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An Exploratory Study of Infant Physical Activity in Relation to Obesity

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INTRODUCTION

Approximately 10% of infants and toddlers in the U.S. are already overweight. The first year of a child’s life can make a significant impact on his/her long-term health, as rapid increases in weight during the first 6 months have been associated with increased risk for obesity at age 3. One modifiable factor that may impact weight is physical activity (PA). Historically, society has thought that infants (0-1 year of age) are “active enough” and not in need of efforts to promote PA to expend energy. However, increases in technology have led to less PA in children of all ages. Specifically in infants, 40% of 3-month olds regularly watch TV or videos and may spend up to 60 hours a week in restrictive devices such as high chairs or car seats limiting their ability to be active. There is a vital need to understand the amount of PA that contributes to healthy development. Therefore, the purpose of this study was to determine the level of PA in normal weight and overweight infants.

METHODS

Participants were part of a pilot study examining infant PA and postural control in normal weight (n=21) and overweight (n=9) infants. Data were collected at 3 time points: 3 months of age, the onset of sitting (~5 months), and one month post onset of sitting (~6 months). Weight and length were measured by trained researchers using standardized procedures. Infants with a weight-for-length z-score ≥ 90th percentile at visit 1 were classified as overweight.

- Average weight-for-length z-score for normal weight infants was $50.6 \pm 25.0$
- Average weight-for-length z-score for normal weight infants was $97.4 \pm 2.1$
- Infants wore Actigraph GT9X Link accelerometers for four days (2 weekdays, 2 weekend days) on the left wrist and ankle.
- Parents completed a time activity diary to document infant activity-level (sleeping, eating, quiet/active play), child’s location (e.g., home, daycare), time spent in restrictive devices (e.g., car seat, wrap), and caregiver interaction for each hour throughout the day.
- A majority of infants were male, (73.3%), white (79.3%), and breastfed for ≥26 months (76%).
- Vector magnitude count (VMC) values were used as a PA indicator
- Statistical analyses were performed using two factor repeated measures ANOVA between normal weight and overweight/obese infant.

RESULTS

• Combined average VMCs for normal weight infants were: 1st visit=5486574, 2nd visit=5726418, 3rd visit=5432360.
• Combined average VMCs for overweight infants were: 1st visit=5628067, 2nd visit=5743573, 3rd visit=5103728.
• There was no significant main effects of weight (F(1, 28)=.004, p=.948) and time (F(2,28)=.271, p=.765) and no significant interaction (F(2,28)=.413, p=.665) was found between group x time.

Table 1. Average Daily VMCs

<table>
<thead>
<tr>
<th>Visit</th>
<th>Normal Weight</th>
<th>Overweight</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
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Summary and Conclusion

Although there appeared to be a reduction in PA from visit 2 to visit 3 and differences in PA at visit 3 between normal weight and overweight infants, these findings were not significant. Future research is needed to examine if significant differences are found during the attainment of other motor milestones (e.g., standing, walking). Additionally due to the importance of PA for motor skill development in childhood, future efforts are needed to validate objective measures of PA in infants in order to identify infants who may be at risk for development delays. Future research could also examine differences between breastfed and formula fed infants as research suggests formula fed infants may be at an increased risk for motor development delays.

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