

Original Research Article

Contextual correlates of development of anganwadi children 3-6 years of rural Uttar Pradesh, India- a complex interplay

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Received: 16 February 2022

Accepted: 10 March 2022

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ABSTRACT

Background: The cross-sectional study was conducted in rural area of Lucknow, UP to assess the developmental status and its determinants among children aged 3 to 6 years registered in AWCs.

Methods: A visit was made to the households of all the registered children (3-6 years) and parents were interviewed to obtain the sample size of 314.

Results: Type of family, presence of congenital anomaly, educational status of the care giver, duration of EBF, presence of books and space to play were found to be independent predictors of the development status.

Conclusions: To conclude, there is a dire need for acknowledgement and prompt redressal of this loss of developmental potential in children at an early age.

Keywords: Anganwadi, Contextual, Correlates, Development, Interplay, Rural

INTRODUCTION

The first six years of a child's life are the most crucial as the foundations for cognitive, social, emotional, physical, motor and psychological development are laid down at this stage.¹ Nutrition plays a key role in overall development of a child and much emphasis has been given to provide good nutrition in the formative years of life.²

Since childhood is the most vulnerable phase in the life, nutritional inadequacies will result in the hampering of the development of the body.³ If this inadequacy is continued for a long period of time it results in the growth faltering manifested in the form of low weight, small height "and" low IQ.³ Malnutrition leads to impairment of mental capacity and motor skills, decreased alertness and physical capacity.⁴ As developmental delays affect at least 10 percent of the children, which comprise about

one third of the nation's populations, therefore, it may hamper the progress that India will make towards achieving the sustainable development goals (SDGs).^{5,6}

ICDS based on the concept of early childhood care and development (ECCD) is one of the prime symbols of India's commitment to its children.⁶ It fortresses the efforts to tackle the challenge of striking a balance between furnishing pre-school education on one hand and interrupting the malicious cycle of malnutrition, disease, impaired learning capacity and mortality, on the other.⁶

Pre-school education encompassing holistic development, primarily focuses on the children of 3 to 6 years age group.¹ It is of paramount importance and is being provided through anganwadi centres set up in every village, for three hours a day, through games, rhymes and other joyful play activity.⁷ Emphasis is on fostering favorable attitudes, behavior and values to bring about the

desired physical, psychological, social and emotional development of the child and not pertaining only to formal learning with a rigid curriculum.⁸ Good pre-school education not only enhances cognitive abilities and accomplishments at school but also improves behavior pattern among children.⁷

Although ICDS is presumed to target the development of children in a comprehensive manner, in reality, it still persists to accord a considerable amount of attention to the salient components of health and nutrition only. Preschool education, the other indispensable pillar of ICDS, still receives less focus and is at a low priority for policy makers and program implementers and henceforth, has not been able to attain the desired level of acceptance and participation by the community.⁹

Therefore the present study aimed at assessing the development status of anganwadi children (3-6 years) in rural Lucknow. It will help in delineating the determinants of normal development and the effect ICDS has on children with regard to their level of development.

Objectives

To assess the developmental status in children in the anganwadi centres of Lucknow. To study the determinants of development among children in the anganwadi centres of Lucknow. To find gaps if any and suggest the way forward for better development of children.

METHODS

It was a cross sectional study conducted at the anganwadi centres in the rural areas of Lucknow for a period of August 2015 to July 2016. Study consisted of children aged 3-6 years registered at the anganwadi centres in rural areas of Lucknow.

Inclusion criteria

Children aged 3-6 years whose caregiver gave consent for the study.

Exclusion criteria

Children who were not registered at the anganwadi centre. Children whose caregivers were non-cooperative. Children whose caregivers were not present during three visit periods.

Sample size determination

The present study was conducted as a part of thesis work to determine the nutritional and development status of children registered at anganwadi centres of rural Lucknow so the sample size was calculated using prevalence of wasting. Taking the value of the standard normal variable at 0.05 level of significance as 1.96,

prevalence of wasting in Lucknow as 13.9% and an allowable error of 4%, the total sample size (n) was calculated as 288.¹⁰

Sampling design

Two-stage random sampling technique was used. There are eight rural ICDS projects in Lucknow. Of them the Sarojini Nagar ICDS project was purposively selected as it is the rural field practise area of the community medicine department of King George's Medical University. A list of supervisor zones under the Sarojini Nagar ICDS project was obtained and five supervisor zones were randomly selected from it. Then from a list of anganwadi centres under each supervisor zone, one anganwadi centre was randomly selected. Then from the selected anganwadi's, households of all the registered children fulfilling the selection criteria were visited to fulfil the requirement of the desired sample size.

Dependent variable

Developmental grade was the dependent variable.

Independent variables

Socio-demographic factors, perinatal history, feeding practices, home care of the child and utilization of ICDS services were the independent variables.

Definitions

Development¹¹

It specifies maturation of functions and indicates acquisition of variety of skills for optimal functioning of the individual.

Developmental grade¹²

Developmental score based on Bharath Raj Scale was used. The scale measures the developmental sequences of children from birth to 15 years of age.

Non-formal pre-school education (PSE)¹³

It focuses on total development of the child, in the age three to six years. It is directed towards providing and ensuring a natural, joyful and stimulating environment for optimal growth and development. It provides a sound foundation for cumulative lifelong learning and development and also contributes to the universalization of primary education by providing to the child the necessary preparation for primary schooling.

Data collection

A visit to the selected anganwadi centres was made and the list of registered children aged 3-6 years was obtained. Then the households of these children were

visited and all the caregivers fulfilling the inclusion and exclusion criteria and consenting for the study were included in the study. A pre-structured and pretested interview schedule was used to collect information from the caregiver of the child beneficiary of the anganwadi centres regarding socio-demography, perinatal history, feeding practices, home care of the child and utilization of ICDS services. The utilization of ICDS services was assessed from the attendance of the child at the anganwadi. The development status of the child was assessed using developmental screening test developed by Bharath Raj (1977, 1983).¹² It consists of 88 items which represent the behavioural characteristics of respective age levels. At each age level, items were drawn from behavioural areas, like motor development, speech, language, and personal social development. Observed age was estimated and developmental index was derived using the formula:

Developmental index / score = (observed age/ real age) × 100

Scores were then classified into various grades of development.

Table 1: Grades of development.

Developmental grade	Score
High average	110-119
Average	90-109
Dull normal	80-89
Borderline	70-79
Mild mental retardation	55-69
Moderate mental retardation	39-54
Severe mental retardation	25-39
Profound mental retardation	0-24

Data processing and analysis

Data was analysed using SPSS. 16. The descriptive summary of the study results was presented using frequencies, proportions, graphs and cross tabs. Association between determinants and development status was determined using Chi square test and multivariate logistic regression.

Ethical consideration

Before the commencement of the study ethical permission was obtained from the Institutional Ethical Committee of the King George's Medical University UP, Lucknow.

RESULTS

A total sample of 314 children registered at the anganwadi centres was analysed to assess their development status and the related factors.

In the present study about two-fifth (37.6%) of the children belonged to the age group of 4-5 years followed by 32.5% and 29.9% in the age groups of 3-4 and 5-6 years respectively; their mean age being 52.69±9.44 months. Males comprise of about 54.8% of the study participants while remaining 45.2% were females.

Majority (95.2%) of the study participants belonged to Hindu religion and of them, general, OBC and SC/ST were 23.1%, 24.1% and 55.5% respectively. About two-fifth (37.9%) of the mothers and one-fifth (17.2%) of the fathers of the children were illiterate. Only few mothers (12.1%) had an educational level of intermediate and above. Fathers on the other hand had a better educational status with about one fourth (24.8%) of the fathers being educated up till high school and about one fifth (20.4%) of them having an education level of intermediate and above.

Most (77.7%) of the mothers were unemployed, whereas on the other hand the fathers were employed in unskilled (42.7%) and partially skilled occupations (34.7%). When classified as per the modified BG Prasad classification, majority of the children belonged to socioeconomic class IV and V (58.9% and 31.2% respectively).

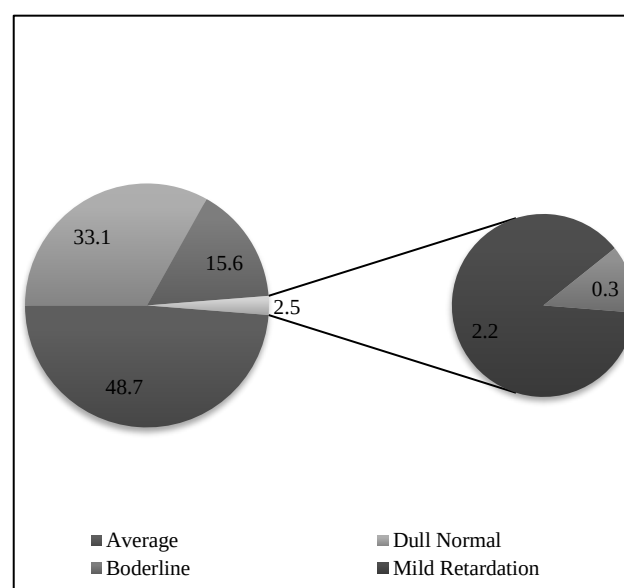


Figure 1: Developmental status of the anganwadi children.

About half (48.7%) of the children were of average developmental grade. About one-third (33.1%) were dull normal and 15.6% were of borderline developmental grade. 2.2% of them showed mild mental retardation while another 0.3% of them showed moderate mental retardation.

Table 1: Distribution of the children on the basis of nutritional status and developmental grade (N=314).

Nutritional status	Developmental Grade					Total (%) N=314	p value
	Average (%) n=153	Dull normal (%) n=104	Borderline (%) n=49	Mild retardation (%) n=7	Moderate retardation (%) n=1		
Underweight							
-2SD to +2SD	93 (53.1) (60.8)	56 (32.0) (53.8)	24 (13.7) (49.0)	01 (0.6) (14.3)	01 (0.6) (100.0)	175 (55.7)	0.081
< -2SD	60 (43.2) (39.9)	48 (34.5) (46.2)	25 (18.0) (51.0)	06 (4.3) (85.7)	00 (0.0) (0.0)	139 (44.3)	
Stunting							
-2SD to +2SD	88 (62.9) (57.5)	39 (27.9) (37.5)	12 (8.6) (24.5)	01 (0.7) (14.3)	00 (0.0) (0.0)	140 (44.6)	0.000
< -2SD	65 (37.4) (42.5)	65 (37.4) (62.5)	37 (21.3) (75.5)	06 (3.4) (85.7)	01 (0.6) (100.0)	174 (55.4)	**
Wasting							
-2SD to +2SD	122 (46.4) (79.7)	89 (33.8) (85.6)	47 (17.9) (95.9)	04 (1.5) (57.1)	01 (0.4) (100.0)	263 (83.8)	0.024
< -2SD	31 (60.8) (20.3)	15 (29.4) (14.4)	02 (3.9) (4.1)	03 (5.9) (42.9)	00 (0.0) (0.0)	51 (16.3)	*

Number (Row %) (Column %)

Table 2: Utilization of anganwadi services and developmental status of the anganwadi children.

Variables	Frequency n=314 (%)	Developmental Grade			P value
		Average (%)	Below average (%)	Mental retardation (%)	
Pre school education received in the last three months (mean no. of days)					
Don't attend	123 (39.2)	94 (76.4)	27 (22.0)	02 (1.6)	0.000**
<10 days	102 (32.5)	33 (32.4)	66 (64.7)	03 (2.9)	
10-20 days	81 (25.8)	25 (30.9)	53 (65.4)	03 (3.7)	
>20 days	08 (2.5)	01 (12.5)	07 (87.5)	00 (0.0)	

Number (Row %) [Column %]; * p < 0.05; ** p < 0.01

Table 3: Association of developmental status with socio-demographic factors of the child.

Variables	Frequency n=314 (%)	Developmental grade			P value
		Average (%)	Below average (%)	Mental retardation (%)	
Age groups (months)					
36-47	102 (32.5)	34 (33.3)	63 (61.8)	05 (4.9)	0.000**
48-59	118 (37.6)	54 (45.8)	62 (52.5)	02 (1.7)	
60-71	94 (29.9)	65 (69.1)	28 (29.8)	01 (1.1)	
Gender of the child					
Male	172 (54.8)	87 (50.6)	81 (47.1)	04 (2.3)	0.759
Female	142 (45.5)	66 (46.5)	72 (50.7)	04 (2.8)	
Religion					
Hindu	299 (95.2)	146 (48.8)	146 (48.8)	07 (2.3)	0.024*
Muslim	15 (4.8)	07 (46.7)	07 (46.7)	01 (6.7)	
Caste/tribe					
SC/ST	166 (52.9)	70 (42.2)	94 (56.6)	02 (1.2)	0.002**
OBC	64 (20.4)	31 (48.4)	32 (50.0)	01 (1.6)	
Others	84 (26.8)	52 (61.9)	27 (32.1)	05 (6.0)	
Mother's education					
Illiterate	119 (37.9)	40 (33.6)	76 (63.9)	03 (2.5)	0.000**
Upto Primary level	65 (20.7)	33 (50.8)	32 (49.2)	0 (0.0)	
Upto high school	85 (27.1)	43 (50.6)	38 (44.7)	04 (4.7)	
Intermediate and above	42 (13.4)	35 (83.3)	06 (14.3)	01 (2.4)	
Mother's occupation					
Unemployed	244 (77.7)	127 (52.0)	111 (45.5)	06 (2.5)	0.026*
Unskilled worker	52 (16.6)	13 (25.0)	37 (71.2)	02 (3.8)	
Partially skilled worker	13 (4.1)	09 (69.2)	04 (30.8)	0 (0.0)	
Professional	2 (0.6)	02 (100.0)	0 (0.0)	0 (0.0)	
Father's education					
Illiterate	54 (17.2)	15 (27.8)	38 (70.4)	01 (1.9)	0.000**
Upto primary level	54 (17.2)	14 (25.9)	39 (72.2)	01 (1.9)	

Continued.

Variables	Frequency	Developmental grade			P value
Upto high school	141 (44.9)	82 (58.2)	57 (40.4)	02 (1.4)	
Upto intermediate	64 (20.4)	42 (65.6)	18 (28.1)	04 (6.3)	
Father's occupation					
Unemployed	4 (1.3)	02 (50.0)	02 (50.0)	0 (0.0)	0.000**
Unskilled worker	134 (42.7)	47 (35.1)	84 (62.7)	03 (2.2)	
Partially skilled worker	109 (34.7)	59 (54.1)	48 (44.0)	02 (1.8)	
Skilled worker/business/farmer	51 (16.3)	33 (64.7)	15 (29.4)	03 (6.4)	
Professional	15 (4.8)	12 (80.0)	03 (20.0)	0 (0.0)	
Type of family					0.211
Nuclear	194 (61.8)	87 (44.8)	102 (52.6)	05 (2.6)	
Joint	120 (38.2)	66 (55.0)	51 (42.5)	03 (2.5)	
Total number of family members					0.264
≤5	172 (54.8)	77 (44.8)	91 (52.9)	04 (2.3)	
>5	142 (45.2)	76 (53.5)	62 (43.7)	04 (2.8)	
Total number of under five children in the family					0.527
≤2	293 (93.3)	141 (48.1)	145 (49.5)	07 (2.4)	
>2	21 (6.7)	12 (57.1)	08 (38.1)	01 (4.8)	
Socio-economic status (Updated BG Prasad scale)					0.019*
II	4 (1.3)	03 (75.0)	01 (25.0)	0 (0.0)	
III	27 (8.6)	20 (74.1)	07 (25.9)	0 (0.0)	
IV	185 (58.9)	94 (50.8)	85 (45.9)	6 (3.2)	
V	98 (31.2)	36 (36.7)	60 (61.2)	2 (2.0)	
Number (Row %) (Column %); * p < 0.05; ** p<0.01					

Among the children who were underweight, more than two-fifth (43.2%) were of average developmental grade while about one-third (34.5%) were dull normal. No significant difference in developmental status was found between children who were underweight to those who had a normal weight for age. Among the children who were stunted, more than one-third (37.4%) were dull normal and another 21.3% were of borderline developmental grade. There was a statistically significant difference in developmental status of children who were stunted as compared to those who had a normal height for age. A statistically significant difference in developmental status of children who were wasted was observed as compared to those who had a normal weight for height.

About two-third (64.7%) of the children who had an attendance of <10 days, were of below average development status. With the increase in the attendance at AWC, the proportion of children having below average developmental grade was found to increase and this association of developmental status with the average number of days on which the child received Pre School Education at the anganwadi centre was found to be statistically significant.

Age and gender

In the present study about two-third (61.8%) of the children in the age group of 3-4 years were of below average development status. With increase in age, the proportion of children having average developmental grade was found to increase and this association between

the age of the child and developmental status was found to be statistically significant. However, no statistically significant association was found between gender and developmental status of the child.

Religion and caste

The proportion of children having mental retardation was more among the Muslims as compared to Hindus and this association was found to be statistically significant. More than half (56.6 %) of the SC/ST children were of below average development status. The proportion of children having below average development grade was found to more in SC/ST and OBC as compared to the general category; the association between caste/tribe and development status of the child being significant.

Education and occupation of mother and father

The proportion of children having below normal developmental grade was found to decrease with increase in the level of education of mother and father. More than half of the children whose mother was unemployed had an average level of development. About three fourth (71.2%) of the children whose mother and about two-third (62.7%) of the children whose father were employed as an unskilled worker had below average developmental grade. With more skilled profession of the mother and father more proportion of children had an average developmental status. The association between development grade of the children and the educational and occupational status of both mother and father was found to be statistically significant.

Family characteristics and socioeconomic status

Type of family, total number of family members and total number of under-five children in the family were found to be statistically non significant with developmental status of the child. The proportion of children having average

development grade was found to decrease with decrease in the socioeconomic class ie lower socioeconomic classes having more children with below average development status. This association between socioeconomic status and developmental status of the child was found to be statistically significant.

Table 4: Association of developmental status with maternal and child related perinatal factors.

Variables	Frequency n=314 (%)	Development grade			P value
		Average (%)	Below average (%)	Mental retardation (%)	
Maternal factors					
Age of the mother at the birth of index child (in years)					
18-24	214 (68.2)	104 (48.6)	104 (48.6)	06 (2.8)	0.909
25-29	94 (29.9)	45 (47.9)	47 (50.0)	02 (2.1)	
≥30	06 (1.9)	04 (66.7)	02 (33.3)	00 (0.0)	
Parity of the mother					
1	53 (16.9)	27 (50.9)	25 (47.2)	01 (1.9)	0.294
2-4	245 (78.0)	122 (49.8)	116 (47.3)	07 (2.9)	
≥5	16 (5.1)	04 (25.5)	12 (75.0)	00 (0.0)	
Mother suffer any illness during index pregnancy					
Yes	276 (87.9)	129 (46..7)	142 (51.4)	05 (1.8)	0.006**
No	38 (12.1)	24 (63.2)	11 (28.9)	03 (7.9)	
Duration of index pregnancy					
Term	306 (98.1)	151 (49.3)	149 (48.4)	08 (2.6)	0.651
Preterm	06 (1.9)	02 (33.3)	04 (66.7)	00 (0.0)	
Place of delivery of index pregnancy					
Home	16 (5.1)	1 (6.3)	15 (93.8)	00 (0.0)	0.001**
Institution	298 (94.9)	152 (51.0)	138 (46.3)	08 (2.7)	
Child related factors					
Birth order of the index child					
1	135 (43.0)	72 (53.6)	59 (43.7)	04 (3.0)	0.083
2	83 (26.4)	37 (44.6)	45 (54.2)	01 (1.2)	
3	63 (20.1)	34 (54.0)	26 (41.3)	03 (4.8)	
≥4	33 (10.5)	10 (30.3)	23 (69.7)	00 (0.0)	
Age difference of the index child with siblings (n=259)					
≤1 year	11 (4.2)	05 (45.5)	06 (54.5)	00 (0.0)	0.339
1-3 years	175 (67.6)	80 (45.7)	92 (52.6)	03 (1.7)	
>3 years	73 (28.2)	41 (56.2)	29 (39.7)	03 (4.1)	
Birth weight of the index child					
Normal	249 (79.3)	134 (53.8)	112 (44.9)	03 (1.2)	0.000**
Less than normal	65 (20.7)	19 (29.2)	41 (63.0)	05 (7.6)	
Congenital anomaly(s) in the index child					
Absent	311 (99.0)	153 (49.2)	151 (48.6)	07 (2.3)	0.002**
Present	3 (1.0)	0 (0.0)	2 (66.7)	1 (33.3)	
Fathers attitude regarding birth of the index child					
Favourable	285 (90.8)	144 (50.5)	133 (46.7)	08 (2.8)	0.202
Unfavourable	1 (0.3)	00 (0.0)	01 (100.0)	00 (0.0)	
Indifferent	28 (8.9)	09 (32.1)	19 (67.9)	00 (0.0)	

Number (Row %) (Column %); * p .05; ** p<0.01

Maternal factors

More than half (51.2%) of the children whose mothers had suffered any illness during the index pregnancy had below average development grade. Also majority (93.8%)

of the home born children had a below average development grade. The association between illness suffered by the mother during pregnancy and place of delivery and development status of the child was found to be statistically significant. Age of the mother, parity and duration of pregnancy did not have a statistically

significant association with developmental status of the child.

Child related factors

About two-third (63.0%) of the children with below normal birth weight, were of below average development grade and this association was found to be statistically significant. Two third (66.7%) of the children with presence of congenital anomalies were of below average development grade and one third (33.3%) of them had mental retardation, the association being statistically significant. Birth order of the index child and age difference of the index child with siblings was found to have no significant association with development status. The proportion of children having below average development status was found to be more where fathers had an unfavourable or indifferent attitude towards the birth of the index child, however no significant association could be established between them.

Feeding practices

Majority (85.7%) of the children who were not given colostrums had below average development grade. Also more than half (53.4%) of the children who were not exclusively breast fed had below average development grade. The association of giving colostrum and duration of exclusive breast feeding with development status of the child was found to be statistically significant. Early initiation of complimentary feeding was found to have a statistically significant association with development status of the child. However, no significant association was observed between time of initiation of breast feeding and duration of breast feeding with development status of the child. About two third (64.7%) of the children who did not have diversity of food intake were found to be of below average development grade. The association between food diversity and development status of the child was found to be statistically significant.

Table 5: Feeding practices affecting developmental status of anganwadi children.

Variables	Frequency n=314 (%)	Developmental Grade			P value
		Average (%)	Below average (%)	Mental retardation (%)	
Time of initiation of breast feeding					
≤1 hour	19 (6.1)	13 (68.4)	06 (31.6)	00 (0.0)	0.188
>1 hours	295 (93.3)	140 (47.5)	147 (49.8)	08 (2.7)	
Colostrum given					
Yes	300 (95.5)	151 (50.3)	141 (47.0)	08 (2.7)	0.018*
No	14 (4.5)	02 (14.3)	12 (85.7)	00 (0.0)	
Duration of exclusive breast feeding					
No exclusive breastfeeding	263 (83.3)	117 (44.5)	140 (53.2)	06 (2.3)	0.001**
>4 months	51 (16.2)	36 (70.6)	13 (25.5)	02 (3.9)	
Age of starting complimentary feeding					
<6 months	38 (12.1)	26 (68.4)	11 (28.9)	01 (2.6)	0.032*
6-9 months	276 (87.9)	127 (46.0)	142 (51.4)	07 (2.5)	
Duration of breast feeding					
< 1 year	18 (5.7)	9 (50.0)	08 (44.4)	01 (5.6)	0.746
1-2 years	95 (30.3)	45 (47.4)	49 (51.6)	01 (1.1)	
>2 years	201 (64.0)	99 (49.3)	96 (47.8)	06 (3.0)	
Food diversity					
Yes	141 (44.9)	96 (68.1)	41 (29.1)	4 (2.8)	0.000**
No	173 (55.1)	57 (32.9)	112 (64.7)	4 (2.3)	

Number (Row %) (Column %); * p < 0.05; ** p<0.01

Home care

The proportion of children with average development status was found to increase with increase in the level of educational of the care giver and the association was found to be statistically significant. Relation of the child to the caregiver and mother and father staying together were found to have an insignificant association with development status of the child. Three fourth (75%) of the children who were left alone for >1 hour had below average development grade, the association being statistically significant. Presence of toys from shop, picture books/religious books and mobile phone and

enough space in and around the house of the child were found to be significantly associated with development status of the child. More than two-third (67.5%) of the children whom someone read books and told stories were of average development grade and the association was found to be statistically significant. About two third of the children who were verbally abused/excessively scolded by parents or excessively hit by the parents or exposed to domestic violence on mother were found to have below average development status, the association being statistically significant. The association of time spent by the caregiver with child per day and child playing with siblings and peers and development status was found to be statistically insignificant.

Table 6: Association of developmental status with home care of the anganwadi children.

Variables	Frequency (%) n=314	Developmental grade			P value
		Average (%)	Below average (%)	Mental retardation (%)	
Main care giver of the child					
Mother	232 (73.9)	105 (45.3)	122 (52.6)	05 (2.2)	0.066
Others	82 (26.1)	48 (58.5)	31 (37.8)	03 (3.7)	
Educational status of the care giver					
Illiterate	160 (51.0)	63 (39.4)	93 (58.1)	04 (2.5)	0.007**
Upto Primary level	74 (23.3)	41 (55.4)	32 (43.2)	01 (1.4)	
Upto High school	58 (18.5)	32 (55.2)	23 (39.7)	03 (5.2)	
Upto Intermediate	22 (7.0)	17 (77.3)	05 (22.7)	00 (0.0)	
Father and mother of the child stay together					
Yes	302 (96.2)	148 (49.0)	147 (48.7)	07 (2.3)	0.413
No	12 (3.8)	05 (41.7)	03 (50.0)	01 (8.3)	
Child left alone > one hour					
Yes	32 (10.2)	7 (21.9)	24 (75.0)	01 (3.1)	0.006**
No	282 (89.8)	146 (51.8)	129 (45.7)	07 (2.5)	
Child left in care of another child of less than 10 year age for more than one hour					
Yes	253 (80.6)	123 (48.6)	123 (48.6)	07 (2.8)	0.882
No	61 (19.4)	30 (49.2)	30 (49.2)	01 (1.6)	
Presence of Play materials of the child					
Toys from the shop	302 (96.2)	152 (50.3)	142 (47.0)	08 (2.6)	0.010*
Household objects	238 (75.8)	119 (50.7)	112 (47.1)	07 (2.9)	0.476
Picture books/religious books	131 (41.7)	89 (67.9)	39 (29.8)	03 (2.3)	0.000**
Mobile phone	67 (21.3)	50 (74.6)	15 (22.4)	02 (3.0)	0.000**
Enough space in and around the house of the child					
Yes	120 (38.2)	75 (62.5)	41 (34.2)	04 (3.3)	0.000**
No	194 (61.8)	78 (40.0)	112 (57.7)	04 (2.1)	
Someone reads books and tells stories to the child					
Yes	83 (26.4)	56 (67.5)	23 (27.7)	04 (4.8)	0.000**
No	231 (73.6)	97 (42.0)	130 (56.3)	04 (1.7)	
Child plays with siblings and peers					
Yes	304 (96.8)	151 (49.7)	145 (47.7)	08 (2.6)	0.130
No	10 (3.2)	02 (20.0)	08 (80.0)	00 (0.0)	
Time spent by the caregiver with child per day					
<2 hours	258 (82.2)	128 (49.6)	125 (48.4)	05 (1.9)	0.306
≥2 hours	56 (17.8)	25 (44.6)	28 (50.0)	03 (5.4)	
Child verbally abused / excessively scolded by parents					
Yes	101 (32.2)	34 (33.7)	65 (64.4)	02 (2.0)	0.001**
No	213 (67.8)	119 (55.9)	88 (41.3)	06 (2.8)	
Parents excessively hit the child					
Yes	75 (23.9)	21 (28.0)	53 (70.7)	01 (1.3)	0.000**
No	239 (76.1)	132 (55.2)	100 (41.8)	07 (2.9)	
Domestic violence on Mother of the child n=303					
Yes	52 (17.2)	14 (26.9)	37 (71.2)	01 (1.9)	0.010*
No	251 (82.8)	134 (53.4)	110 (43.8)	07 (2.9)	

The above table shows predictors of developmental status. Factors obtained statistically significant in bivariate analysis were subjected to conditional multiple logistic regressions for adjustment and controlling the effect of confounding variables. Several factors that were found to be statistically significant on bivariate analysis were not significant on multivariate analysis which could

be partly explained due to co-linearity and possible confounding observed between predictor variable.

Among the variables, type of family, presence of congenital anomaly in the child, educational status of the care giver, duration of exclusive breast feeding, presence of picture/religious books and presence of adequate play

space showed independently significant association with developmental status of the child.

Absence of congenital anomaly was 39.414 times more associated with a better developmental status. Duration of exclusive breastfeeding for more than four months was

3.100 times more associated with a better developmental status. Above primary educational status of the caregiver was 4.142 times more associated with a better developmental status. Also children having an adequate play space were 3.326 times more likely to be of better developmental status.

Table: 7: Logistic regression for factors associated with developmental status.

Variables	B	SE	P value	Adjusted OR	95% CI	
					Lower	Upper
Type of family						
Nuclear	Reference					
Joint	1.178	0.497	0.018*	3.249	1.226	8.6078
Congenital anomaly						
Present	Reference					
Absent	3.674	1.485	0.013*	39.414	2.147	723.659
Duration of exclusive breast feeding						
More than 4 months	Reference					
No exclusive breast feeding	1.131	0.568	0.047*	3.100	1.018	9.445
Educational status of the care giver						
Upto primary	Reference					
Above primary	1.421	0.655	0.030*	4.142	1.147	14.950
Picture / religious books						
No	Reference					
Yes	1.317	0.499	0.008**	3.731	1.403	9.927
Enough play space						
Yes	Reference					
No	1.202	0.537	0.025*	3.326	1.160	9.538

*p<0.05, **p<0.01

DISCUSSION

Child development is an interplay of several factors viz. genetic, nutritional, socioeconomic and psychosocial.¹⁴ These dimensions including motor, cognitive, emotional and social performance, as well as the behavioral patterns and the health and nutritional status are coexisting and interdependent; thus difficult to disentangle and isolate individually.^{14,15} It has been recently documented that in developing countries, 39% of the under-five children (i.e. roughly 200 million) are not attaining their expected developmental potential because of impoverishment and instability in the homes, high infection rates, malnutrition, lack of psychosocial stimulation, and preschool education thereby, detrimentally affecting their motor, cognitive, emotional and social development.¹⁵ The present study has made an attempt to include many, but not all the, potential determinants having an influence on the development of anganwadi children and the study findings corroborate those described in the literature.

The study found that 48.7% of the children were having below average development grade and 2.5% of the children were having mental retardation. The prevalence of mental retardation was far less as compared to that found by Dabar et al who reported a development delay of 10.1% in her study among under-five children in an urbanized village of Delhi.¹⁴ As reported by Rashtriya Bal

Swasthya Karyakram, the apparent developmental delay affects at least 10 percent of the children.⁵ Thus, the present study projects the dire need to focus on the huge chunk of children having below average development grade and at risk of potentially preventable developmental deficits. If not intervened in time this demographic potential will convert into demographic burden in due course of time, thus hindering the progress of the nation.

Though, development is influenced by many factors, even way beyond food (macro and micronutrients), yet we cannot defy the centrality of good nutrition.¹⁵ Nutrition by yielding the building blocks for the development of brain has a strong influence on the fine and gross motor skills, cognitive, emotional and social development, thereby affecting the linguistics, educational attainment, psychosocial and self regulatory behavior of the individual.¹⁵ Similar to the findings of various studies done across the world, stunting was found to be significantly associated with developmental status of the child.^{14,16,17} Dabar et al, in her study has described the process by which stunting accounts to developmental delay.¹⁴ According to her besides poor linear growth, an impoverished environment also hinders the timely acquisition of developmental milestones, thereby depriving the child of its developmental potential. The deficiency of calories, proteins and essential micronutrients may hamper the development of the

neurological system. Apart from this, a malnourished child might lack energy to acknowledge the opportunities that are available for learning and social interactions. In contrast to the findings of Khomsan et al and Ade et al, underweight was not found to be significantly associated with developmental status of the child.^{9,16} But regardless of the susceptibility of the brain to these early insults, exceptional recovery is generally attainable with suitable interventions, and mostly the earlier the mediation, the more noteworthy the benefit is, advocating for a prompt identification and redressal of such developmental delays.¹⁴

Similar to the findings of Das et al, Khomsan et al and Warsito et al preschool education had a significant association with developmental status of the child.^{8,16,17} In contrast to Ade et al the developmental status of the children attending anganwadi centres was reported to be lower than those not attending them.⁹ As the quality and level of psychological stimulation being provided to the children has an effect on the acquisition of developmental milestones, the unavailability of desired cognitive stimulation owing to an impoverished environment at home and absence of quality preschool education (PSE) might be the cause of developmental delay in these children.¹⁴

The present study found a significant association between age and developmental status of the child which is in concurrence to the findings of studies done by Ade et al and Arora et al in Maharashtra and Jammu and Kashmir respectively.^{9,18} Developmental status was not found to be significantly associated with gender of the child which is in contrast to studies by Ade et al and India CLEN and INCLENTTRUST who found gender to be a significant factor in the developmental status of the child.^{8,19} Parental education and occupation were found to play a significant role in the development of the child. The finding is similar to Dabar et al and Ade et al who reported education of parents as a significant factor affecting development of the child.^{9,14} Maternal education in synergy with a highly structured physical environment viz. exposure to a diverse range of stimuli including relevant play materials and mother's emotional and verbal involvement with the child plays an eminent role in the development of the child.¹⁴ This is not the case with poorly educated mothers who have a lack of understanding and tend to dominate their children.¹⁷ Vaida in her study among preschool children in Srinagar reported that maternal occupation played an indispensable role in seminal child feeding practices which had an influence on child's wellbeing and development.²⁰ Also, the development status of the child was found to be significantly associated with socioeconomic status of the family. This is similar to the findings of Muluk et al.²¹ This result concurs with the fact that economically secured families have a scope to provide comparatively better care in contrast to those who are not economically sufficient; as children from low-income families anywhere in the world are generally those with relatively

poor educational stimulation due to their parent's limited resources.¹⁷ The lower the maternal education and income of the family, the more the child is deprived of an appropriate psychosocial stimulation, due to lack of play materials and school stimulation, which further has a negative effect on their development.²² Similar to Ali, illness during the index pregnancy was also found to be significantly associated with development status of the child.²⁰ However, these factors were reported to be insignificant when multivariate analysis was done.

The presence of congenital anomaly was found to be an independent predictor of development status.

In the present study the duration of breast feeding was found to be significantly associated with the development of the child. According to the findings of animal research and clinical studies, several nutrients, and other constituents present in the breast milk tend to enhance the mental development. The long-chain polyunsaturated fatty acids present in human milk have an influence on the chemical composition of the brain and hence augment retinal and cortical function.¹⁵ These agents can function directly or indirectly by either, influencing brain biochemistry and functional development, or by altering sensory systems that have an effect on the brain development.¹⁵ Also in line with several researches age of starting of complimentary feeding was found to be significantly associated with developmental status of the child.^{1,23,24} This could be ascribed to the fact that as the child grows older and enters the weaning stage, he is more susceptible to malnutrition and infection owing to poverty, deficient access to weaning foods and unsanitary conditions, which are all constituents of a impoverished environment.¹⁴ This intermingled with a debilitating microenvironment, may altogether impair learning and retard the acquisition of skills, even in advanced ages.¹⁴ Thus environmental and genetic determinants along with intrauterine growth retardation lead to developmental delay in children.¹⁴

Education status of the caregiver was found to be significantly associated with developmental status of the child which is similar to Chelule et al.²⁵ It is possible that the lack of stimulation, poor vocabulary, and communication skills and failure to recognize or appreciate the importance of acquiring verbal skills, in association with inadequate parental interaction arising from the ignorance of parents are the possible reasons and pathways through which these developmental delays transpire; as prompt, appropriate and good quality cognitive stimulation are critical for early childhood development.¹⁴

The development status of the child was found to be significantly associated with availability of play materials like toys and picture books. Availability of adequate play materials and play space encourages the child to explore and try new things which enhances development of the child. This finding is similar to Santos et al and

Goldstein.^{22,26} Santos et al, in their study found that early cognitive development was affected by availability of appropriate play materials and games i.e. the child's proximal environment.²² As opined by Das et al non-availability of materials for play and learning create hindrances in both language and cognitive development.⁸ Hence, attempts must be made for provision of appropriate play materials and educational aids in each anganwadi centre/ICDS. Also reading of story books to the child was found to be significantly associated with developmental status of the child. This finding is similar to Bornstein et al who found that reading books to the child is associated with better developmental status.²⁷ Howe et al and Hay opined that sibling relations provide an important context for the development of children's understanding of their social, emotional, moral and cognitive worlds.^{28,29} However, contrary to that in our study no significant association was found between developmental status and child's relation with siblings and peers. Similar to the findings of Moylan et al the association between child abuse and developmental status was found to be statistically significant.³⁰ The association between domestic violence on the mother and development status was also found to be statistically significantly. The finding is similar to the studies conducted by UNICEF and Stiles.^{31,32} Children experiencing abuse and witnessing violence on their mother tend to be quiet and are not inquisitive which hampers their development.

The cross-sectional nature of the study can only point toward the possible associations with these factors, but further research incorporating a larger sample size is required to prove the hypotheses.

CONCLUSION

The present study reported 48.7% of the children to be of below average developmental grade and 2.5% of the children to be having mental retardation. Type of family, presence of congenital anomaly in the child, educational status of the care giver, duration of exclusive breast feeding, presence of religious/picture books and enough space to play were found to be independent predictors of the development status of anganwadi children in rural Lucknow.

Recommendations

The study recommends for proper programmatic implementation of the ECCE component of the ICDS program. Proper skills and training focused on the development of conceptual clarity regarding pre-school education (PSE) should be furnished to the functionaries of ICDS program. Acknowledging the prime role of anganwadis in the development of children, adequate infrastructure in the form of enough outdoor space, play materials and PSE kits should be provided at these centres. Interactive learning strategies in ECCE, combined with improved psychological care, health and

nutrition interventions, responsive feeding and skill building of the caregivers, should be emphasized upon. PPP with public schools should be explored whereby the entire Anganwadi setup can be housed in the school with the government providing supplementary nutrition and the school providing pre-school education. As the role and involvement of the caregiver in a child's development cannot be undermined, therefore their level of education and understanding is also of utmost importance and should be stressed upon. Mothers should be counseled regarding exclusive breast feeding and proper complementary feeding which contribute to the developmental status of children.

The concept of developmental surveillance of children should be incorporated and implemented in the existing framework of anganwadi centers so that delays can be identified on timely basis and necessary interventions e.g. referral and follow-up can be carried out. Thus focusing on the underserved and underprivileged i.e. vulnerable children, whole of the education and health system should be encompassed under the presently functioning blanket ICDS for optimal and holistic development of children. To conclude, there is a dire need for acknowledgement and prompt redressal of this loss of developmental potential in children at an early age. As it is influenced by many factors, the interventions will too have to be collaborative, multifaceted and multipronged.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Rehman HM, Agarwal M, Mahour P, Singh VK, Patel SP, Yadhav K. Contextual correlates of development of anganwadi children 3-6 years of rural Uttar Pradesh, India- a complex interplay. *Int J Community Med Public Health* 2022;9:1840-51.