

Evaluation of Waist Circumference: Length Ratio as a Predictor of Metabolic Profile in Newborns of Mothers with and without Obesity or Gestational Diabetes

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INTRODUCTION

Recent literature have proposed waist circumference: length ratio (WLR) as a better measure of visceral adiposity in infants than waist circumference or body mass index (BMI) alone.¹ The objective of this study is to compare the WLR in newborns of mothers who are non-diabetic obese (O), gestational diabetic (GD), and healthy non-obese (N), to analyze relationships between other anthropometric measures in mother-newborn pairs, and to evaluate whether or not WLR in newborns can serve as a neonatal assessment tool for future risk of developing metabolic disorders.

EXPERIMENTAL METHODS

This is a retrospective study with data gathered from 1000 consecutive medical records of mother-newborn (full-term, i.e. 37-42 weeks) pairs born in the University Medical Center, Lubbock, TX between August 2015 and May 2016. After applying exclusion criteria (all related to factors that may affect infant growth), data from 597 pairs were reviewed. Three study groups were formed based on the mother's metabolic profile: N group (BMI <30; n=410), O group (BMI ≥ 30; n=144), and GD group (n=43). Using the standard LMS parameters acquired elsewhere^{1,2}, we calculated GA-adjusted values for the following newborn measurements: WLR, Ponderal Index (PI), BMI, and Weight-to-Length Ratio (WtLR). We used ANOVA to assess the differences between groups.

RESULTS

No statistically significant differences were found between the N group and the other two groups in newborn WLR-for-age. On the other hand, the z-scores for newborn-PI, -BMI, and -WtLR all showed a trend of N < O < GD. Interestingly, WLR z-score for the N group (M=0.49, 95%CI=0.41–0.59) departs significantly from the standard reported by

Holston et al.¹, N (0,1), and equals the O group (M=0.46, 95%CI=0.31–0.61). In contrast, the PI, BMI and WtLR z-score averages for the N group are all within 0.2 of the previously reported² and are lower than the z-score averages of the O and GD groups.

DISCUSSION

Our mean value for WLR in the N group was not close to those reported elsewhere.¹ Possible explanations are the differences in the metabolic profile of our study population demographic that cannot be estimated with BMI. Maternal obesity and gestational diabetes are known risk factors for type 2 diabetes and metabolic syndrome in their offspring.³ However, our study revealed no apparent differences of WLR between infants with varying degrees of maternally-derived metabolic risks. Critical period of infant visceral fat development has been reported to occur in the first 3 months.⁴ Future studies are warranted to evaluate WLR within this critical period to determine if and at which time point WLR can be most usefully applied in the clinical setting.

CONCLUSION

In our study population, different maternal gestational metabolic profiles did not display unique patterns of newborn WLR.

REFERENCES

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**If selected as a winner, I would like to present.*