Development (and initial evaluation) of a school-based intervention for ADHD

Postdoctoral fellowship proposal

Abby Russell
Senior Research Associate in Epidemiology
a.e.russell@bristol.ac.uk
Attention deficit/hyperactivity disorder (ADHD)

- Associated with poor outcomes
- Social, occupational, health, mental health, education
- Estimated £670 million annual cost (2010)

- Medication effective but adherence poor and long term outcomes not comparable to non-ADHD peers
School context

Child with untreated ADHD

Peers

Staff

Family

Peer relationship problems

Low socioeconomic status

Poor GCSE results

Crime

Poor mental health

STDs and pregnancy

Accidents

Teacher burn-out and stress
Teacher mental health problems

Disruptive behaviour

Substance use

Co-occurring disorders

INATTENTION

IMPULSIVITY

HYPERACTIVITY

Time
School-based interventions for attention-deficit/hyperactivity disorder: A systematic review with multiple synthesis methods

Darren A. Moore, Abigail E. Russell, Justin Matthews, Tamsin J. Ford, Morwenna Rogers, Obioha C. Ukoumunne, Dylan Kneale, Jo Thompson-Coon, Katy Sutcliffe, Michael Nunns, Liz Shaw

School Mental Health
https://doi.org/10.1007/s12310-018-9267-2

Non-pharmacological interventions for attention-deficit/hyperactivity disorder are an effective intervention for children and young people in educational settings. However, there is little evidence that such interventions are effective, and it is unclear whether these interventions are effective in educational settings. This review includes a comprehensive review of the literature on the effectiveness of school-based interventions for attention-deficit/hyperactivity disorder.

Best Practices in School Mental Health for Attention-Deficit/Hyperactivity Disorder: A Framework for Intervention

Gregory A. Fabiano · Kellina Pyle

This paper outlines a framework for the implementation of best practices in school mental health for children and young people with attention-deficit/hyperactivity disorder. The framework includes evidence-based interventions and guidelines for educators and mental health professionals.
Current best evidence

- Daily Report Card
- Multiple strategies and flexibility
- Individuality of ADHD
- Contingency management
- Multi-component
- In classroom (academic)
- Adapted based on theories of ADHD
- Short-term
- Self-regulation (academic)
- Functional Behavioural Analysis
- One to one delivery (academic)
Limitations of existing studies

- Fail to take into account the heterogeneity of ADHD, applying multi-component interventions (for example covering social, academic, organisational and self-regulatory domains) to all
- Teachers report a need for brief strategies used as problems present in the classroom (not lengthy intensive intervention)
- Poor quality evaluation- cost effectiveness, blinded
- Not implementable in real-world context
Fellowship project

Develop a school-based intervention for ADHD

- Use intervention mapping to develop a theory- and evidence-based intervention
- Refine and adapt this prototype intervention in a multiple baseline case-series study
ADHD toolkit

- Online training module (teachers, parents)
- Child activity
- Functional behaviour analysis
- Link observed behaviour to ADHD-related outcome (each outcome has a module)
- Implement Daily Reward Card
- Choose strategies to implement from selected module
- Evaluate change in behaviour

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Aims for stage 1

Develop a prototype toolkit using Intervention Mapping (IM) and co-creation with stakeholder groups

- Update, identify and synthesise existing evidence, refine theory and create logic models of change in order to select strategies for inclusion in the intervention.
- Produce version one of the ADHD toolkit with extensive co-creation and collaboration of key stakeholder groups
- Identify suitable outcome measures to assess core symptoms, child and teacher wellbeing
- Develop and test a framework for costing the toolkit, and for assessing cost-effectiveness in a future definitive trial
Intervention mapping

1. Analysis of the problem (needs assessment)
2. Detailed mapping of current behaviour, ideal outcome behaviour and behaviour change needed to get from current to ideal
3. Specify behaviour change techniques to use
4. Specify practical strategies and design intervention
5. Plan for adoption, implementation and sustainability of the intervention
6. Generate an evaluation plan

Stakeholder workshops

Logic models, co-created.
Informed by theories

Stakeholder workshops

Draw on existing literature for strategies where possible, co-create new strategies informed by steps 1-3 where needed
Case series study
Skill building
Aims for stage 2

- Refine the toolkit so that it is feasible and acceptable to implement in the school setting in a multiple-baseline case series study
- Assess whether the toolkit is perceived as useful by end users and whether ADHD symptoms show evidence of improvement

- Identify suitable outcome measures to assess core symptoms, child and teacher wellbeing
- Develop and test a framework for costing the toolkit, and for assessing cost-effectiveness in a future definitive trial
Head teacher or senior leadership team

Consent to school participation
Nominate mental health lead (if not SENCo)

Special educational needs co-ordinator (SENCo)

Identifies teachers working with children with ADHD
Co-ordinates toolkit use with teachers, reviews delivery

Teacher
Delivers toolkit

Child with ADHD

Teacher

Teacher
TA

Teaching assistant (TA)
Delivers toolkit

Child with ADHD

Child with ADHD

Child with ADHD

Child with ADHD
### Figure 1. Multiple baseline case series design - study timeline

<table>
<thead>
<tr>
<th>School</th>
<th>Spring 2022</th>
<th>Summer 2022</th>
<th>Autumn 2022</th>
<th>Spring 2023</th>
<th>Summer 2023</th>
<th>Autumn 2023</th>
<th>Spring 2024</th>
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</table>

**Key**
- `baseline`
- `intervention`
- `follow-up`
<table>
<thead>
<tr>
<th>Time period (school terms)</th>
<th>2020-2021 (begins Spring 2022)</th>
<th>Baseline</th>
<th>Term prior to intervention</th>
<th>Intervention term</th>
<th>Follow-up term</th>
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<tbody>
<tr>
<td>Weeks</td>
<td>1-5</td>
<td>6-10</td>
<td>1-5</td>
<td>6-10</td>
<td>1-5</td>
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<tr>
<td>Activity</td>
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<tr>
<td>Recruitment and consent-sch</td>
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<tr>
<td>schools, teachers</td>
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<td>Recruitment and consent-children, parents</td>
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<td>Randomisation</td>
<td>x</td>
<td>x</td>
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<td>ADHD symptom measure, functioning measure</td>
<td>x x</td>
<td>x x</td>
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<tr>
<td>Preparatory stages</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Implement digital Daily Report Card</td>
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<td>Implement module 1</td>
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<tr>
<td>Implement module 2</td>
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<td>Module outcome measures</td>
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<td>Verbal feedback on modifications</td>
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<tr>
<td>Questionnaire measures (acceptability, feasibility)</td>
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<tr>
<td>Interviews, focus groups (acceptability, feasibility)</td>
<td>x x</td>
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<td></td>
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<td>x x</td>
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</tbody>
</table>

Notes: Baseline may be multiple terms so term shown would be repeated until the term prior to intervention start. Each school term will vary in length so these are approximate data collection points. Preparatory stages include the online training module, child strengths activity, functional behaviour analysis to identify two core behaviours that will be the target of the toolkit, and operationalise Daily Report Card goals.
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Measure</th>
<th>Informant</th>
</tr>
</thead>
<tbody>
<tr>
<td>child ADHD symptoms</td>
<td>SNAP-IV (Swanson, Nolan and Perry questionnaire) or Conners rating scales</td>
<td>teacher, parent</td>
</tr>
<tr>
<td>School functioning</td>
<td>Social Skills improvement system (SISS) rating scales (measures social, academic and competing problem behaviours)</td>
<td>teacher, teaching assistant</td>
</tr>
<tr>
<td>child dimensional psychopathology</td>
<td>Strengths and Difficulties Questionnaire (SDQ)</td>
<td>parent and teacher</td>
</tr>
<tr>
<td>child satisfaction with school</td>
<td>How I Feel About My School (HIFAMS)</td>
<td>child</td>
</tr>
<tr>
<td>child quality of life</td>
<td>Child Health Utility for Economic Evaluation (CHU9D)</td>
<td>child completed and parent proxy</td>
</tr>
<tr>
<td>healthcare and education resource use</td>
<td>Drawing on the Client Service Receipt Inventory (CSRI) and measures in the Database of Instruments for Resource Use Management (DIRUM) repository</td>
<td>parent</td>
</tr>
<tr>
<td>teacher wellbeing</td>
<td>Warwick-Edinburgh mental wellbeing scale (WEMWBS), Work Productivity and Activity Impairment Questionnaire (WPAI; presenteeism)</td>
<td>teacher</td>
</tr>
<tr>
<td>observational measures</td>
<td>Behavioral Observation of Students in Schools (BOSS) or Teacher-Pupil observation tool (TPOT)</td>
<td>School staff or undergraduate student</td>
</tr>
</tbody>
</table>
Analysis

- Primary outcomes: visual and descriptive, evidence of effect replicated across individuals

- Feasibility and acceptability by continuation criteria and Thematic Analysis of focus group and interview data
<table>
<thead>
<tr>
<th>Continuation rules</th>
<th>Acceptable</th>
<th>Discuss, modify</th>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment of schools</td>
<td>6 or more</td>
<td>5</td>
<td>4 or fewer</td>
</tr>
<tr>
<td>Recruitment of teachers, children and parents</td>
<td>&gt;65%</td>
<td>20-65%</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Retention of schools, teachers, children and parents</td>
<td>&gt;65%</td>
<td>40-65%</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>Training completed (teachers)</td>
<td>&gt;90%</td>
<td>70-90%</td>
<td>&lt;70%</td>
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<tr>
<td>Introductory video watched (parents)</td>
<td>&gt;50%</td>
<td>20-50%</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Child strengths activity completed</td>
<td>&gt;50%</td>
<td>20-50%</td>
<td>&lt;20%</td>
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<tr>
<td>Adherence to dDRC</td>
<td>&gt;70%</td>
<td>50-70%</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Teacher-completed measures</td>
<td>&gt;70%</td>
<td>50-70%</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Parent-completed measures</td>
<td>&gt;50%</td>
<td>20-50%</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Child-completed measures</td>
<td>&gt;70%</td>
<td>50-70%</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>Observational measures</td>
<td>&gt;50%</td>
<td>20-50%</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Attendance at toolkit-related meetings</td>
<td>&gt;75%</td>
<td>40-75%</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>% of occasions toolkit reportedly used as instructed</td>
<td>&gt;75%</td>
<td>50-75%</td>
<td>&lt;50%</td>
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<tr>
<td>Follow-up measures completed</td>
<td>&gt;50%</td>
<td>20-50%</td>
<td>N/A</td>
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</tbody>
</table>
Outputs and dissemination

Phase 1
i) evidence synthesis of intervention-outcome pathways
ii) development of the intervention, intervention mapping

Phase 2
i) ADHD toolkit and manual
ii) Case-control study findings
iii) Iterative development during case-control study

Collaborative partners to aid dissemination
ADHD foundation, Association for Child and Adolescent Mental Health, Exeter consortium, Dartmoor and Devon teaching alliances Devon 0-25 team, Babcock LDP.
References