beta)^2 (P_1 Q_1+P_2 Q_2) / (P_1-P_2)^2$. Where, n= Sample size, z= 1.64 (one sided), Z_a= 1.64 at 5% level of significance, Z_β= 1.28 at 90% power, P_1= Proportion of study subjects having correct knowledge about correctly plotting and interpreting growth chart. (0.08), P_2= Proportion of correct knowledge after intervention in the study group (0.28), Q_1= 1-P_1 = 0.92, Q_2= 1-P_2 = 0.72 and P_1- P_2= 20%. The required sample size calculated was n= 117.3 = 118 (for both intervention and control group). Thus, sample size for each group was 59. Also, 10% potential

attrition (non-participation rate) was considered (100/90*118=131.1=132) post intervention. Thus, the final sample size for each group was 66.

Two stages were involved in the selection of study subjects. In the first stage, two Community Development Blocks were selected from eight Community Development (CD) Blocks of Varanasi District by simple random sampling. Out of them randomly, one was selected as intervention block (Chiraigaon) and other (Cholapur) was considered as control block.

In the second stage selection of villages was done. Chiraigaon CD block has 232 Anganwadi Centers comprising of 232 Anganwadi Worker. Out of these 232 AWW 66 AWW were selected from 66 AWC of 66 different villages through simple random sampling method at both stages (village selection and AWC selection). During sample selection, the villages in which pilot testing was done, were excluded from the sampling frame. Cholapur Community Development Block has 200 Anganwadi Worker. The similar method was applied in selecting the samples for control group. All the AWWs from Cholapur were included in the sampling frame.

The consort flow of the study is mentioned in Figure 1. A quick survey was conducted before the baseline data collection to prepare the sampling frame and for group matching of selected AWWs, based on all known socio-demographic, work and training related variables by using a pre-designed interview schedule. Each AWW was provided 3 weight readings of different ages for plotting and 4 filled growth charts for interpretation before and after intervention (baseline and end line, respectively). All study subjects were interviewed in local language. Verbal and written consent was taken, and privacy was maintained at the time of interview and skill assessment.

Data generated was analyzed with the help of Microsoft excel 2010 and SPSS v.16.0 software. Appropriate tables were generated and required statistical tests (chi-square and t test) were applied to draw relevant inferences.
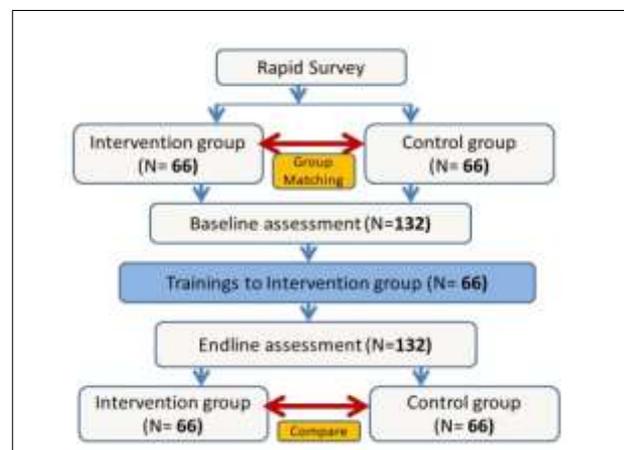

Figure 1: Consort flow diagram of the study.

RESULTS

The group matching of AWWs from both the blocks, which was done for all the possible known socio demographic characteristics. The mean age of the respondents was 33.44+6.12 years. Almost all the respondents in the study area were Hindus. Majority of respondents in Chiraigaon were belonging to OBC caste category, while in Cholapur it was in other caste category. More than 90 percent of the respondents in both the blocks were currently married.

Majority of the respondents in both the blocks were living in a joint family. More than 95% of the respondents in both the blocks were residing in the same village where their AWC was located. Nearly half of the AWWs in both the blocks were educated up to graduation level or above. There was no significant difference (p>0.05) in regard with all the socio-demographic, economic and work related variables of AWWs from intervention and control block (Table 1).

The skill of growth chart plotting by AWWs. During baseline survey only 12.1% and 10.6% of AWWs in Chiraigaon and Cholapur, respectively, could correctly plot all 3 growth charts. Nearly 20% of AWWs in Chiraigaon and 25% in Cholapur could not plot even a single growth chart correctly. The planned intervention could significantly (p<0.01) improve their skill of growth chart plotting in intervention block, and during endline survey, 40.9% AWWs in Chiraigaon could correctly plot all 3 growth charts while in Cholapur the skill was almost unchanged (Table 2).

The skill of growth chart interpretation by AWWs. During baseline survey only 54.5% and 53% of AWWs in Chiraigaon and Cholapur, respectively, could correctly interpret all the four growth chart. The planned intervention could significantly (p <0.05) improve their skill of growth chart interpretation in intervention block. During endline, 77.3% of AWWs in intervention block, could correctly interpreting all the four growth chart, while not much change in proportion was observed in the control group (Table 3).

Table 1: Group matching of selected AWWs based on sociodemographic, economic and work related attributes information (N=132).

Socio-demographic profile	Blocks of district Varanasi		Total (n=132)	p value/ Fisher's exact
	Intervention (n=66)	Control (n=66)		
Mean age (years)	33.11±5.95	33.77±6.45	33.44±6.12	0.382
Religion				
Hindu	66(100)	65(98.5)	131(99.2)	NA
Muslim	0(0)	1(1.5)	1(0.8)	
Caste category				
SC/ ST	13(19.7)	13(19.7)	26(19.7)	0.217
OBC	31(47)	22(33.3)	53(40.2)	
Others	22(33.3)	31(47)	53(40.2)	
Marital status				
Married	62(93.9)	63(95.5)	125(94.7)	1
Unmarried/ Widow	4(6.1)	3(4.5)	7(5.3)	
Type of family				
Joint	39(59.1)	48(72.7)	87(65.9)	0.098
Nuclear	27(40.9)	18(27.3)	45(34.1)	
Mean Family size	9.9±4.83	10.4±4.19	10.1±4.52	0.34
Residence of AWW (within or outside the village where AWC is located)				
Within	63(95.5)	63(95.5)	126(95.5)	0.66
Outside	3(4.5)	3(4.5)	6(4.5)	
Educational Status of AWWs				
Middle to secondary	9(13.6)	7(10.6)	16(12.1)	0.792
Intermediate	25(37.9)	26(39.4)	51(38.6)	
Graduate	27(40.9)	25(37.9)	52(39.4)	
Postgraduates and above	5(7.6)	8(12.1)	13(9.8)	
Mean Family Income (INR)	11939.4±5225.3	12651.5±5881.5	12295.4±5553.3	0.297
Mean years of working as AWW	6.6±3.6	6.9±3.6	6.8±3.6	0.43

Table 2: Skill of growth chart plotting by anganwadi workers.

Plotting by AWWs	Baseline (n=132)			Endline (n=132)			p value
	Intervention (n=66)	Control (n=66)	p value	Intervention (n=66)	Control (n=66)		
All 3 correct	8(12.1)	7(10.6)		27(40.9)	9(13.6)		
Two correct	18(27.3)	16(24.2)	0.737	28(42.4)	21(31.8)		<0.01
One correct	27(40.9)	26(39.4)		9(13.6)	27(40.9)		
All incorrect	13(19.7)	17(25.8)		2(3)	9(13.6)		

Table 3: Skill of AWWs in regard with growth chart interpretation.

Variables	Baseline (n=132)			Endline (n=132)		
	Intervention (n=66)	Control (n=66)	p value	Intervention (n=66)	control (n=66)	p value
All 4 correct	36(54.5)	35(53)		51(77.3)	38(57.6)	
3 correct	15(22.7)	16(24.2)		13(19.7)	14(21.2)	
2 correct	8(12.1)	9(13.6)	0.979	2(3)	10(15.2)	0.01
1 correct	5(7.6)	5(7.6)		0(0)	4(6.1)	
All incorrect	2(3)	1(1.5)		0(0)	0(0)	

Based on ability of AWWs to correctly plot and interpret all the growth charts, the grading of skill has been developed as Excellent (all plotting and interpretation correct), Average (all plotting correct and interpretation incorrect or vice-versa) and Poor (all plotting and interpretation both incorrect). It is evident from table 4 that, during baseline, only 3% of AWWs were having excellent skill and around 60% were having average skill in both the blocks. As much as 36.4% AWWs in Chiraigaon and 39.4% in Cholapur were having poor skills. The planned intervention could significantly (p <0.01) improve their skills in intervention block. During end line, 30.3% of AWWs in Chiraigaon, were having excellent skill and only 12% were showing poor skill. While in control block the skill of AWWs was almost similar to baseline (Table 4).

Table 4: Skill of AWWs in regard with growth chart plotting and interpretation.

Skill	Baseline (n=132)			Endline (n=132)			p value
	Intervention (n=66)	Control (n=66)	p value	Intervention (n=66)	Control (n=66)		
Excellent	2(3)	2(3)		20(30.3)	6(9.1)		
Average	40(60.6)	38(57.6)	0.98	38(57.6)	35(53.0)		<0.01
Poor	24(36.4)	26(39.4)		8(12.1)	25(37.9)		

DISCUSSION

Growth monitoring is one of the important activities conducted by the AWWs. For two-way communication with mothers, growth chart is the excellent tool. It not only clearly depicts the growth of a child to the mothers, but also gives early warning to both of them (AWWs and mothers) to take appropriate actions for children who are malnourished or going towards malnourishment.

In the present study only around 10% of AWWs could correctly plot all 3 growth charts provided to them and nearly one fourth of AWWs could not plot even a single growth chart correctly. The planned intervention could significantly improve their skill of growth chart plotting in intervention block.

Similar kind of poor practices of growth monitoring by weighing the child and plotting it on growth chart has been observed by Bhardwaj et al, (2016) among AWWs in Rajasthan.[11] In the study of Parmar A et al, growth chart plotting was not satisfactory in 38% cases.[12]

In the study by Kapil U et al, half of the studied AWWs plotted weights incorrectly on the chart.[13] Chaturvedi A et al, also demonstrated that about three fourth of AWWs could correctly plot the child's weight against his age.[14] Chaturvedi A et al, observed that about 25% of the AWWs overlooked the use of gender based growth chart (pink for girls and blue for boys) and used an incorrect growth chart for the exercise.[14] However, in the present study none of the AWW did this kind of mistake.

In this study, only around half of the AWWs could correctly interpret all the four growth charts during baseline. The intervention was found effective in significantly improving their skill of growth chart interpretation in the intervention block. Gurukartick J et al, found that growth charts were appropriately interpreted by all the AWWs.[15] Chaturvedi A et al, also observed that growth of the child was correctly inferred by around 80% of AWWs.[14] But Kapil U et al, observed that more than half (57%) of AWWs were unable to interpret a flattened growth curve in their study.[13] In the study by Nale T et al, in assessing impact of health interventions in the form of health and nutritional education, growth chart interpretation by mothers was assessed by giving 3 different growth charts to them. Based on the correct plotting they were given points as invalid (0 correct), partially correct (1 correct or 2 correct) and valid (all 3 correct).

Their study revealed that half of mothers were invalid in interpret the growth charts, while 43% and 7% of mothers were partially correct and valid, respectively.[16] However, present study limits itself in assessing the ability of growth chart interpretation by mothers.

In the present study, only 3% and 60% of AWWs were having excellent and average skills of growth chart plotting and interpretation, respectively. And more than one third of AWWs were having poor skill in this regard. The planned intervention could significantly improve their skill of growth chart plotting and interpretation in intervention block. During end line survey 30% of AWWs in intervention block had shown excellent skill and only 12% were showing poor skill. Similar kind of skill improvement in growth chart plotting and interpretation among AWWs has been demonstrated by Anderson MA (1989) in Maharashtra and Gujarat.[17]

CONCLUSION

Based on the findings of the study, it can be concluded that the planned hypothesis is well accepted and intervention in the form of skill up gradation training was found effective in improving the skills of AWWs in regard with growth chart plotting and interpretation. There is an urgent need of multi-centric evaluation of the skills of AWWs in this regard and accordingly there is wide scope to upgrade their skills through refresher/skill up gradation trainings.

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