

Original Research Article

Growth and development status of preschool children in a rural community of Dehradun, Uttarakhand: a cross-sectional study

Nancy Baluni, Anchal Raturi, Mohit Kumar, Shruti Uniyal, Shalini Panwar, Ritika, Sarthak Vats, Akansha Kukreti, Sandhya Yadav, Anshavi Rana, Chandan Kumar, Namrata Pundir*

Himalayan College of Nursing, Swami Rama Himalayan University, Dehradun, Uttarakhand, India

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*Correspondence:

Dr. Namrata Pundir,

E-mail: namrta.pundir@gmail.com

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ABSTRACT

Background: Growth and development monitoring consist of periodic assessment of physical parameters such as weight and height measurement and assessment of milestones. Community-based assessment of nutritional and developmental status helps in early identification of at-risk children and timely intervention.

Methods: A community-based cross-sectional study was conducted among 100 preschool children aged 3-6 years in a selected rural area of Dehradun, Uttarakhand, during June-August 2024. Children were selected through door-to-door survey using convenience sampling. Anthropometric measurements were assessed using WHO growth standards, and developmental screening was carried out using the Trivandrum developmental screening chart (TDSC).

Results: Based on weight-for-age, 90% of children had normal nutritional status, while 10% were underweight. Stunting was observed in 23% of children, and wasting in 16%. Screening using TDSC identified children with delay in one or more developmental domains, indicating the need for further developmental evaluation. A statistically significant association was observed between time of weaning and nutritional status ($\chi^2=5.56$, $p=0.018$).

Conclusions: Although, the majority of preschoolers had normal growth parameters, a considerable proportion showed evidence of chronic malnutrition and screened positive for developmental delay. Regular growth monitoring and developmental screening at the community level are essential to ensure early identification and intervention.

Keywords: Growth and development, Preschool children, Anthropometry, Trivandrum developmental screening chart, Community health

INTRODUCTION

The process of growth starts from the time of conception and continue till the child grows into mature adult. Growth denotes a net increase in size or mass of tissue and development specifies maturation of function.¹ Adequate nutrition during early years of life is of paramount importance for growth, development and long-term health throughout the adulthood.² Early growth has implications for adult health. Children not meeting

their growth potential may not be meeting their developmental potential either. Poor linear growth, or stunting may follow childhood enteric disease or undernutrition.³ Measuring early growth monitors health and development and several early anthropometry measurements such as weight, length, and head circumference carry particular implications for maturation. Early identification of developmental delay is important to prevent onward progression to disability family problem, peer problem, and school failure. In order to improve the identification of children with

developmental delays early intervention can be provided in a timely manner, and a significant emphasis must be placed on the routine use of developmental screening.⁴ The present study aims to assess the growth and development status of preschool children in a rural community of Dehradun, Uttarakhand.

METHODS

A community-based descriptive cross-sectional study was conducted in Ranipokhari village of Dehradun district, Uttarakhand in July-August 2024. The approval of conducting this study was obtained from the institutional Ethics committee. The study included 100 preschool children aged 3-6 years selected through convenience sampling by door-to-door survey. Children whose parents were willing to participate and who could understand Hindi or English were included. Children who were critically ill or unavailable at the time of data collection were excluded.

Written informed consent was taken from the parents of the children. Anthropometric assessment included measurement of weight and height using standard procedures. Nutritional status was assessed using WHO growth standards and expressed as Z-scores. Developmental screening was performed using the TDSC. Children failing to achieve age-appropriate milestones in any domain were considered screen-positive for developmental delay. Data were analyzed using IBM SPSS Statistics for Windows, version 27.0.

RESULTS

Socio-demographic characteristics of the participants

As per Table 1, 100 preschoolers were enrolled in the study. Out of these 51% were in the age group of 4-5 year of age. Most (54%) of them were females and 42% of participants were first born child. 51% of preschoolers had birth weight between 1.5-2.0 kg. Majority (85%) of participants were Hindu. 44% of them belonged to joint family. Nearly half (44%) of mother's were high school passed and 40% of father's were intermediate pass. Most (66%) of mother's were home maker and 63% of fathers were employed. 51% of participants had family income between 20,000-30,000. Majority (76%) of study participants were fully immunized. None of the participants were taking any supplements to enhance growth and development. 32% of study participants were not exclusively breastfed. In 50% of participants, weaning was started after 6 months of age.

Figure 1 shows that 68% children were exclusively breastfed for first six months of life after birth, whereas 32% did not received exclusive breastfeeding.

Figure 2 shows that in 68% children, weaning was started at six months, while among 32%, it was started after six months of age.

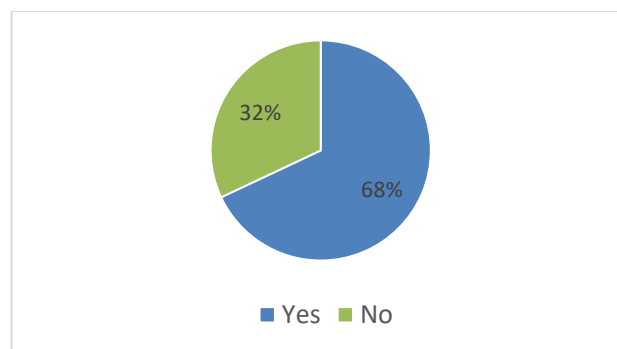


Figure 1: Percentage distribution of children on the basis of exclusive breastfeeding, (n=100).

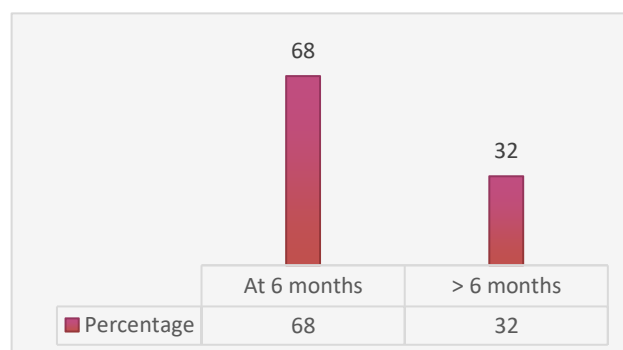


Figure 2: Percentage distribution of children on the basis of age of weaning, (n=100).

Anthropometric assessment

Weight for age

Table 2 shows that as per weight for age charts, 90% children had normal weight, 2% were underweight, 8% were severely underweight.

Height for age

Table 3 shows that as per length for age charts 77% preschoolers had normal height, 14% were stunted, 9% of the preschoolers were severely stunted.

Weight for height

Table 4 shows that as per weight for height 74% were normal, 10% were wasted, 6% were severely wasted, 6% were overweight and only 4% children were obese.

Assessment of development using TDSS

On screening using TDSS, children identified with delay in 1/more developmental domains, including gross motor, fine motor, language and social-adaptive areas (Figure 3). These findings indicate need for detailed developmental evaluation and early intervention services. Statistically significant association between time of weaning and nutritional status ($\chi^2=5.56$, $df=1$, $p=0.018$) (Table 5).

Table 1: Frequency and percentage distribution of socio-demographic variables of research study, (n=100).

Demographic variables	N	Percentage
Age (in years)		
3-4	49	49
4-5	51	51
Gender		
Male	46	46
Female	54	54
Birth order of child		
First	42	42
Second	39	39
Third	16	16
Fourth	3	3
Birth weight of child		
<1.5 kg	2	2
1.5-2.0 kg	51	51
2.0-2.5 kg	36	36
>2.5 kg	11	11
Religion		
Hindu	85	85
Muslim	11	11
Christian	1	1
Sikh	3	3
Type of family		
Nuclear	39	39
Extended	17	17
Joint family	44	44
Mother's education		
No formal education	8	8
Primary school	6	6
High school	44	44
Intermediate	36	36
Graduate	1	1
Post-graduate	5	5
Father education		
No formal education	02	02
Primary school	02	02
High school	18	18
Intermediate	40	40
Graduate	21	21
Post-graduate	17	17
Mother occupation		
Employed	31	31
Unemployed	03	03
Home maker	66	66
Father occupation		
Employed	63	63
Unemployed	02	02
Self employed	35	35
Monthly family income (in INR)		
Less than 10000	03	03
10,000 to 20,000	35	35
20,000 to 30,000	51	51
More than 30,000	11	11

Continued.

Demographic variables	N	Percentage
Dietary preference of child		
Vegetarian	54	54
Non-vegetarian	29	29
Eggetarian	17	17
Immunization status		
Full immunized	76	76
Partially immunized	24	24
Is child taking any prescribed supplement for growth and development?		
No	100	100

Table 2: Frequency and percentage distribution of weight for age of children, (n=100).

Weight for age	F	Percentages
Normal	90	90
Underweight	2	2
Severely under-weight	8	8

Table 3: Frequency and percentage distribution of height for age of child, (n=100).

Height for age	F	Percentages
Normal	77	77
Stunted	14	14
Severely stunted	9	9

Table 4: Frequency and percentage distribution of weight for height of child, (n=100).

Weight for length/ height	F	Percentages
Obese	4	4
Overweight	6	6
Normal	74	74
Wasted	10	10
Severely wasted	6	6

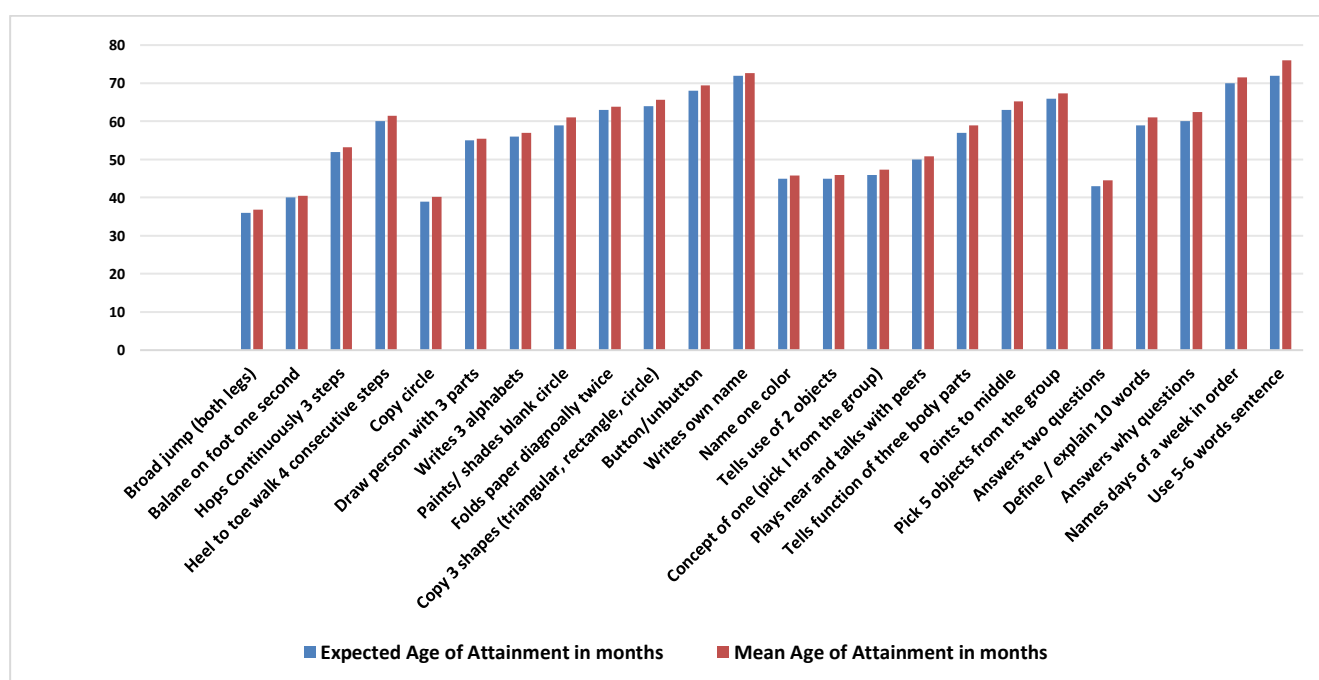


Figure 3: Developmental milestones in preschoolers using TDSC.

Table 5: Association between socio-demographic variables and nutritional status of children, (n=100).

Variables	Normal	Underweight	X ²	Df	P value
Birth weight					
<2.5 kg	81	08	0.18	1	0.67
≥ 2.5 kg	09	02			
Exclusive breastfeeding					
Yes	64	04	2.70	1	0.10
No	26	06			
Time of weaning					
At 6 months	65	03	5.56	1	0.018
>6 months	25	07			

DISCUSSION

The present study assessed the growth and developmental status of preschool children in a rural community of Dehradun. The majority of children had normal weight-for-age; however, nearly one-fourth of the children were stunted, reflecting the presence of chronic undernutrition. A similar study conducted by Kalyan et al to assess the growth and development of under five children as per new WHO growth standards showed that out of 140 children, 23 (16.4%) of children were severely stunted, 22 (15.7%) were severely underweight and 27 (19.3%) were severely wasted, which indicates that children had both acute and chronic malnutrition.⁵

In an another study conducted by Negi et al out of 70 children 17.14 children showed mild wasting, 18% showed moderate wasting and 21% showed severe wasting. The 11% children showed mild stunting, 15.7% showed moderate stunting and 27% showed severe stunting. The 31.4% children were moderately underweight and 30% were severely underweight.⁶

Developmental screening using TDSC identified children who screened positive for delay in one or more developmental domains. As TDSC is a screening tool, these findings emphasize the importance of early identification and referral rather than definitive diagnosis. Similarly, a study conducted by Uke et al on neurodevelopmental assessment of children with congenital heart diseases using TDSS showed that Neurological delay was present in children with CHD as plotted on TDSC chart in all 4 developmental domains, i.e., gross motor, fine motor, language, and social adaptive.⁷

The present study did not find a significant association between birth weight and nutritional status, which is in contrast to several studies that have reported low birth weight as an important risk factor for underweight and stunting in children.⁸ Similarly, exclusive breastfeeding was not significantly associated with underweight status in this study, whereas previous evidence suggests that exclusive breastfeeding for the first six months has a protective effect against childhood undernutrition.⁹

However, the significant association observed between time of weaning and nutritional status is consistent with other studies highlighting the critical role of timely and appropriate complementary feeding in preventing undernutrition.¹⁰

Public health implications

The findings of the present study highlight the need for strengthening routine growth monitoring and developmental screening services at the community level. Integration of nutritional counselling, early developmental screening, and timely referral through existing programmes such as ICDS and Rashtriya Bal Swasthya Karyakram (RBSK) can facilitate early identification and management of growth and developmental problems among preschool children.

Limitations

This study also has several limitations. Convenience sampling technique was used, and the study was conducted in a single community area of Dehradun, which may limit the generalizability of the findings to other populations or regions. The sample size was relatively small (n=100), which restricts subgroup analysis and limits the statistical power of the study. Anthropometric measurements were taken at a single point in time; therefore, growth trends over time could not be assessed.

Development was assessed using the TDSS, which is a screening tool and not a diagnostic instrument; hence, the presence of developmental delay requires further confirmatory assessment.

CONCLUSION

Although most preschool children demonstrated normal growth parameters, a significant proportion exhibited stunting and screened positive for developmental delay. These findings highlight the need for regular growth monitoring, early developmental screening, and strengthened nutrition education at the community level to promote optimal child health and development.

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Conflict of interest: None declared

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

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