If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.

This handout is for reference only. It may not include content identical to the powerpoint. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.
Exploring the efficacy of weighted blankets with children with Autism Spectrum Disorders (ASD) and sleep disturbances

By: Bryan M. Gee, PhD, OTR/L, BCP

Objectives

• As a result of this course, participants will be able to:

  • 1) discuss the present state of practice related to the use of weighted blankets to improve sleep quality.

  • 2) discuss ways to measure outcomes related to sleep quality among children with ASD and their caregivers.

  • 3) discuss the clinical implications of outcomes research related to the use of weighted blankets to improve sleep quality among children with ASD and/or sensory over responsivity.

Introduction

• 1 in 68 children are diagnosed with ASD (Baio, 2014).

• 1% prevalence in Asia, Europe, and North America (Center for Disease Control and Prevention [CDC], 2014).

• ASD occurs in all racial, ethnic, and socioeconomic groups (CDC, 2014).

• ASD is almost 5 times more common in boys (CDC, 2014).

  • 1 out of 42 boys

  • 1 out of 189 girls
Introduction

• 44-83% of children with ASD have sleep disturbances (Tumiran et al., 2013).
• Those between 30 months and 11 years sleep 17-43 minutes less than typically developing peers (Humphreys et al., 2013).
• Decreased sleep patterns are most pronounced between 18 and 42 months (Humphreys et al., 2013).
• Sleep disturbances noted include (Malow et al., 2006):
  • Difficulty falling asleep
  • Frequent night awakenings
  • Earlier risings

Introduction

• Sleep and rest are occupations addressed by occupational therapists (OTs) (Commission on Practice, 2014)
  • Sleep preparation
  • Sleep participation
• OTs help children with ASD obtain adequate sleep by (Picard, 2012):
  • Recommending sleep routines
  • Implementing cognitive and behavioral interventions
  • Use of sensory integration and modulation approaches
Research Questions

• Does sleeping with a weighted blanket increase the quality of sleep in children with ASD and Sensory Over-Responsivity (SOR)?
• Does sleeping with a weighted blanket increase the duration a child with ASD and SOR remains asleep?
• Does sleeping with a weighted blanket decrease the amount of time taken to fall asleep in a child with ASD and SOR?
• Does sleeping with a weighted blanket reduce the number of times a child with ASD awakens in the night?
• Does sleeping with a weighted blanket improve a child with ASD and SOR's morning mood upon waking?

Key Literature

• Sensory-based interventions may be more beneficial for specific subgroups within the ASD population.
• Reynolds & Lane (2011) also found that children with ASD who had SOR were those that had the strongest sleep difficulties.
• Younger children were used in this study due to their neural plasticity which may amount to a greater potential of change.
Key Literature

• Understand and treat the underlying cause of the sleep disturbance

• Various causes include:
  • Alterations in GABA function
  • Serotonin dysregulation
  • Behavioral insomnia
  • Speech perservations
  • Lactogenic disturbances (milk/dairy)
  • Iron deficiency

• Difficult to determine if sleep disturbances are the cause or effect of other behaviors associated with ASD.

Kotagal, n.d.

---

Key Literature

• Melatonin is a common over-the-counter drug used to help children with ASD with sleep deficits.

• Melatonin is associated with helping children fall and stay asleep

• Associated with improved daytime behaviors

• Mixed reviews on it’s affect on night-time wakenings

• There are few to no interaction side-effects when used with psychotropic or anti-seizure drugs.

Rossignol & Frye, 2011
Key Literature

- The theory behind weighted blankets is that they provide (Mosaic Weighted Blankets, 2014):
  - Deep pressure touch without uncomfortable restrictions.
  - Deep pressure causes body to release serotonin and endorphins.
- Believed to provide a feeling of safety, comfort, and groundedness (Mullen, Champagne, Krishnamurty, Dickson, and Gao, 2008).
- Often used to help with stabilization and modulation of sensory input (Mullen et al., 2008).
- May be used to help lower anxiety (Mullen et al., 2008).

Key Literature

- A systematic review was performed to address the topic of weighted blankets and children with ASD.
- No primary or secondary sources addressed this issue.
- Despite a lack of evidence, many organizations advocate for the use of weighted blankets.
- Recommended a randomized study to determine the efficacy and safety of weighted blankets be performed.

Creasy & Finlay, 2013
Key Literature

• As recommended, a randomized control trial was performed
• Sample included children 5-16 years of age with a diagnosis on the autism spectrum
• Crossover study design
• Primary outcome measure was total sleep time as measured by an actigraph
• It was found that weighted blankets were not more effective than a typical blanket at improving the children’s total sleep time and other qualitative and quantitative sleep measures.
  • Parents reported improved daytime moods.

Gringras et al., 2014

Relationship to Key Literature

• Several key differences between our study and the study by Gringas et al. (2014):
  • Children with ASD and SOR
  • Younger children
  • Impact of the intervention on next-morning mood
  • Post-intervention carryover
Purpose

- Due to a lack of research regarding the use of weighted blankets with children with ASD, we conducted a research study to:
  - Identify the effectiveness of weighted blankets in helping children with ASD and SOR fall asleep.
  - The effectiveness of weighted blankets in helping these children stay asleep.
  - And identify the impact of a weighted blanket intervention on behavior the next morning.

Methods: Research Design

<table>
<thead>
<tr>
<th>Research Design Diagram</th>
<th>A (1)</th>
<th>B</th>
<th>A (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory Processing Measure</td>
<td>Pre-weighted Blanket Survey</td>
<td>Weighted Blanket Survey</td>
<td>Post weighted Blanket Survey</td>
</tr>
<tr>
<td>Child’s Sleep Habits Questionnaire</td>
<td></td>
<td></td>
<td>Child’s Sleep Habits Questionnaire</td>
</tr>
<tr>
<td>Goal Attainment Scaling</td>
<td></td>
<td></td>
<td>Goal Attainment Scaling</td>
</tr>
</tbody>
</table>
Methods: Measures

- Sensory Processing Measure-Preschool (SPM-P)
- Child’s Sleep Habits Questionnaire (CSHQ)
- Online parent survey

Sensory Processing Measure

VISION
This child...

1. Seems bothered by light, especially bright light (blinks, squints, cries, closes eyes, etc.).
2. Has trouble finding an object when it is part of a group of other things.
3. Has difficulty recognizing how objects are similar or different based on their colors, shapes, or sizes.
4. Enjoys watching objects spin or move more than most children his or her age.
5. Wacks into objects or people as if they were not there.
6. Likes to flip light switches on and off repeatedly.
7. Enjoys looking at moving objects out of the corner of his or her eye.
8. Has trouble paying attention if there are a lot of things to look at.
9. Becomes bothered by noisy environments, such as a cluttered room or a store with a lot of items.
10. Becomes easily distracted by looking at things while walking.
11. Has trouble completing simple tasks when there are many things to look at.

HEARING
This child...

12. Seems bothered by ordinary household sounds, such as the vacuum cleaner, hair dryer, or toilet flushing.
13. Responds negatively to loud noises by running away, crying, or holding hands over ears.
14. Appears not to hear certain sounds.
15. Seems disturbed by or intensely interested in sounds not usually noticed by other people.
16. Seems easily distracted by background noises, such as a train engine outside, an air conditioner, a refrigerator, or fluorescent lights.
17.
Child’s Sleep Habits Questionnaire

The following statements are about your child’s sleep habits and possible difficulties with sleep. Think about the past week in your child’s life when answering the questions. (If there was no unusual or specific reason such as your child had an ear infection and didn’t sleep well or the TV set was left on, please use the most recent typical week.)

1. Child goes to bed at the same time each night
2. Child falls asleep alone in one bed
3. Child falls asleep within 20 minutes after going to bed
4. Child sleeps for the right amount
5. Child sleeps about the same amount each day
6. Child wakes up by themselves

Indicate whether or not the sleep habit is a problem by circling “Yes”, “No”, or “Not applicable (N/A).”

Write in child’s bedtime: __________ Write in child’s usual wake time: __________
Child’s usual amount of sleep each night (hrs): ________ hours and ________ minutes
Child’s usual amount of sleep each day (hrs): ________ hours and ________ minutes

<table>
<thead>
<tr>
<th>Problem?</th>
<th>1: Usually</th>
<th>2: Sometimes</th>
<th>3: Rarely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>N/A</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Online Caregiver Survey

1. Please indicate the number of naps your child took yesterday.
   Number of naps: __________
   How many times did your child nap yesterday? __________

4. Please indicate the total number of minutes your child napped yesterday.
   Length of nap: __________
   How many minutes total did your child nap yesterday? __________

5. Please indicate how long it took your child to fall asleep last night.
   Time to fall asleep: __________
   How long did it take your child to fall asleep last night? __________
Methods: Recruitment

- Approved by Idaho State University's Human Subjects Committee
- Physicians and therapists helping with recruitment
  - Solicited potential participants
  - Provided potential participants with PI contact information
- Information about the study and inclusion requirements discussed with PI
- If inclusion criteria was met, than caregiver signed Informed Consent Form and asked any additional questions.

Methods: Inclusion Criteria

- Child must:
  - Carry a diagnosis of an Autism Spectrum Disorder
  - Struggle with sensory over reactivity
  - Be between the ages of 3 and 6
  - Live in the Idaho Falls, Pocatello, or Twin Falls areas
- Caregiver must:
  - Report their child has difficulty falling asleep and/or staying asleep
  - Speak English
  - Have access to reliable internet on a daily basis during the study.
  - Be able to complete an online survey for 30 consecutive days.
  - Be able to implement a weighted blanket as part of the child’s sleep routine for 14 consecutive days.
Methods: Participant 1

- Four years, two months during intervention
- Mild ASD
- Definite sensory dysfunction in all areas of SPM
- Areas of sleep disturbances:
  - Problems falling asleep
  - Staying asleep the entire night
  - Struggles with staying in bed
  - Sleeping too little

Methods: Participant 2

- Five years one month during intervention
- Mild-moderate ASD
- Definite sensory dysfunction in all areas of SPM
- Areas of sleep disturbances:
  - Waking during the night
  - Afraid of the dark
  - Breathing difficulties at night
  - Waking in a negative mood
Methods: Intervention

• Participants received the weighted blanket intervention during the B phase.
• Blankets were used for 14 consecutive nights.
• SensaCalm weighted blankets were borrowed by participants.
  • Blankets were calculated to weigh 10% of child's weight.
• Caregivers also completed daily online surveys

Methods: Intervention

• Sensacalm weighted blankets - http://www.sensacalm.com/
  • Selected based upon:
    • Pricing
    • Sizing
    • Distribution of weight
    • Non-therapy look
Methods: Intervention

- Caregivers were provided with instructions:
  - Only use blanket at night
  - Only use blanket if child can remove it on their own
  - Blanket should cover arms, body, and feet
  - Blanket should not cover face or head
  - Check on child while using blanket
  - Adjust blanket over child's bedding
  - Contact PI if blanket becomes worn

Results

- Data analyzed through repeated measure graphs.
  - Excel, 2013
  - Equation: $y = m \cdot x + b$
    - $m = \text{SLOPE}(y,x)$
    - $b = \text{INTERCEPT}(y,x)$
  - Data for graphs generated through online parent survey.
  - Topics analyzed (including types of data):
    - Time to fall asleep (ratio)
    - Number of nighttime wakings (ratio)
    - Hours of sleep (ratio)
    - Morning mood (nominal)
Results
Participant #1

<table>
<thead>
<tr>
<th>Time to Fall Asleep (min)</th>
<th># of Night Time Wakings</th>
</tr>
</thead>
</table>

Pre Intervention Phase

Intervention Phase

Post Intervention Phase
Key:

1=More agitated than their normal waking mood
2=Slightly more agitated than their normal waking mood
3=No different than their normal waking mood
4=Slightly calmer than their normal waking mood
5=More calm than their normal waking mood
# Sensory Processing Measure—Preschool

<table>
<thead>
<tr>
<th>Domain</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>76</td>
<td>70</td>
<td>6</td>
</tr>
<tr>
<td>Vision</td>
<td>75</td>
<td>72</td>
<td>3</td>
</tr>
<tr>
<td>Hearing</td>
<td>75</td>
<td>79</td>
<td>-4</td>
</tr>
<tr>
<td>Touch</td>
<td>80</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Body Awareness</td>
<td>76</td>
<td>79</td>
<td>-3</td>
</tr>
<tr>
<td>Balance and Motion</td>
<td>76</td>
<td>76</td>
<td>0</td>
</tr>
<tr>
<td>Planning &amp; Ideas</td>
<td>78</td>
<td>71</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>80</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

# Child's Sleep Habits Questionnaire

<table>
<thead>
<tr>
<th>Pre Test</th>
<th>Score</th>
<th>Post Test</th>
<th>Score</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A (Sum)</td>
<td>8</td>
<td>Part A (Sum)</td>
<td>9</td>
<td>-1</td>
</tr>
<tr>
<td>Part B (Sum)</td>
<td>0</td>
<td>Part B (Sum)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Part C (Sum)</td>
<td>39</td>
<td>Part C (Sum)</td>
<td>43</td>
<td>-4</td>
</tr>
</tbody>
</table>
Results
Participant #2
Key:

1 = More agitated than their normal waking mood
2 = Slightly more agitated than their normal waking mood
3 = No different than their normal waking mood
4 = Slightly calmer than their normal waking mood
5 = More calm than their normal waking mood

Sensory Processing Measure Preschool

<table>
<thead>
<tr>
<th>Domain</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>75</td>
<td>71</td>
<td>4</td>
</tr>
<tr>
<td>Visual</td>
<td>76</td>
<td>76</td>
<td>0</td>
</tr>
<tr>
<td>Hearing</td>
<td>75</td>
<td>79</td>
<td>-4</td>
</tr>
<tr>
<td>Touch</td>
<td>80</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>Body Awareness</td>
<td>72</td>
<td>80</td>
<td>-8</td>
</tr>
<tr>
<td>Balance</td>
<td>67</td>
<td>62</td>
<td>5</td>
</tr>
<tr>
<td>Play &amp; Ideas</td>
<td>74</td>
<td>75</td>
<td>-1</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>80</td>
<td>0</td>
</tr>
</tbody>
</table>
### Child's Sleep Habits Questionnaire

<table>
<thead>
<tr>
<th>Pre Test</th>
<th>Score</th>
<th>Post Test</th>
<th>Score</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A (Sum)</td>
<td>10</td>
<td>Part A (Sum)</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Part B (Sum)</td>
<td>1</td>
<td>Part B (Sum)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Part C (Sum)</td>
<td>43</td>
<td>Part C (Sum)</td>
<td>40</td>
<td>3</td>
</tr>
</tbody>
</table>

### Discussion

- Both participants increased amount of hours slept.
- Both participants demonstrated a decrease in time to fall asleep.
- Morning mood was not improved for either participant.
- Improvement in quantity of sleep, but what about quality?
- Relationship to Gringas et al.'s (2014) study:
  - Support findings of no improvement in night time wakenings
  - Contradict findings of no impact on sleep duration or time to fall asleep
Clinical Implications

- Mixed results to support use of weighted blankets in increasing sleep behaviors and moods and behaviors upon waking.
- Clinicians choosing this intervention should:
  - Understand child.
  - Generate hypothesis for weighed blanket use.
  - Provide parents with information on evidence.
  - Track functional outcomes.
  - Reassess intervention based on data collected.

Sleep Hygiene

- Sleep environment
- Bedtime routine
- Sleep\wake schedule
Sleep Hygiene

- Teach the child to fall asleep alone
- Exercise/activity
- Avoid caffeine and other stimulants
- Naps

Current Research

- N = 3 - 5 preschoolers
- Sleep Sensors - https://hello.is/
- More rigorous statistical analysis
References

References


