A Systematic Review of Neurofeedback Training to Treat ADHD in Children and Adolescents: A Child Welfare Perspective

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A systematic review of neurofeedback training to treat ADHD in children and adolescents: a child welfare perspective

Chad Ellis, LSW, MSW Student, Minnesota State University, Mankato

**Purpose / Significance**
A systematic literature review was completed on the impact that childhood ADHD has on children and families, from a child welfare perspective. The potential risks and benefits of two different treatment approaches (pharmacological and neurofeedback) were compared along with a cost analysis. The significance of this project is that it will aid in the advocacy efforts for the continued allocation of funding towards the neurofeedback program within Olmsted County’s Youth Behavioral Health Unit.

**Methodology**
Information was gathered from various sources using the MSU Mankato Memorial Library’s collections. Databases such as Social Service Abstracts, ERIC on EBSCO, PsycINFO, ProQuest, BioMedCentral, Alt-HealthWatch, MEDLINE, and SAGE Premier were explored in obtaining journal articles focusing on neurofeedback. Only peer reviewed journal articles pertaining to children and adolescents was selected and reviewed. Neurofeedback, children, adolescents, child welfare, ADHD, attention deficit/hyperactivity disorder, EEG, QEEG, EKG, and treatment efficacy were the search terms used to locate articles from the data bases for the literature review.

Secondary aggregate data were obtained from the Olmsted County’s Children’s Mental Health 2012 Annual Report. The annual report provided information from 2009 through 2012 on the number of children served, number of children who have the primary mental health diagnosis of ADHD, number of children placed in out of home care, and also the dollar amount the county paid for the children to be in out of home care.

Secondary information was also collected from websites such as the United States Census Bureau, National Alliance on Mental Illness, Minnesota Association for Children’s Mental Health, and Minnesota Compass. The statistics obtained were then used to estimate the prevalence of ADHD in children and adolescents within the state of Minnesota and specifically, Olmsted County. Also, several neurofeedback practitioner websites were reviewed in an effort to estimate the average cost per training session using neurofeedback.

**Special Thanks**
Agency: Olmsted County’s Children’s Mental Health Resource Center
Field Instructor: Stevan Huber, MSW, LICSW
Academic Advisor: Dr. Annelies Hagemeister, PhD, MSW, LISW

**Neurofeedback**
Neurofeedback is a form of operant conditioning which trains the individual to have control over their brain activity patterns. In the majority of patients with ADHD, studies have shown that there is a cortical slowing or hyper arousal which can be seen in the electroencephalogram (EEG) data. Neurofeedback training programs have been developed to target these EEG abnormalities and through reinforcing a specific change in the cortical activity using auditory or visual feedback, the patient can develop the ability to maintain and control the targeted behavior.

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-ADHD</td>
<td>ADHD</td>
</tr>
<tr>
<td>Annual medical cost difference</td>
<td>$0</td>
</tr>
<tr>
<td>Accident specific medical costs</td>
<td>$194</td>
</tr>
<tr>
<td>Criminal costs</td>
<td>$498</td>
</tr>
</tbody>
</table>

**ADHD Treatment Comparison**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medications</td>
<td></td>
</tr>
</tbody>
</table>
- Simple to implement | • Significant side effects |
- Fast acting | • Loses effectiveness within 2 years |
- Proven effective to treat symptoms | • Temporary benefits based on medication compliance |
- Insurance reimbursable | • Unknown long-term effects on development |

| Neurofeedback |
- Fast acting | • Limited research |
- Non-invasive | • Currently not reimbursable by most insurances |
- Minimal side effects | Enduring benefits |

**Implications / Discussion**
ADHD is the most commonly diagnosed childhood disorder and creates significant challenges for individuals, families, and communities. The treatment of ADHD in children and adolescents has primarily been provided through pharmacological methods. These children are still undergoing physical and neurological developments, so the long-term impact that this form of treatment has on children is still unknown. Neurofeedback training is a safe alternative treatment for ADHD in children and adolescents and should be pursued. The neurofeedback training is more cost effective than pharmacological treatments due to the enduring, if not permanent, benefits.

**Effects of ADHD**
- School |
  - Higher grade retention | Diamond, 2014; Ford et al., 2008; Matza et al., 2005 |
  - Lower educational achievement |

- Social |
  - Lower social competence |
  - Lower self esteem |
  - Exhibit higher levels of antisocial behaviors |

- Future Employment |
  - Lower status jobs |
  - Less occupational stability | Docherty et al., 2012; Hillard et al., 2013 |

- Quality of life |
  - Difficulties maintaining relationships |
  - Higher risk of criminal activity |
  - Higher risk of substance abuse | Docherty et al., 2012; Fletcher & Wolfe, 2009; Leslie & Wolraich, 2007 |

References will be provided upon request.