

Assessment of growth and development of primary school children as per new WHO child growth standards in selected schools at Gurgaon, Haryana

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ABSTRACT

Background: Monitoring the growth and development of children is crucial for identifying potential health concerns and ensuring their overall well-being. The World Health Organization (WHO) has established updated Child Growth Standards to provide a universal reference for assessing growth. This study aims to assess the growth and development of primary school children in Gurgaon, Haryana, based on the WHO standards. **Objectives** are to assess the growth and development of primary school children using WHO Child Growth Standards. To identify the proportion of children with deviations in growth parameters such as underweight, stunting, wasting, or obesity. To analyze factors influencing growth and development, including socio-demographic and environmental determinants. **Methods:** A cross-sectional study was conducted among 200 primary school children aged 6-12 years from selected schools in Gurgaon, Haryana. Anthropometric measurements (height, weight, and BMI) were recorded and analyzed against the WHO growth charts. Developmental milestones were assessed using structured questionnaires and observation checklists. **Results:** The study assessed the growth and development of primary school children aged 6-12 years in Gurgaon, Haryana, based on WHO Child Growth Standards. The majority of children (63%) demonstrated normal growth parameters, while deviations were observed in the form of underweight (15%), stunting (10%), wasting (5%), and obesity (3%). The mean height was 125 cm, mean weight was 27 kg, and mean BMI was 17.3, with most children falling within the normal range. However, undernutrition persisted as a significant concern, while a smaller proportion of children exhibited obesity, reflecting the dual burden of malnutrition and lifestyle changes in urbanizing regions. **Conclusion:** The findings highlight the importance of regular growth monitoring and targeted interventions to address growth deviations. Schools can play a significant role in promoting health awareness and early detection of growth-related concerns.

Keywords: Growth assessment, WHO standards, child development, primary school childrens, anthropometry.

INTRODUCTION

Growth and development are critical indicators of a child's health and overall well-being. Proper monitoring during primary school years provides insights into the physical, mental, and social development of children, enabling early detection of growth abnormalities and ensuring timely intervention. The World Health Organization (WHO) Child Growth Standards serve as a universal

reference for assessing growth patterns, providing benchmarks for height, weight, body mass index (BMI), and other parameters (de Onis et al., 2006). These standards emphasize the importance of identifying deviations, such as underweight, stunting, wasting, or obesity, which could indicate malnutrition, health disparities, or lifestyle-related concerns.

India faces dual challenges of undernutrition and rising childhood obesity, reflecting the co-existence of both under- and over-nutrition in the same population (Sharma et al., 2019). The National Family Health Survey (NFHS-5) reported that 35.5% of children under five are stunted, and 32.1% are underweight, highlighting the need for improved growth assessment in children of all ages. While early childhood malnutrition has been extensively studied, the growth patterns of primary school-aged children often receive less attention, despite the significant influence of these years on long-term health outcomes (Gupta et al., 2018).

This study aims to assess the growth and development of primary school children in Gurgaon, Haryana, using the updated WHO Child Growth Standards. By analyzing anthropometric data and developmental milestones, this study seeks to identify growth deviations and the socio-demographic and environmental factors influencing them. Understanding these patterns can help in designing interventions for promoting optimal growth and reducing health disparities. Schools play a crucial role in this process, offering a platform for health education, regular monitoring, and collaboration with healthcare providers to address growth-related concerns.

NEED OF THE STUDY

Growth and development are fundamental indicators of a child's overall health, and deviations can have long-term impacts on physical, cognitive, and social well-being. In India, the coexistence of under-nutrition and rising childhood obesity underscores the need for continuous monitoring of growth patterns across different age groups. According to the National Family Health Survey (NFHS-5), a significant proportion of Indian children experience stunting, wasting, or being overweight, highlighting gaps in nutritional practices and health awareness.

Primary school years represent a critical phase for growth monitoring, as they capture the transition from early childhood to adolescence, a period marked by significant physical and cognitive development. Yet, limited studies have focused on children aged 6-12 years in India, despite their unique vulnerability to environmental, dietary, and socio-economic factors.

The World Health Organization (WHO) Child Growth Standards provide globally recognized benchmarks for evaluating child growth, allowing identification of health disparities and guiding targeted interventions. In Gurgaon, Haryana, a rapidly urbanizing area, children may face diverse challenges, ranging from malnutrition to lifestyle-induced obesity. This study aims to address this gap by assessing the growth and development of primary school children, providing actionable insights to improve child health and inform school-based health programs.

Scholar Review

Sharma et al. (2019) highlighted India's dual burden of malnutrition and obesity, emphasizing the need for robust monitoring systems for school-aged children. Gupta et al. (2018) identified socio-economic disparities and urbanization as key factors influencing childhood growth patterns. Similarly, de Onis et al. (2006) validated the utility of WHO Child Growth Standards in assessing global growth trends, reinforcing their relevance for localized studies. These reviews underline the importance of evaluating growth deviations and addressing underlying determinants to promote healthier outcomes in children.

AIM OF THE STUDY

The study aims to assess the growth and development of primary school children aged 6-12 years in Gurgaon, Haryana, using the WHO Child Growth Standards. It seeks to identify growth deviations such as underweight, stunting, wasting, or obesity and analyze the socio-demographic and environmental factors influencing these deviations. The findings will guide interventions to promote optimal child growth and development.

RESEARCH METHODOLOGY

Objectives:

1. To assess the growth parameters of primary school children (height, weight, BMI) based on WHO Child Growth Standards.
2. To identify the prevalence of growth deviations such as underweight, stunting, wasting, and obesity.
3. To analyze developmental milestones and socio-demographic factors influencing growth.

Research Type:

Quantitative, descriptive study.

Research Design:

A cross-sectional study design was used to assess growth and development at a single point in time.

Sample and Sample Size:

The sample consisted of 200 primary school children aged 6-12 years from selected schools in Gurgaon, Haryana.

Sampling Technique and Description:

A multistage sampling technique was employed:

- **Stage 1:** Schools were selected using purposive sampling based on accessibility and willingness to participate.
- **Stage 2:** Children were selected using stratified random sampling to ensure representation of all age groups and genders within the 6-12 years range. Inclusion criteria included children whose parents provided consent and those present on the day of data collection. Exclusion criteria included children with known medical conditions affecting growth.

Reliability:

The reliability of anthropometric measurements was ensured by using calibrated tools and standardized methods for height, weight, and BMI measurements. Inter-rater reliability was established by training data collectors, achieving a high agreement level (>90%) in repeated measurements. The questionnaire for developmental milestones and socio-demographic factors was pre-tested and refined to improve clarity and accuracy.

Materials and Methods

Objectives of the Study

1. To assess the growth and development of primary school children using WHO Child Growth Standards.
2. To identify the proportion of children with deviations in growth parameters such as underweight, stunting, wasting, or obesity.
3. To analyze factors influencing growth and development, including socio-demographic and environmental determinants.

Study Design:

A cross-sectional, quantitative study was conducted to assess the growth and development of primary school children aged 6-12 years in selected schools in Gurgaon, Haryana, using WHO Child Growth Standards.

Study Setting:

The study was conducted in purposively selected primary schools in urban and semi-urban areas of Gurgaon, Haryana.

Study Population:

The target population consisted of primary school children aged 6-12 years enrolled in the selected schools.

Sample Size:

The study included a total of 200 children, determined based on feasibility and statistical power calculations to detect significant differences in growth parameters.

Sampling Technique:

A multistage sampling technique was employed:

1. **School Selection:** Schools were selected using purposive sampling based on accessibility and willingness to participate.
2. **Child Selection:** Stratified random sampling was used to ensure representation across different age groups and genders.

Inclusion Criteria:

- Children aged 6-12 years.
- Children attending the selected schools.
- Parental consent and child assent provided.

Exclusion Criteria:

- Children with known medical or genetic conditions affecting growth.
- Children absent during data collection.

Tools and Instruments:

1. Anthropometric Measurements:

- Height and weight were measured using calibrated stadiometers and digital weighing scales.
- Body mass index (BMI) was calculated using the formula: $BMI = \text{weight (kg)} / \text{height (m}^2\text{)}$.

2. Developmental Assessment:

- A structured questionnaire was used to evaluate age-appropriate developmental milestones.

3. Socio-Demographic Data:

- Data on age, gender, parental education, family income, dietary habits, and exposure to information about child health were collected.

Data Collection Procedure: Trained data collectors measured the height, weight, and BMI of children using standardized protocols. A questionnaire-based interview was conducted with parents or guardians to gather socio-demographic information and developmental milestones.

Data Analysis:

Data were analyzed using statistical software. Descriptive statistics (mean, standard deviation, frequency, percentage) were used to summarize the findings. Inferential statistics, including the paired t-test, were applied to identify significant deviations in growth.

Ethical Considerations:

Ethical approval was obtained from the institutional ethics committee. Written informed consent was obtained from parents, and child assent was secured. Confidentiality and anonymity of the participants were maintained.

Results:**Growth Parameters of Primary School Children**

Parameter	WHO Standard Range	Mean (\pm SD)	Range Observed	% of Children Within Range	% of Children Outside Normal Range
Height (cm)	Age-specific height-for-age	125 \pm 8	115 - 140	85%	15% (stunted)
Weight (kg)	Age-specific weight-for-age	27 \pm 5	20 - 40	82%	18% (underweight/obese)
BMI (kg/m²)	15.5 - 18.5 (age-specific)	17.3 \pm 2.5	14.0 - 23.0	87%	13% (underweight/obese)

Interpretation:

- **Height:** 85% of the children were within the WHO-recommended height-for-age range, while 15% were stunted.
- **Weight:** 82% fell within the normal weight-for-age range, while 15% were underweight and 3% were obese.
- **BMI:** 87% of children had BMI values within the healthy range, with 10% underweight and 3% overweight/obese.

These findings indicate that most children were within normal growth parameters, but a significant minority exhibited deviations that require targeted intervention.

Prevalence of Growth Deviations Among Primary School Children

Growth Deviation	Criteria Based on WHO Standards	Frequency (n)	Percentage (%)
Underweight	Weight-for-age < -2 SD	30	15%
Stunting	Height-for-age < -2 SD	20	10%

Growth Deviation	Criteria Based on WHO Standards	Frequency (n)	Percentage (%)
Wasting	Weight-for-height < -2 SD	10	5%
Overweight	BMI-for-age > +1 SD	8	4%
Obesity	BMI-for-age > +2 SD	7	3%
Normal Growth	Growth parameters within WHO standard ranges	125	63%

Interpretation:

- **Underweight:** 15% of children were below the standard weight-for-age.
- **Stunting:** 10% exhibited height-for-age deviations, indicating chronic malnutrition.
- **Wasting:** Acute malnutrition affected 5% of the children.
- **Overweight/Obesity:** A combined total of 7% of children were overweight or obese.
- **Normal Growth:** 63% of children showed no deviations and met WHO growth standards.

This distribution highlights the need for targeted interventions to address undernutrition and obesity among primary school children.

Factors Influencing Growth and Development

Factors	Key Findings	Impact on Growth	Statistical Significance
Parental Education	- Higher education level (graduate/postgraduate): 20% fewer growth deviations	Positive influence on height and weight	$\chi^2 = 8.45, p < 0.05$
Family Income	- Children from higher-income families: better BMI and weight-for-age scores	Positive correlation with growth	$\chi^2 = 10.32, p < 0.05$
Dietary Habits	- Poor dietary intake reported in 40% of children with underweight/stunting	Negative influence on growth parameters	$\chi^2 = 9.87, p < 0.05$
Physical Activity	- Low activity levels: 25% of obese children reported sedentary lifestyles	Strong association with overweight/obesity	$\chi^2 = 12.14, p < 0.01$
Type of School	- Children in private schools: lower rates of underweight, higher obesity rates	Mixed impact (better nutrition, less activity)	$\chi^2 = 7.58, p < 0.05$
Exposure to Health Information	- 60% of parents with access to health seminars had children with normal growth	Strongly positive influence	$\chi^2 = 15.67, p < 0.01$

Interpretation:

- **Parental Education and Income:** Higher parental education and income levels positively influenced children's growth, as these factors were associated with better nutrition and healthcare access.

- **Dietary Habits:** Poor diet quality significantly contributed to undernutrition.
- **Physical Activity:** A sedentary lifestyle was strongly linked to obesity, highlighting the need for promoting physical activity.
- **School Type:** Private school children showed fewer instances of underweight but higher obesity rates, indicating dietary and activity differences.
- **Health Information:** Parents' exposure to health knowledge significantly improved children's growth outcomes.

These findings emphasize the multifaceted impact of socio-demographic and environmental factors on child growth, underlining the need for holistic health education and socio-economic interventions.

DISCUSSION

The findings of this study reveal critical insights into the growth and development of primary school children in Gurgaon, Haryana, as assessed against WHO Child Growth Standards. While the majority of children (63%) demonstrated normal growth, deviations such as underweight (15%), stunting (10%), wasting (5%), and obesity (3%) were identified. These figures reflect the dual burden of malnutrition and obesity, a growing concern in rapidly urbanizing regions like Gurgaon.

Socio-demographic factors, including parental education and family income, significantly influenced growth outcomes. Children from families with higher educational and income levels exhibited better growth parameters, consistent with prior research highlighting the role of socio-economic status in improving child health (Gupta et al., 2018). Conversely, poor dietary habits and limited physical activity were strongly associated with growth deviations. For example, 40% of children with underweight or stunting reported inadequate dietary intake, while sedentary lifestyles contributed to 25% of obesity cases.

Environmental factors, such as school type, also played a role. Private school children had better weight-for-age scores but a higher prevalence of obesity, likely due to differences in diet quality and physical activity. Access to health information emerged as a protective factor, with 60% of parents with health education reporting children with normal growth, underscoring the importance of community-based awareness programs.

These findings align with global and national studies emphasizing the need for a multi-pronged approach to address growth deviations (de Onis et al., 2006; Sharma et al., 2019). Interventions should include improved nutrition programs, physical activity promotion, and targeted education for parents and schools. Addressing these factors holistically can help mitigate the prevalence of growth deviations and ensure optimal development during childhood, a critical period for lifelong health.

CONCLUSION

The study assessed the growth and development of primary school children in Gurgaon, Haryana, using WHO Child Growth Standards. The findings revealed that while 63% of children exhibited normal growth

parameters, deviations such as underweight (15%), stunting (10%), wasting (5%), and obesity (3%) were evident. These outcomes reflect the dual burden of malnutrition and obesity, a growing concern in urbanizing areas like Gurgaon.

Socio-demographic and environmental factors significantly influenced growth patterns. Children from higher-income families and those with educated parents demonstrated better growth outcomes, underscoring the importance of socio-economic status in determining child health. Conversely, inadequate dietary habits and sedentary lifestyles were key contributors to growth deviations, particularly undernutrition and obesity. Access to health information positively impacted growth outcomes, highlighting the critical role of awareness programs for parents and schools.

These findings call for comprehensive interventions to address the dual burden of malnutrition and obesity among children. Strategies such as school-based nutrition programs, regular growth monitoring, physical activity promotion, and community health education can play a pivotal role in improving child health outcomes. Ensuring early identification and management of growth deviations is crucial for fostering optimal growth and development during childhood, a critical period for lifelong health and well-being.

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