

Action 3:30R: A cluster randomised feasibility study of a revised teaching assistant-led extracurricular physical activity intervention for 8-10 year olds

Russell Jago ^{1,4*}

Byron Tibbitts ¹

Alice Porter ¹

Emily Sanderson ²

Emma Bird ³

Jane E Powell ³

Chris Metcalfe ²

Simon J Sebire ¹

¹Centre for Exercise, Nutrition & Health Sciences, School for Policy Studies, University of Bristol, Bristol, UK.

²Bristol Randomised Trials Collaboration, Bristol Trials Centre, University of Bristol, Bristol, UK.

³Centre for Public Health & Wellbeing, University of the West of England, Bristol, UK,

⁴The National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care West (NIHR CLAHRC West) at University Hospitals Bristol NHS Foundation Trust, UK

***Corresponding author:** Russell Jago, Centre for Exercise, Nutrition & Health Sciences, School for Policy Studies, University of Bristol, 8 Priory Road, Bristol BS8 1TZ. Email: russ.jago@bristol.ac.uk. Telephone: +44 (0)117 9546603

Declared competing interests of authors: Professor Jago has been a member of the Research Funding Board for the National Institute for Health Research (NIHR) Public Health Research (PHR) board since October 2014. Professor Powell was a member of the NIHR PHR Funding Board from June 2011 to September 2015. Metcalfe is a member of CTUs funded by NIHR.

Key words: physical activity, children, teaching assistants, schools, feasibility

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Important

A 'first look' scientific summary is created from the original author-supplied summary once the normal NIHR Journals Library peer and editorial review processes are complete. The summary has undergone full peer and editorial review as documented at NIHR Journals Library website and may undergo rewrite during the publication process. The order of authors was correct at editorial sign-off stage.

A final version (which has undergone a rigorous copy-edit and proofreading) will publish as part of a fuller account of the research in a forthcoming issue of the Public Health Research journal.

Any queries about this 'first look' version of the scientific summary should be addressed to the NIHR Journals Library Editorial Office – journals.library@nihr.ac.uk

The research reported in this 'first look' scientific summary was funded by the PHR programme as project number 15/55/09. For more information visit <https://www.journalslibrary.nihr.ac.uk/programmes/phr/155509/#/>

The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The PHR editors have tried to ensure the accuracy of the authors' work and would like to thank the reviewers for their constructive comments however; they do not accept liability for damages or losses arising from material published in this scientific summary.

This 'first look' scientific summary presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the PHR programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the PHR programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Scientific summary

Background

Physical activity (PA) is positively associated with improved health, yet at least 50% of children in the UK do not meet the minimum recommendation of 60 minutes per day of moderate to vigorous physical activity (MVPA). Strategies to engage children in more PA opportunities are therefore warranted.

After-school programmes present opportunities for increasing discretionary PA, however provision is dominated by external companies delivering competitive sports which can be expensive for schools. PA declines as children age, and the decline is more pronounced in girls. Alternative options that are affordable to schools and engage the least-active children, particularly girls, are needed.

Formative piloting of the Action 3:30 intervention in schools tested a model which trained teaching assistants (TAs) to deliver an active after-school programme, underpinned by motivational theory, to children aged 9-11 years. The intervention showed promise as a scalable PA approach that increased PA levels in boys but not girls. Evaluation work concluded that more work was needed to improve attendance rates and appeal to girls and children who are less active.

Based on review of existing evidence and issues raised from the original programme, a revised Action 3:30 programme was developed, underpinned by motivational theory. The aim of this research is to test, via a feasibility study, whether the revised programme has the potential to recruit low-active children, engage the interest of girls, achieve higher attendance levels, assess the evidence of promise for an increase in PA of boys and girls, and thereby examine the evidence for progressing to a definitive trial.

Objectives

Objective 1: Optimise the intervention to increase activity in boys and girls.

Objective 2: Identify effective means of recruiting low-active children.

Objective 3: Assess intervention fidelity.

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Objective 4: Estimate the effect of allocation to the Action 3:30 intervention on weekday MVPA of participants and related physical activity behaviours.

Objective 5: Collect the information needed to assess the feasibility of conducting a definitive trial and assess the implementation potential of the Action 3:30 intervention.

Objective 6: Assess whether 5 progression criteria for conducting a definitive trial are met:

- a) 25% of schools that are approached agree to join the study.
- b) 25% of eligible Year 4/5 pupils express an interest in the study by returning consent forms.
- c) At least 40% of participants expressing an interest in the study are girls.
- d) At least 50% of the participants in the intervention arm attend 50% of the sessions.
- e) At time 1, at least a small benefit for weekday MVPA is observed for each of boys & girls, comparing intervention to control schools, and the upper bound of the 95% confidence interval exceeds 10 minutes.

Methods

Study design

The study included two components. Component A, intervention optimisation, was used to address Objective 1. Component B, (objectives 2-6), was a cluster-randomised controlled feasibility trial in primary schools to compare the Action 3:30 intervention against a usual-practice control. The trial included quantitative, qualitative, process and economic evaluations.

For component A, two primary schools were recruited and a sample Action 3:30 session was delivered by trained coaches to one class of Year 5 (aged 9-10) pupils in each school. Focus groups were held after the session with six boys and six girls separately in each school. Pupils commented on the content and teaching style of the sessions and offered potential improvements which would make the club more appealing. Findings were used to enhance the programme before delivery.

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

For component B, 12 primary schools were recruited from two local authorities (n=8 from South Gloucestershire and n=4 from North Somerset). Half of the schools recruited were above the local authority median for free school meals (an indication of socioeconomic position i.e. more deprived).

Pre-baseline

To address Objective 2 all pupils in Year 3 and 4 in the 12 recruited schools were asked, via a parental opt-out consent process, to complete the validated Physical Activity Questionnaire for Older Children (PAQ-C)

(https://www.prismsports.org/UserFiles/file/PAQ_manual_ScoringandPDF.pdf [Accessed 10th April 2017]) prior to being invited to take part in the main study when they reached Year 4 and 5 respectively. In a sub-set of four South Gloucestershire schools participants were also asked to wear an accelerometer for seven days. These data were used to compare PA levels between pupils who did and did not consent to participate in the main study.

Recruitment and measures

Prior to randomisation into intervention arms, baseline data were collected from up to 32 Year 4 and 5 pupils from each school who returned parental consent forms. Two different recruitment strategies were tested for effectiveness. Recruitment method A (standard) involved a short briefing in each class as well as detailed information sheets. Recruitment method B (enhanced) involved recruitment method A plus a 20-30-minute taster session of Action 3:30 club activities. Baseline measures included parent-reported individual and family demographics including school travel mode and after-school club participation, objectively-measured height, weight and physical activity (seven days of accelerometry), and child-reported psychosocial and health-related quality of life. Measures were repeated at follow-up during the final three weeks of the intervention in each school.

Randomisation

Schools were randomised to control (n=6) or intervention (n=6) after baseline data collection. Randomisation was stratified by local authority and recruitment method. Two teaching assistants (TAs) in each intervention school were recruited to undertake training to deliver the intervention. Two of the intervention schools were unable to provide staff to attend the intervention training and so did not deliver the intervention. Therefore, four schools were intervention schools and six were control schools.

TA training and intervention

In total, nine TAs from the four intervention schools (at least two from each school) attended a 25-hour (5-day) training programme off-site. The programme equipped TAs with the skills and resources (a comprehensive Training Guide for reference, 30 detailed session plans and access to an online video archive demonstrating 22 of the activities in the session plans) to deliver structured physical activity sessions focused on promoting children's perceptions of autonomy, relatedness and competence in relation to being physically active. Schools delivering the intervention were also given £200 to buy equipment needed for the planned sessions. Once trained, TAs delivered the Action 3:30 after-school club twice per week for 15 weeks. Sessions each lasted 60 minutes. Attendance rates in each intervention school were assessed after session 12 and spaces in each club were offered to new children.

Process Evaluation

A process evaluation using the RE-AIM framework reporting on recruitment, dose, intervention effectiveness, fidelity and adoption was conducted in the four intervention schools to address Objectives 3 and 5 using quantitative and qualitative components.

Quantitative

The number of schools approached and proportion recruited was recorded. TAs were asked to record attendance and dose (degree to which sessions were delivered as planned) of the

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

intervention in log books. Three observation visits were conducted by research team members in each intervention school to assess intervention fidelity and dose, during which researchers observed sessions, pupils completed self-report measures of enjoyment and exertion, and TAs completed surveys relating to self-efficacy and autonomy-supportive teaching style adoption. These TA measures were also conducted pre- and post-training to ascertain training fidelity and effectiveness at promoting autonomy-supportive teaching. School context was assessed in all schools using a validated school physical activity environment audit tool and questions relating to school PA policies. These data were used to examine whether differences in the social/physical environment and school policy strategies could impact delivery of the intervention.

Qualitative

Post-intervention semi-structured interviews were conducted with TAs who delivered the intervention to explore their experience of the study, training, and intervention, and to highlight potential changes to improve maintenance. Focus groups were conducted with eight boys and eight girls in each of the four intervention schools exploring recruitment motivation, attendance issues, delivery experience, enjoyment and potential improvements. Key contacts from intervention schools were interviewed to explore wider attitudes to the programme, school burden and potential sustainability, improvements and potential contamination from TAs moving between schools or sharing expertise with control schools. Finally, eight external stakeholders including regional public health leads, school sport coordinators and directors of public health non-profit organisations were interviewed about the sustainability, commissioning potential and dissemination considerations for programmes such as Action 3:30.

Analysis

Qualitative

The Framework Method was used to analyse qualitative data since it produces a matrix of data from different participant groups and allows for constant comparison. Researchers identified

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

themes for exploration in each participant group inductively and deductively. Themes were triangulated across groups to explore convergent and divergent perspectives. Findings were reported in line with COREQ guidelines.

Quantitative

Summary statistics were presented comparing control and intervention arms at baseline and follow-up on demographics, psychosocial and accelerometer variables, including MVPA. Where distribution of the outcomes was approximately normal, mean values and standard deviations were presented. For binary/categorical variables, a number and percentage were presented. As this was a feasibility trial, the primary and secondary outcomes were reported using basic statistics to describe the recruitment, attendance, accelerometer and questionnaire data.

Economic evaluation

An analysis to estimate the cost-effectiveness and cost-utility of the Action 3:30 intervention compared with no active intervention over the 1-year period of the feasibility study was conducted. Resource use and actual costs incurred by TAs was assessed by checklist. Prices were drawn from time sheet data and from published, established sources. Costs were categorised according to stage of programme delivery and were stratified by school as follows: one-off training resources; recurrent programme preparation resources; and recurrent programme delivery resources.

To estimate the potential cost-effectiveness of Action 3:30 compared with no active intervention, objectively-measured follow-up MVPA for intervention and control arms and data collected on Action 3:30-related resources and costs were examined. To assess the potential for change in health-related quality of life due to participating in Action 3:30 pupils were asked to complete two validated measures at baseline and follow-up: KIDSCREEN-10 (<https://www.kidscreen.org/english/questionnaires/kidscreen-10-index/> [Accessed 10th April 2017]) and Child Health Utility Instrument (CHU9D) (https://www.sheffield.ac.uk/polopoly_fs/1.441111!/file/Health-Questionnaire-final-

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

[watermarked.pdf](#) [Accessed 10th April 2017]). To compare Action 3:30 delivery costs with existing extra-curricular club provision at participating schools, key contacts at each participating school were asked to complete a retrospective survey at baseline and follow-up providing a description of each existing after-school club, including club duration and cost to the school and parents/guardians.

Results

The primary goals were to assess the feasibility of conducting a cluster randomised controlled trial of the Action 3:30 project and assess the efficacy for increasing physical activity in boys and girls.

Recruitment and attendance

Interest in the project was high, with 44% of schools approached agreeing to join the project and 43% of eligible pupils expressing an interest in the study by returning consent forms (n=459). The program appealed to boys and girls; 50% of consenting pupils were girls (n=228), and more than 70% of pupils (70% of girls and 74% of boys) attended at least half of the club sessions. Progression criteria a-d were therefore met. Furthermore, only 60% of control pupils and 62% of intervention pupils met the current PA guidelines at baseline, indicating that a range of pupils across the PA spectrum were recruited.

Physical activity outcomes

There was no evidence for a difference in weekday MVPA minutes between intervention and control at follow-up (-0.5, 95%CI -4.57, 3.57). Likewise, the proportion of pupils meeting the 60 mins MVPA per weekday guidelines was similar between arms overall and among boys and girls separately. There was no difference in any accelerometer-derived measures of PA between arms at follow-up. Therefore, progression criterion e) was not met.

Secondary outcomes

No psychosocial outcomes showed any notable difference between control and intervention. Number of active travel days from school and number of after-school clubs attended (excluding Action 3:30) was slightly lower in the intervention group versus control (1.94 vs 2.35 and 1.44 vs 1.70 respectively).

Process evaluation

The RE-AIM framework provided an appropriate and comprehensive structure for the process evaluation. Quantitative and qualitative data indicated that once schools were signed up to the study, TAs were willing to be delivery agents and that Action 3:30 was successful in reaching a variety of children, including girls and those who were less active. Barriers to adoption at the school level included congested after-school programmes and the cost related to releasing TAs for training. The training programme for TAs was valued as professional development, which aligns with many school priorities. Intervention adherence was consistent across schools and acceptable. The training was deemed comprehensive and supported high adherence to content. The overall fidelity of implementation of Action 3:30 core principles was high despite different TA experiences. One school decided to continue running Action 3:30 –and other intervention schools expressed an interest in doing so, giving evidence of maintenance. Stakeholders suggested that comparable delivery costs to existing provision, funding for delivery and equipment, continued TA training, a flexible number of weekly sessions, and ability to evolve content to keep low-active children engaged were key to maintenance. The results suggested that Action 3:30 may have replaced existing after-school provision rather than adding to it, which may partly explain why no increase in MVPA was observed.

Economic evaluation

As Action 3:30 was not shown to be effective at increasing MVPA there was no basis for creating a cost-effectiveness ratio. Health-related quality of life measures did not differ between intervention and control arms at baseline or follow-up. Findings indicated that Action

© Queen's Printer and Controller of HMSO 2019. This work was produced by Jago *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This 'first look' scientific summary may be freely reproduced for the purposes of private research and study and extracts may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

3:30 is inexpensive, (mainstream cost after one year of £1.64 per pupil per session), compared with the average school-level costs of existing extra-curricular PA (£5.91 per pupil per session). As such, Action 3:30 may provide a more economically viable option for schools than existing school provision.

Conclusions

A TA-led after-school PA programme is feasible to implement within primary schools. The study was able to recruit a range of pupils, including girls and less active children. Attendance levels were high for boys and girls and maintained throughout the study, and intervention fidelity was high. No effect was observed in any of the primary or secondary accelerometer-derived outcomes when comparing intervention versus control participants. Process data implied that participants attending Action 3:30 sessions were swapping PA from other contexts instead of adding PA where none existed before. However, the economic evaluation revealed that Action 3:30 is inexpensive to deliver compared with existing provision and so could be a financially viable program for primary schools to deliver, which would engage a range of pupils in PA and up-skill core staff simultaneously.

Funding details

Funding was provided by the National Institute for Health Research Public Health Research (NIHR-PHR) Programme.

ISRCTN:34001941