



EVALUATING THE MUAC/HC RATIO FOR IDENTIFYING SMALL FOR GESTATIONAL AGE NEONATES AT BIRTH

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ABSTRACT **Background:** Small for gestational age (SGA) neonates are born with a birth weight below the 10th percentile for gestational age, often facing increased morbidity and mortality. Accurate and early identification is crucial. The Mid Upper Arm Circumference/Head Circumference (MUAC/HC) ratio offers a non-invasive and reliable method for diagnosing SGA, especially in resource-limited settings or when exact GA is not known. **Objective:** This study evaluates the effectiveness of the MUAC/HC ratio for identifying SGA neonates, comparing its performance with standard percentiles and the Intergrowth charts. **Methods:** A prospective observational study was conducted with 300 term neonates. Anthropometric measurements, including MUAC and HC, were recorded within 72 hours of birth. The MUAC/HC ratio was compared with birth weight-based classifications and Intergrowth charts for identifying SGA. **Results:** Of the 300 neonates, 15.7% were identified as SGA. The MUAC/HC ratio, with a cutoff of <0.24 , demonstrated high sensitivity (89.36%) and specificity (99.6%) in identifying SGA neonates. There was significant correlation between the MUAC/HC ratio and birth weight ($P < 0.001$). The overlap between the Intergrowth chart and the MUAC/HC ratio indicated strong reliability. **Conclusion:** The MUAC/HC ratio is a practical, non-invasive anthropometric tool for identifying SGA neonates. Its simplicity and accuracy make it highly suitable for clinical use, particularly in settings with limited resources or when exact GA is not known.

KEYWORDS : SGA, Anthropometry, MUAC/HC Ratio, Neonatal Growth Assessment, Prevalence

INTRODUCTION

SGA neonates, defined by birth weight below the 10th percentile for gestational age, are at increased risk for neonatal and long-term health complications, including developmental delays, cardiovascular diseases, and metabolic disorders. Hence their identification is essential for planning discharge of babies and monitoring for risk factors.

Accurately identifying SGA at birth can be challenging, particularly in low-resource settings where advanced gestational age assessment tools may be unavailable. The MUAC/HC ratio provides a simple, cost-effective alternative. This study examines its efficacy in detecting SGA neonates and compares it to traditional methods, such as birth weight percentiles and Intergrowth charts.

MATERIALS AND METHODS:

Study Design: A prospective observational study was conducted at Vijay Marie Hospital from June 2022 to May 2023, involving 300 term neonates (gestational age 37–41 weeks).

Measurements: Anthropometric data, including birth weight, MUAC, and HC, were recorded within 72 hours post-birth. The MUAC/HC ratio was calculated and analyzed against established percentiles and the Intergrowth charts to assess the identification of SGA.

Statistical Analysis: SPSS 26.0 was used for analysis. Sensitivity, specificity, and validity of the MUAC/HC ratio for identifying SGA were calculated. A P-value of <0.05 was considered statistically significant.

Results

Among the 300 neonates, 47 (15.7%) were identified as SGA. The MUAC/HC ratio cutoff of <0.24 showed high sensitivity (89.36%) and specificity (99.6%) for SGA identification. There was significant correlation between the MUAC/HC ratio and birth weight ($P < 0.001$). The overlap between the Intergrowth chart and the MUAC/HC ratio indicated strong reliability.

Table 1: Descriptive Statistics of the Study Population

| Variable | Frequency (%) |
|--------------------|---------------|
| Sex: Male | 159 (53%) |
| Gestational Age | |
| 37-37 weeks 6 days | 140 (46.7%) |
| 38-38 weeks 6 days | 81 (27%) |
| 39-39 weeks 6 days | 64 (21.3%) |
| 40-40 weeks 6 days | 14 (4.7%) |

Table 2: MUAC/HC Ratio Performance

| Method | SGA Identified (n = 300) | Percentage of Total |
|---------------------------|--------------------------|---------------------|
| Intergrowth Chart | 47 | 15.7% |
| MUAC/HC Ratio (<0.24) | 45 | 15% |
| Both Methods | 42 | 14% |

Table 3: MUAC/HC Ratio Performance

| MUAC/HC Ratio Cutoff | Sensitivity (%) | Specificity (%) | Validity (%) |
|----------------------|-----------------|-----------------|--------------|
| <0.24 | 89.36 | 99.6 | 97.67 |

DISCUSSION

The MUAC/HC ratio has demonstrated itself as a reliable and efficient tool for identifying SGA neonates. The high overlap with the Intergrowth chart and significant statistical correlation highlights its utility, particularly in clinical settings where gestational age data or advanced equipment is lacking. This makes the MUAC/HC ratio a valuable screening tool in resource-limited environments.

Further research could explore its application across larger and more diverse populations. The inclusion of maternal factors and other risk assessments could refine its accuracy and implementation.

CONCLUSION

The MUAC/HC ratio provides a practical, non-invasive, and reliable method for identifying SGA neonates. Its high sensitivity and

specificity make it a valuable tool in both advanced and resource-limited healthcare settings. Implementing this ratio in routine neonatal assessments could lead to earlier diagnosis and improved outcomes for at-risk neonates.

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